DECLARATION

I, Mr. R. Lalbiakmawia, hereby declare that the subject matter of this dissertation entitled, **"Webometric Analysis of Indian Institutes of Management (IIMs) Website: A study"** is the record of the work done by me, the content of this dissertation did not form the basis of the award of any previous degree to me, or to do the best of my knowledge to anybody else, and that the dissertation has not been submitted by me for any research degree in any other University/ Institutes.

This is being submitted to the Mizoram University for the degree of Master of Philosophy in the Department of Library and Information Science.

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(Supervisor)   (Head)

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CERTIFICATE

This is to certify that the dissertation entitled **"WEBOMETRIC ANALYSIS OF INDIAN INSTITUTES OF MANAGEMENT (IIMs) WEBSITE: A STUDY"** submitted by R. Lalbiakmawia for the award of the degree of Master of Philosophy in Library and Information Science is carried out under my guidance and incorporates the student's bonafide research. This is the candidate's original work and is worthy of examination.

Date: **(Dr. Manoj Kumar Verma)**
                                                                          Supervisor

Place: Aizawl, Mizoram

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Date: **(R. LALBIAKMAWIA)**

Place: Aizawl, Mizoram

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List of Abbreviations

Term	Description
ccTLD	Country Code Top Level Domain
FTP	File Transfer Protocol
gTLD	Generic Top Level Domain
HTML	Hyper Text Markup Language
HTTP	Hyper Text Transfer Protocol
ICT	Information and Communication Technology
IDNA	Internationalizing Domain Names of Applications
IIMs	Indian Institutes of Management
IP	Internet Protocol
ISI	Institute for Scientific Information
ISO	International Organization for Standardization
JIF	Journal Impact Factor
LIS	Library and Information Science
MZU	Mizoram University
NEHU	North-Eastern Hill University
PGDCM	Post Graduate Diploma in Computer aided Management
RAE	Research Assessment Exercise
RWIF	Revised Web Impact Factor
SAU	State Agricultural Universities
SLD	Second- Level Domain
TLD	Top Level Domain
UK	United Kingdom
URI	Uniform Resource Identifier
URL	Uniform Resource Location
US	United State
WIF	Web Impact Factor
WISER	Web Indicators for Science, Technology and Innovation Research
WWW	World Wide Web
XML	Extensible Markup Language

1.1 INTRODUCTION

The internet and websites became one of the most popular communication tools to the world in the age of Information and Communication Technology (ICT). The World Wide Web (www) which is the most popular part of the Internet is the result of the project initiated by CERN High Energy Physics Lab in Switzerland in 1990 for allowing the researchers to share information with each other. The internet has made it available to individuals all the information globally at just one click. So, there is an extreme need for developing and updating the websites. The development of technology has made a tremendous change in every sphere of life. So, there is always a need of developing the libraries to cope up with the pace of time. In the present era, people prefer browsing websites and collecting all the necessary information at one time rather than visiting physically, which is yet time saving too. Henceforth, the responsibility of website developer has become more important in updating the correct data so that it could reach in every nook and corner of the world. The World Wide Web (WWW) is a system of interlinked hypertext documents accessed via the Internet. With a web browser, one can view web pages that may contain text, images, videos and other multimedia, and navigate between them via hyperlinks (Wikipedia). It is a system of Internet servers that support specially formatted documents. The documents are formatted in a markup language called HTML (Hyper Text Markup Language) that supports links to other documents, as well as graphics, audio, and video files. This means one can jump from one document to another simply by clicking on hot spots.

The growing demand for education, fundamental changes in higher education in India, and enhancing value system needs the creative coordination of world universities on the basis of a constant exchange of experiences among them. The easiest and the effective way to operational exchange of information is publication on the website. Enhancing a web policy expands the dialogue between the universities, contributes to the formation of new communications in the scientific community, and helps in realization of innovative development. Thus, it sheds some light on the use of key communication medium and may lead to more effective academic use of the web. "The World Wide Web (WWW) has now become one of the main sources of information on academic and research activities, and therefore, it is an excellent platform to test new methods of evaluating webometric activities" (Babu, Jeyshankar and Rao, 2010).

Web resources are apple of information professional's eye due to its value added services to meet their current and diversified information needs. In the WWW, the web pages are the entities of

information, with hyperlinks from them acting as citations. Quantitative analysis on the WWW is being carried out in the same way, as is tradition in citation databases. As information on Web increases towards entropy, it is needed to apply some theory/ metrics (measurement) to develop new methods, modeling techniques and metaphors to examine this emerging complex network. Through webometric study one can observe that how users actually react and use specific web document. The web is beyond control in growth, which means opportunities exist where good system architecture and diligent analysis can be applied for everyone's benefit. On the basis of the study and conception, the definition of webometric is given, "the webometric study is based on quantitative measurement – indirectly includes the qualitative aspect also of structure, use of information resources and technologies on WWW drawing on bibliometric and info metric approach" (Goswami, 2007).

Webometrics covers research of all networking activities based on informatics and other quantitative measures. It is evident that informatics methods using word counts and similar techniques can be applied to the WWW. The WebPages are the entities of information with hyperlinks from them acting as citations. When applying the informatics methodologies to the internet, Search engine plays important role i.e., if the search engine is weak and affected by commercial interests, then searching for the perfect algorithm; matching the perfect user's perfectly well defined need of information (Fugl,2001).

1.2   WORLD WIDE WEB

The World Wide Web or simply the web is a reflection of human culture, a massive socio cultural network of web resources authored by millions of people and organizations around the world. Today, the web is one of the main sources of information and the major showcase for everyone (institutions, business enterprises, individuals, etc.) who wants to be recognized on in the 'real world' (Aguillo, Ortega, and Fernandez, 2008). It is simply a collection of linked documents stored on millions of computers and spread over the information superhighway. The web allows a user-friendly way to search for information on the internet

The World Wide Web (WWW) was created in 1990 by CERN physicist Tim Berners Lee. The term 'World Wide Web' comes from the notion that individual nodes of information are linked with hypertexts and this creates a 'web' of information. 'World Wide' signifies that www browsers speak not one, but multiple protocols and retrieve information from distant machines

around the globe over the internet. The documents on the web are generally written in HTML (Hypertext Markup Language) that defines their appearance and layout, and create the links to other documents. These links appear in text as underlined word or phrase, usually colored in blue called hypertext link or hyperlink. These hyperlinks when attached to images or any other kinds of media are called hypermedia. The most important thing about the web is that it includes an easy-to-use standard interface. It is a global, seamless environment in which all information (text, images, audio, video services) that is accessible from the internet (Wikipedia).

The World Wide Web (WWW) is a way of exchanging Information between computers on the Internet and it is the network of pages of images, texts and sounds on the Internet which can be viewing using browser software.

1.2.1 Component of the Web

The components of the World Wide Web are divided into two parts. There are:-

1. Structural Components:-

a) Clients/Browsers:

A web browser (commonly referred to as a **browser**) is a software application for retrieving, presenting, and traversing information resources on the World Wide Web. An *information resource* is identified by a Uniform Resource Identifier (URI/URL) and may be a web page, image, video or other piece of content. Hyperlinks present in resources enable users easily to navigate their browsers to related resources.

Although browsers are primarily intended to use the World Wide Web, they can also be used to access information provided by web servers in private networks or files in file systems. The major web browsers are Firefox, Google Chrome, Internet Explorer/Microsoft Edge, Opera, and Safari.

b) Servers – run on sophisticated hardware:

Servers are computers that deliver (*serves up*) Web pages. Every Web server has an IP address and possibly a domain name. For example- if you enter the URL*http://www.webopedia.com/index.html* in your browser, It sends a request to the Web server whose domain name is *webopedia.com*. The server then fetches the page named *index.html* and sends it to your browser.

Any computer can be turned into a Web server by installing server software and connecting the machine to the Internet. There are many Web server software applications, including public domain software and commercial packages.

c) Caches – many interesting implementations:

Cache is a hardware or software component that stores data so future requests for that data can be served faster; the data stored in a cache might be the result of an earlier computation, or the duplicate of data stored elsewhere. A *cache hit* occurs when the requested data can be found in a cache, while a *cache miss* occurs when it cannot. Cache hits are served by reading data from the cache, which is faster than re computing a result or reading from a slower data store; thus, the more requests can be served from the cache, the faster the system performs.

d) Internet:

The Interne**t** is the global system of interconnected computer networks that use the Internet protocol suite (TCP/IP) to link devices worldwide. It is a *network of networks* that consists of private, public, academic, business, and government networks of local to global scope, linked by a broad array of electronic, wireless, and optical networking technologies. The Internet carries an extensive range of information resources and services, such as the inter-linked hypertext documents and applications of the World Wide Web (WWW), electronic mail, telephony, and peer-to-peer networks for file sharing.

2) Semantic Components

a) Hyper Text Transfer Protocol (HTTP)

HTTP is short for *Hyper Text Transfer Protocol. H*TTP is the underlying protocol used by the World Wide Web and this protocol defines how messages are formatted and transmitted, and what actions Web servers and browsers should take in response to various commands.
For example, when you enter a URL in your browser, this actually sends an HTTP command to the Web server directing it to fetch and transmit the requested Web page. The other main standard that controls how the World Wide Web works is HTML, which covers how Web pages are formatted and displayed.

b) Hyper Text Markup Language (HTML)

Hyper Text Markup Language, the authoring language used to create documents on the World Wide Web. HTML is similar to SGML, although it is not a strict subset.

HTML defines the structure and layout of a Web document by using a variety of tags and attributes. The correct structure for an HTML document starts with **<HTML>**

<HEAD> (enter here what document is about) **<BODY>** and ends with **</BODY> </HTML>**. All the information you'd like to include in your Web page fits in between the **<BODY>** and **</BODY>** tags.

c) Uniform Resource Identifiers (URL)

Uniform Resource Identifier (URI) is a string of characters used to identify a resource. Such identification enables interaction with representations of the resource over a network, typically the World Wide Web, using specific protocols. Schemes specifying a concrete syntax and associated protocols define each URI. The most common form of URI is the Uniform Resource Locator (URL), frequently referred to informally as a *web address.* More rarely seen in usage is the Uniform Resource Name (URN), which was designed to complement URLs by providing a mechanism for the identification of resources in particular namespaces.
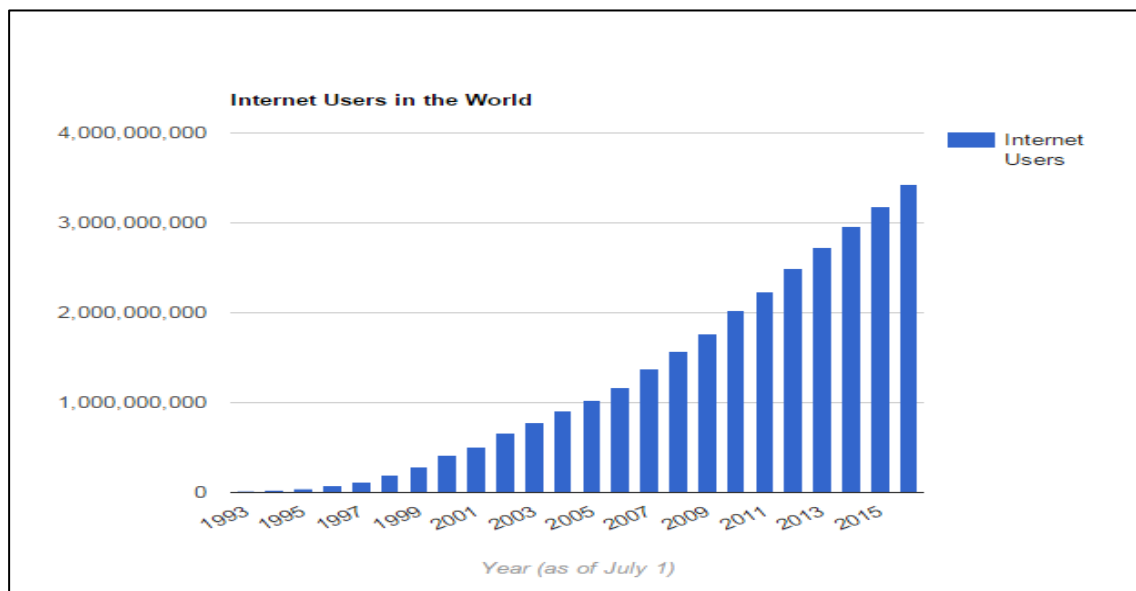
Figure 1: Internet Users in the World till 2015 as on July, 2016
(Source: http://www.internetlivestats.com/internet-users/)

1.3 WEBOMETRICS

Webometrics is a scientific discipline that studies the quantitative aspects of information sources and their use. In other words, **webometrics** try to measure the World Wide Web, analyses technology usage and allows us a simple content analysis.

The science of webometrics (also cybermetrics) tries to measure the World Wide Web to get knowledge about the number and types of hyperlinks, structure of the World Wide Web and

usage patterns. According to Bjornborn and Ingwersen (2004), the definitoion of webometrics is "the study of the quantitative aspects of the construction and use of information resources, structures and technologies on the Web drawing on bibliometric and informetric approaches". The Tern webometrics was first coined by Almind and Ingwersen (1997). A second definition of webometrics has also been introduced, "the study of web-based content with primarily quantitative methods for social science research goals using techniques that are not specific to one fields of study" (Thelwall,2009), which emphasizes the development of applied methods for use in the wider social sciences. The purpose of this alternative definition was to help publicize appropriate methods outside of the information science discipline rather than to replace the original definition within information science.. The Webometrics concentrates on the Construction and Usage sides of the Web which mainly cover four areas namely:

a) Web page content analysis
b) Web link structure analysis (e.g. hyperlink, self link and external link)
c) Web usage analysis (e.g. exploiting log files for users searching and browsing behavior)
d) Web technology analysis (including search engine performance)

Web page content analysis is a kind of subject analysis based on the content of the website. Web link structure is an analysis that provides links to other web page/ sites. Web usage analysis is an analysis performed on the record of user accesses to the application pages, collected in a Web server log. Web technology analysis refers to an information systems evaluation including engine performance.

1.4   SIGNIFICANT OF THE STUDY

The Webometrics is a very important segment in the field of library and information science through which analysis of websites has been conducted by many information professionals..In the present digital era, web became the master source of information and plays an important role in its dissemination because people became more webs centric to find their information. They want all the information should be at their fingertips at anytime from anywhere and any pattern. It means the information must be available in the web domain so that users can access it in 24X7 modes. Therefore, all the institutes has designed and developed their website to provide information through web. It initiates the research in the area of web analysis, which developed conceptually

from Bibliometrics. There are number of studies on Webometrics which have been conducted in India as well as over the globe to analyze institute websites but no detail study has been conducted to analyze the websites of apex management institutions of India. In the case of IIM's websites, few webometric studies have been conducted. So, the study is an attempt to fill up the gap. Therefore, through this study the scholar will try to investigate the effectiveness IIMs websites by analyzing the URL analysis, calculating web impact factor (WIF), link pattern and search engine's performance. Find out the Domain Authority of IIM's websites and Find out the Internal and External Link page of IIM's Websites. Examine the link-equity in IIM's websites and indentify the individualized Domain of each IIM's websites. Thus, present study will help to show the current status of websites by webomeric analysis.

1.5 SCOPE OF THE STUDY

The present study is confined to websites of Indian Institutes of Management (IIMs). IIMs are the apex educational institutions for imparting education and research in Management. Presently there are nineteen (19) IIMs in the country which are registered as societies under the Indian Societies Registration Act. The lists of sixteen (19) Indian Institutes of Management (IlM's) are given in the table 1.The findings of the study may helpful to webmasters in redesigning their institute website to a more interactive and informative way.

1.6 MEASUREMENT OF THE WEB

The most popular types of measurement of web is search engine performance, recall and precision of search engines, search engine query analysis, indexing of search engine databases, behavior of search engines, websites usage analysis, website content analysis, URL analysis, depth of the web, quantitative analysis of web documents. The web is measured to check the effectiveness of various services provided over it. (Shukla &Tripathi 2015)

1.6.1 Web Impact Factor (WIF)

According to Shukla and Tripathi (2015) "Web Impact Factor (WIF) are the number of outside web pages linking to a website which is divided by the number of web pages in that very website at a time".

That means, the numerator is the number of link pages made to a website and the denominator is a measure of the size of that very website. This very idea was adopted from the Journal Impact

Factor (JIF), originally proposed by Eugene Garfield in 1972. The WIF is extemporaneous result of search engines' database at a specific time. It provides quantitative tools for ranking, evaluating, categorizing, and comparing websites, top-level domains and sub-domains.

There are three kinds of Web Impact Factors (WIF)based on three types of links found i.e. *inlinks, outlinks,* and *self-links.* Links coming into a site from another site is *inlinks* (also known as *backlinks),* links outgoing from a site to another site is *outlinks,* and links coming from the same site is *self-links.* The *self-links* are made for navigational purposes only. (Shukla and Tripathi 2015)

The Web Impact Factor (WIF) based on links properties are:

    a) Overall WIF: It is calculated by the total number of combining *inlinks* pages and *self-links* pages;

    b) Inlink (Revised) WIF: It is calculated by the total number of *inlinks* pages coming from outside;

    c) Self-link WIF: It is calculated by the total number of *self-link* pages of the website.

Calculation of Web Impact Factor (WIF):

The web impact factor (WIF) can be calculated by using the Showing formula given by Ingwersen (1998) where:

        A =   total links to a website (all *inlinks* and *self-links* pages)

        B =   *inlinks* to the website (subset of A)

        C =   *self-links* within the same website

        D =   total number of web pages present in the website at a time.

  A.   **Calculation for Overall WIF**

      A = total links to a website (all inlinks and self-links pages)
      _____
      D= total number of web pages present in the website at a time

      Overall WIF= A/D

B. Calculation for Inlink (Revised) WIF:

B= Inlinks to the website
_____
D=total number of web pages present in the website at a time

Revised WIF = B/D

C. Calculation for Self-link WIF

C= Self-links within the same website
_____
D= total number of web pages present in the website at a time

Self-link WIF = C/D

1.6.2 URL Analysis:

URL analysis is the study of analyzing the structure and properties of URLs embedded in interlinks web pages (i.e. incoming links or outgoing links), between one website / domain to another **website** / domain or in any single website. Thus we can understand URL analysis is the study of characteristics and behaviour of web pages address of websites. The URL analysis includes study of top level domains (TLD), country code TLDs (ccTLD), generic TLDs (gTLD), sites / domains, sub-sites / sub-domains, file types of web pages, structure of URLs etc. (Shukla & Vanlalfeli, 2014).

1.6.3. Web Citation Analysis

The term web citation describes the number of web links that any online article or online journal has received during a given time. Search engines Google, Yahoo, AltaVista, All the Web etc. are used in the web link analysis. However, Google Scholar (Mukherjee, 2007) is used in extraction of web citation from scholarly resources. As mentioned in Google Scholar's Support for Scholarly Publishers website "Google and Google Scholar have boosted the worldwide visibility and accessibility of content. Work with publishers of scholarly information to index peer-

reviewed papers, theses, preprints, abstracts, and technical reports from all disciplines of research and make them searchable on Google and Google Scholar" (Mukherjee, 2007 and Shukla & Tripathi,2015).

1.6.4 Web Content Analysis:

Content analysis is considered as a scholarly methodology in the humanities by which texts are studied as to authorship, authenticity, and their meaning. Thus content analysis of web documents is known as web content analysis which is now prevalent in the area of web to check the authenticity and quality of information available over the Internet. Recall and precision efficiency of search engines is also one aspect of web content analysis.(Shukla&Tripathi2015).

1.7 INDIAN INSTITUTES OF MANAGEMENT (IIMS)

The **Indian Institutes of Management** (**IIMs**) is a group of public, autonomous institutes of management educationand research in India. Presently there are nineteen (19) IIMs in the country as listed in MHRD website (http://mhrd.gov.in/iims) and situated in different part of the country.

Table-1: List of Indian Institutes of Management (IIMs)*(Source: (https://en.wikipedia.org/wiki/Indian_Institutes_of_Management)*

Sl.No	Name of Institution	Year of Established	Location
1	Indian Institute of Management Calcutta	1961	Kolkata, West Bengal
2	Indian Institute of Management Ahmedabad	1961	Ahmedabad, Gujarat
3	Indian Institute of Management Bangalore	1973	Bangalore, Karnataka
4	Indian Institute of Management Lucknow	1984	Lucknow,Uttar Pradesh
5	Indian Institute of Management Kozhikode	1996	Kozhikode,Kerala
6	Indian Institute of Management Indore	1996	Indore,Madhya Pradesh
7	Indian Institute of Management Shillong	2007	Shillong, Meghalaya
8	Indian Institute of Management Rohtak	2010	Rohtak, Haryana
9	Indian Institute of Management Ranchi	2010	Ranchi,Jharkhand
10	Indian Institute of Management Raipur	2010	Raipur,Chhattisgarh
11	Indian Institute of Management Trichy	2011	Trichy, Tamil Nadu
12	Indian Institute of Management Udaipur	2011	Udaipur,Rajasthan

13	Indian Institute of Management Kashipur	2011	Kashipur,Uttarakhand
14	Indian Institute of Management Nagpur	2015	Nagpur,Maharashtra
15	Indian Institute of Management Bodh Gaya	2015	Bodh Gaya,Bihar
16	Indian Institute of Management Visakhapatnam	2015	Visakhapatnam,Andhra Pradesh
17	Indian Institute of Management Amritsar	2015	Amritsar,Punjab
18	Indian Institute of Management, Sambalpur	2015	Sambalpur, Odisha
19	Indian Institute of Management, Sirmaur	2015	Sirmaur district, Himachal Pradesh

IIMs are registered as societies under the Indian Societies Registration Act. Each IIM is autonomous and exercises independent control over its day-to-day operations. However, the administration of all IIMs and the overall strategy of IIMs is overseen by the IIM council. The IIM Council is headed by India's Minister of Human Resource Development and consists of the chairpersons and directors of all IIMs and senior officials from the Ministry of Human Resource Development of the Government of India. Business schools are colleges or institutes, which are conducting courses on business administration and management. These are either autonomous or would have affiliated to a university. The prominence of a business school is purely based on the quality of education, faculty, campus placement facility etc. The top business schools in the country such as IIMs and ISB are always making headlines with campus placement and salary offers. This clearly shows that importance of excellence in education and faculty of business schools. In beginning, the numbers of IIMs are very less but with the time many IIMs was established. Table-2 shows that the decade wise development of IIMs and from it clears that maximum IIMs was established during 2011-2016.

Table-2: IIMs with the year of Establishment as on 2016

Sl.No	Year of Establishment	No. of IIMs
1	Between 1961-1970	2
2	Between 1971-1980	1
3	Between 1981-1990	1
4	Between 1991-2000	2
5	Between 2001-2010	4
6	Between 2011-2016	9

Indian Institute of Management Calcutta was the first IIM to be set up, on 13 November 1961. Its main campus is located in Joka, in the outskirts of the city of Calcutta.[13] In addition to the regular PGDM programme, it offers a second two-year full-time postgraduate programme called the Post Graduate Diploma in Computer aided Management (PGDCM). As a member of Global Alliance in Management Education (CEMS), it offers the CEMS Master's in International Management (CEMS MIM) degree to its PGDM and PGDCM students. It also offers a specialized one-year postgraduate programme for executives in the manufacturing sector.[14] IIM-C is the only IIM (and the only business school in India) which is triple accredited: its programmes are accredited by AACSB, AMBA and EQUIS.

Indian Institute of Management Ahmedabad was the second IIM to be set up, on 16 December 1961. In addition to the regular PGDM programme, it offers a two-year postgraduate programme in Agri-Business Management. It also offers a one-year postgraduate programme in General Management PGPX, which ranks 24th in the world, and also in Public Management and Policy.

Indian Institute of Management Bangalore, the third IIM to be established, was set up in 1973. Its main campus is located in Bilekahalli, Bangalore. Apart from its flagship full-time two-year PGP programme, it offers programmes in Enterprise Management (PGPEM), one year full-time EPGP and Public Policy Management (PGPPM).

Indian Institute of Management Lucknow is the fourth IIM to be established, in 1984.[12] In addition to its primary campus in Lucknow, it has an additional campus in Noida. The campus was established in 2007 and focuses on executive programmes. Like IIM Ahmedabad, IIM Lucknow offers a programme in Agribusiness Management.

Indian Institute of Management Kozhikode, the fifth IIM, was established in 1996 and started its first batch of students in 1997. IIM Kozhikode was the first institute in Asia to offer a distance learning programme in management for working executives.

Indian Institute of Management Indore, the sixth IIM, was established in 1996. Its 193 acres (78 ha) campus is located on at Rau, near Indore. IIM Indore offers a unique course for armed forces officers, designed particularly for mid-level defense officers. It has additional campuses in Mumbai and UAE. It offers a unique 5-year program IPM, and it is the only IIM to offer this course. The participants can directly take admission into this course after Class XII.

Indian Institute of Management Shillong, also known as Rajiv Gandhi Indian Institute of Management, was the seventh IIM established, following a 2005 decision by the Government of India. The foundation stone of the institute was laid on 1 December 2007 and started its academic session from 2008–'09.

Indian Institute of Management Rohtak, the eighth IIM to be inaugurated, was the first of the six IIMs established in 2010–2011 as part of the Eleventh Five-Year Plan. It was inaugurated and started operation on 30 June 2010 with IIM Lucknow as mentor, from a temporary campus at Maharishi Dayanand University.

Indian Institute of Management Ranchi, the ninth IIM to be established in 2010 with IIM Calcutta as its mentor, started operations on 6 July 2010.It offers a specialized programme in Human resource management called Post Graduate Diploma in Human Resource Management (PGDHRM).

Indian Institute of Management Raipur, the tenth IIM, was inaugurated on 11 October 2010. It was mentored by IIM Indore. It currently operates at the Government Engineering College (GEC), Sejbahar. Construction of the permanent campus has started on August 2011.

Indian Institute of Management Tiruchirappalli, the eleventh IIM, was inaugurated on 4 January 2011. It was mentored by IIM Bangalore and operates temporarily from the campus of National Institute of Technology, Trichy. It would be shifting to its permanent campus spread across 175 acres in January 2017. It also has its campus in Chennai which offers program in Business Management for executives.

Indian Institute of Management Kashipur, the twelfth IIM, started operation in July 2011, under the mentorship of IIM Lucknow. The foundation stone for the permanent campus in the Escorts Farm Area of Kashipur, Uttarakhand, was laid in April 2011. The Second year Students

have moved to its permanent campus while the first year operates from a temporary campus located at GannaSansthan in Kashipur.

Indian Institute of Management Udaipur, the thirteenth IIM, started operation in July 2011 from a temporary campus at the MohanlalSukhadia University. Initially proposed to be slated under the mentorship of IIM Indore, the institute is the first new IIM working autonomously since its inception in 2011. Construction of the permanent campus has begun, and the first phase would be complete by April 2016.

Indian Institute of Management Nagpur, the fourteenth IIM, commenced operations in 2015 under the mentorship of IIM Ahmedabad. The institute is operating out of a temporary campus VNIT, with its own permanent campus under development and expected to be ready in 3–4 years. The institute is among a handful of premier management institutes in the country that offer elective subjects to students from first year of the course itself. The 'field immersion' module of IIM Nagpur gives exposure of live organizations to the students and the opportunity to apply the concepts learnt in classroom in real world conditions. Some of the field immersion partner firms are Commissionerate (Nagpur), MGNREGA (Maharashtra), Maharashtra State Skill Development Society (MSSDS), Spacewood, Plasto, Amul, NEERI etc.

Indian Institute of Management Visakhapatnam, the fifteenth IIM, commenced operations in 2015 under the mentorship of IIM Bangalore. The institute is operating out of a temporary campus from Andhra Bank School of Business Building in Andhra University campus, with its own 300 acre permanent campus under development at Gambheeram and is expected to be ready in 3 years. The students in IIM Visakhapatnam follow the PGP curriculum of IIM Bangalore and will be taught by the faculty members of IIM-B. The institute achieved 100% summer placement in its first year. Ranked 1st among the IIMs started in 2015.

Indian Institute of Management Bodh Gaya the sixteenth IIM which is located in the sprawling campus of Magadh University (Bodh Gaya). Till its 118-acre permanent campus comes up, IIM Bodh Gaya will operate from the state-of-the art Institute of Distance Education building of the Magadh University. The newly constructed boys and girls hostel are already in place. IIM Bodh Gaya is being mentored by the IIM Calcutta (the oldest IIM in the country). In effect, students in IIM Bodh Gaya follow the PGP curriculum of IIM Calcutta and will be taught by the faculty members of IIMC. They partake of the academic rigor for which IIMC is known for. In all other respects, IIM Calcutta assists IIM Bodh Gaya.

Indian Institute of Management Amritsar is temporarily located in the campus of Government Polytechnic College, till its own 60 acre permanent campus comes up at Manawala on Amritsar-Jalandhar GT Road. IIM Amritsar is being mentored by the IIM Kozhikode, is the seventeenth IIM.

Indian Institute of Management Sambalpur the eighteenth IIM is temporarily located in the campus of Silicon Institute of Technology, Sason. Its own 200 acre permanent campus coming up at Basantpur. IIM Sambalpur is being mentored by the IIM Indore.

Indian Institute of Management Sirmaur started operation in 2015. It is being mentored by IIM Lucknow. It is temporarily located in the campus of Himachal Institute of Technology, in Paonta Sahib its own 200 Acre permanent comes up at Dhaulakuan.

Table-3: List of IIMs with Code Name and Websites Address as on 01.12.2016

Sl.No	Name of Institution	Code Name	Websites
1	Indian Institute of Management Ahmedabad	IIMA	www.iimahd.ernet.in
2	Indian Institute of Management Amritsar	IIMAMT	iimamritsar.ac.in
3	Indian Institute of Management Bangalore	IIMB	www.iimb.ernet.in
4	Indian Institute of Management Bodh Gaya	IIMBG	www.iimbg.ac.in
5	Indian Institute of Management Calcutta	IIMC	www.iimcal.ac.in
6	Indian Institute of Management Indore	IIMI	www.iimidr.ac.in
7	Indian Institute of Management Kashipur	IIMKSP	www.iimkashipur.ac.in
8	Indian Institute of Management Kozhikode	IIMK	www.iimk.ac.in
9	Indian Institute of Management Lucknow	IIML	www.iiml.ac.in
10	Indian Institute of Management Nagpur	IIMN	iimnagpur.ac.in
11	Indian Institute of Management Raipur	IIMRP	www.iimraipur.ac.in
12	Indian Institute of Management Ranchi	IIMRNCH	www.iimranchi.ac.in
13	Indian Institute of Management Rohtak	IIM-RTK	www.iimrohtak.ac.in
14	Indian Institute of Management Shillong	IIMS	www.iimshillong.in
15	Indian Institute of Management Trichy	IIMT	www.iimtrichy.ac.in
16	Indian Institute of Management Udaipur	IIMU	iimu.ac.in
17	Indian Institute of Management Visakhapatnam	IIMV	www.iimv.ac.in
18	Indian Institute of Management, Sambalpur	IIMSMBL	www.iimsambalpur.ac.in
19	Indian Institute of Management, Sirmaur	IIMSMR	www.iiml.ac.in/iimsirmaur

1.8 OBJECTIVES OF THE STUDY

The present study is undertaken to have an in-depth study of webometric study of Indian Institutes of Management (IIMs) website with following objectives to:

❖ Analyze URL of IIMs websites under study.

❖ Evaluate the search engine performance for Webometric studies.

❖ Find out the Domain Authority, Page Authority and Individual domains of IIMs website.

❖ Find out the Internal, External Link Pages and link equity of IIMs Websites.

❖ Calculate the web impact factor (WIF) of IIMs website and rank them as per WIF.

1.9 RESEARCH METHODOLOGY

The present study is on Webometrics analysis of the IIMs websites by calculating web impact factor of respective websites and evaluates the performance of search engine through webometrics study. The primary data will be collected from selected institutes' website by survey and observation methods by the respective institute website(as mention in table-3). There are established criteria for Webometrics analysis of websites i.e. how to collect URLs, data collection tools through search engine and calculation of web impact factors (WIF).

While undertaking WIF study, it is necessary to select a suitable search engine that would count the number of pages in website and number of pages linking to the websites. Open site explorer is an optimization tool and search engine for links analysis. It makes gathering, sorting and exporting link data easier than ever. It provides a tremendous amount of information about the links to any page or site.

1.9.1 Data Collection Method

The survey and observation method of data collection are applied for collecting the websites of IIMs. The following steps are being followed:

Step 1: Collection of IIM's Websites/ URLs

The URLs of IIMs websites have been collected by visiting their websites.

Step 2: Retrieving of Data

All the URLs/ Websites of IIMs are tested through command line textual quarries like link, link domain, site etc. inside the preferred search engine's database i.e. Google.

Step 3: Tools / Software

Open site explorer which is an optimization online tool and search engine are used for exploring link data and for finding out the information about the links to any page or a website

1.9.2 Data Collection Tools

In webometric studies, different types of data collection tools are being utilized. In the present study, search engine Google and Free Online tools Open Site Explorer have been used for webometric data collection and analysis.

1.9.3 Time Duration of Data Collection

The data have been collected in five (five) rounds having gaps of 15 days between each round. The months August to October have been chosen for collection of the data. The data have been collected without any fixed time frame and without any discrimination of morning, evening and night. The data collection hours and minutes (in Indian Standard Time) has been recorded while collecting from the search engine.

1.10 CHAPTERIZATION

The study is presented in following Chapters:

Chapter -1   :   Introduction

Chapter -2   :   Review of Literature

Chapter -3   :   Webometrics and overview

Chapter -4   :   Data Analysis and Findings

Chapter -5   :   Conclusion and Suggestions

References:

Aguillo, Isidro F., Ortega, J. L. and Ferna´ndez, Mario. (2008). Webometric ranking of world universities: introduction, methodology, and future developments. *Higher Education in Europe*, *33*(2/3).

Babu, B. Ramesh, Jeyshankar, R., &Rao, P. Nagesware. "Websites of central universities in India: a webometrics analysis." *DESIDOC Journal of Library & Information Technology* 30.4 (2010): 33-43.

Bakeri, Ahmad and Leyni, Nur (2015) Webometric Study of World Class Universities Websites. *Qualitative and Quantitative Methods in Libraries (QQML) Special Issue Bibliometrics and Scientometrics: 105-115*

Cache Computer. Retrieved 24 September, 2016. From Wikipedia.

https://en.wikipedia.org /wiki/Cache_(computing).

Goswami, P. "Webometric study of universities websites of Uttar Pradesh."*M.Phil Diss.* Ujjain: Vikram University, 2007.

Goswami, Prashant., et.al.. (2008),TheWebometrics. *International Caliber,* 1-4

HTML.Retrieved 24 September, 2016.From Webopedia.

http://www.webopedia.com TERM/H/HTML.html

Indian Institutes of Management. Retrieved 20 October, 2016 From Wikepedia

https://en.wikipedia.org/wiki/Indian_Institutes_of_Management

Internet Users.Retrieved 24 September, 2016.From Google Search engine

http://www.internetlivestats.com/internet-users/

Islam, MdAnwarul and Alam, MdSaiful (2011).Webometric Study of Private Universities in Bangladesh.*Malaysian Journal of Library & Information Science16 (2): 115-126.*

Jayasundari , A and Jeyshankar, R (2014) Web Credibility of Indian Institute of Management (IIMs) Web Sites: *Journal of Advances in Library and Information ScienceVol. 3. No.3. 2014.p 222-232*

Jeyshankar, R, &Babu, B.R. (2009). Websites of Universities in Tamil Nadu: A Webometric Study. *Annals of Library and Information Studies, 56, 69-79.*

Kothainayaki, S andGopalakrishnan, S (2011) Webometric analysis of agriculturaluniversities in India. *Indian Journal of Science and Technology 4 (3): 1-7.*

Madhusudhan ;Margam&Prakash; Shashi (2013). Websites of Indian Institutes of Technology: A Webometric Study. *International Journal of Library and Information Studies*Vol.*3 (4) Oct-Dec, 2013. P 1-3*

Maharana, Rabindra K.;   K. C. Panda, C.K.; and   Sahoo, J (2012) Web Impact Factor (WIF) and Link Analysis of Indian Institute of Technologies (IITs) A Webometric Study: *National Institute of Science Education and Research. 5-18*

Pavlina, Kresimir (2012) Webometric ranking of European universities. *Elsevier* (*46): 3788 – 3792.*

R. Jeyshankar , B Ramesh Babu and P. NageswaraRao. (May 2014) "Websites of Indian Institutes of Management (IIMs): A Webometric Study". *e-Library Science Research JournalVol.2, Issue.7.*

Ratha, Bhupendra (2012), Webometrics Study of IIT Libraries Websites. *DESIDOC Journal of Library & Information Technology, 1-5*

Sharma C.K, (2005). Webometrics: An Overview. Journal of Library and Information Technology, (1) 5-8.

Sharma C.K,(2005).Webometrics:An Overview. *Journal of Library and Information Technology, (1) 5-8.*

Shukla, Akhandanand., and Tripathi, Aditya (2014), Backlinks Analyses of Institutes of National Importance And Premier Management Institutions Library Websites. *Journal of International of Academies Research for Multidisciplinary*, *1-15*

Shukla, Akhandanand., and Tripathi, Aditya (2015),Webometric Studies and Libraries 1-175

Shukla, Akhandanand., and Vanlalfeli. (2015), Conceptual Approach to Webometrics: An Exploratory Study.*ABHIYANTRIKI An International Journal of Engineering & Technology (AIJET),2-19*

Shukla, S. H., &Poluru, L. (2012).Webometric analysis and indicators of selected Indian state universities. *Information Studies*, *18(2), 79-104.*

Thanuskodi, S. (2013).A webometric analysis of selected Institutes of national Importance Websites in India.*International Journal of Library Science, 1 (1), 13-18*

Thanuskodi, S. (2013). A webometric analysis of selected Institutes of national Importance Websites in India, *International Journal of Library Science, 1 (1), 13-18*

Uniform Resource Identifier.Retrieved 24 September, 2016.From Wikipedia.

https://en.wikipedia.org/wiki/Uniform_Resource_Identifier

Verma.,Manoj Kumar and Devi, Krishna (2015) Content Analysis of Central Universities Library Websites of North Eastern States of India: A Survey.*Journal of Research in Librarianship - Vol.2(5) Sep-Oct, 2015*

Verma.,Manoj Kumar., and Devi, Krishna (2016) Web Content and Design Trends of Indian Institutes of Management (IIMs) Libraries Website: An Analysis. *DESIDOC Journal of Library & Information Technology, Vol. 36, No. 4, July 2016, pp. 220-227*

Wallia, P.K. &Kaur, Prabhjeet. (2008) Webometric analysis of library association's websites of India. *IASLIC Bulletin*, 53(3), 131-43.

Web Browser.Retrieved 23 September, 2016.From Webopedia. *http://www.webopedia.com/TERM/B/browser.html*

Web Browser.Retrieved 23 September, 2016.From Wikipedia. *https://en.wikipedia.org/wiki/Web_browser*

Web Impact Factor.Retrieved 27 January, 2016.From Wikipedia. *https://de.wikipedia.org/wiki/Web_Impact_Factor*

Web Server.Retrieved 24 September, 2016.From Webopedia. *http://www.webopedia.com/TERM/W/Web_server.html*

Webometrics Research. Retrieved 27 January , 2016. From Wikipedia *http://research.webometrics.info/.*

Webometrics.Retrieved 27 January, 2016. From Wikipedia *https://en.wikipedia.org/wiki/Webometrics.*

World Wide Web History.Retrieved 23 September, 2016, from Wikipedia. *https://en.wikipedia.org/wiki/History_of_the_World_Wide_Web*

World Wide Web.Retrieved 23 September, 2016, from Wikipedia. *https://en.wikipedia.org/wiki/World_Wide_Web.*

2.1 INTRODUCTION

Literature review is an attempt to identify, locate and synthesize research reports, articles, books and other relevant materials related to the specific problem of research. The review may be done on the published sources, such as journal articles, conference papers, research abstracts, book chapters, and research institutions' websites and so on, or on unpublished sources such as thesis, dissertations, etc. By reviewing the literature, a researcher can exploit the previous investigations and findings done by the experts for the maximum benefit of the research in hand.

The review literature is an essential component of any research investigation, which gives necessary input to the investigator to frame the research study on the chosen topic. It sets an investigation in the right direction which would keep abreast of the latest development of the subject.

2.2 GROWTH AND DEVELOPMENT OF WEBOMETRICS

Bjorneborn and Ingwersen (2001) pointed out the selected areas of webometrics research. They reviewed the search engine coverage and performance as a framework for selected quality and content analysis. The problems associated with measuring Web Impact Factors (Web-IF) were also discussed. The authors outlined new directions of webometrics for performing knowledge discovery on the web, partly based on bibliometric methodologies used in bibliographic and citation databases.

Bjorneborn and Ingwersen (2004) defined webometrics within the framework of informetric studies and bibliometrics, as belonging to library and information science, and as associated with cybermetrics as a generic subfield. They developed a consistent and detailed link typology and terminology and made explicit the distinction among different web node levels when using the proposed conceptual framework.

Kothainayaki and Gopalakrishnan (2011) have evaluated Agricultural Universities in India through Webometrics method. A total of 54 Agricultural Universities were considered, which includes 44 State Agricultural Universities (SAUs), 1 Central University, 5 Deemed Universities, and 4 Central Universities with agriculture faculty. Various concepts like Google Page Rank, Traffic Rank, and rich files are considered for evaluation. It also presents the network diagrams showing the link structures between the web nodes in Webometric analysis.

Ramesh, Jeyshankar and Rao (2010) conducted a study of Webometrics to concern with measuring aspects of the web: websites, web pages, parts of web pages, words in web pages, etc. This study examines 40 central universities websites in India. Investigates domain systems of the websites, analyses the number of WebPages and link pages and calculates the simple web impact factor, self link web impact factor, external link web impact factor and revised web impact factor for Central universities in India and ranks the websites as per the WIF. It also develops a novel network diagram showing link structures between web nodes in Webometric analysis. This study warns against taking the analogy between citation analysis and link analysis which too far from each other.

Shukla and Vanlalfeli (2015) reviewed the development of Webometrics researches conducted by scholars and depicts the origin of Webometrics from Bibliometrics. Relationship between metrics branches such as Bibliometrics, Scientometrics, Informatrics, Webometrics and cybermetrics has been established and discussed the boundary of each. Webometrics techniques like web link structure analysis, web page content analysis, web usage analysis, and web technology analysis elaborated. Further Webometric terminology and diagrams used for understanding of Webometrics terms has been explained thoroughly.

Thelwall and Wilkinson (2003) introduced three new metrics to measure the range of use of a university website by its peers through different heuristics for counting links targeted at its pages. These metrics provide results that correlate significantly with the research productivity of the target institution. The directory range model, which is based upon summing the number of distinct directories targeted by each university, produces the most promising results of any link metric. Based upon an analysis of changes between models, it was suggested that range models measure essentially the same quantity as their predecessors but they were less susceptible to spurious causes of multiple links and therefore considered more robust.

Thelwall *et al*. (2002) reported the results of a survey of 670 websites of higher education institutions in countries associated with the European Union, as estimated by AltaVista. The study found that there were enormous national differences of up to three orders of magnitude. It also addressed the extent to which AltaVista's coverage of university websites is reliable and consistent across Europe.

Thelwell (2008 a) reviewed the distance that bibliometrics has travelled since 1958 by comparing early bibliometrics with current practice, and by giving an overview of recent developments. The concept of webometrics was discussed in detail. Thelwall *et al*. (2008) conducted a webometric study to assess the web connectivity of European life sciences research groups as a case study. A commercial search engine was harnessed to deliver hyperlink data via its automatic query submission interface. A special purpose link analysis tool, Lexi URL then summarized and graphed the link data in appropriate ways. According to Thelwall, this was the first paper to make a case for the value of using a range of webometric techniques to evaluate the web presences of research groups within a field, and possibly the first "applied" webometrics study that has been produced for an external contract.

Wallia and Kaur (2008) have explored the Webometric study of 45 universities (both state and deemed) in Tamil Nadu. The study reflects that some universities in Tamil Nadu have higher number of web pages but correspondingly their link pages are very small in number and websites fall behind in their simple, self link and external link web impact factor.

2.3 WEB IMPACT FACTOR

Babu, Jayshankar and Rao, P.N (2010) examined 40 central universities websites in India. They investigated domain systems of the websites, analyzed the number of web pages and link pages and calculated the Simple Web Impact Factor, Self-link Web Impact Factor, External link Web Impact Factor and revised web impact factor for central universities in India and ranked the websites as per the WIF. They also developed a novel network diagram showing link structures between web nodes in webometric analysis.

Barjak, Li, and Thelwall (2006) analyzed data concerning 456 scientists from five scientific disciplines in six European countries and showed that both homepage content and personal and institutional characteristics of the homepage owners had significant relationships with inlink counts. Notable differences between the total inlinks to scientists' homepages existed between the scientific disciplines and the countries in the sample. There are also both gender and age effects: fewer external inlinks (links from other web domains) to the homepages of female and of older scientists.

Ingwersen (1998) analyzed a selection of seven small and medium scale national and four large web domains as well as six institutional websites over a series of snapshots taken of the web during a month. The data isolation and calculation methods are described and the tests discussed. The results demonstrate that Web-IFs should be approached with caution. The data isolation method makes use of sets of inverted but logically identical Boolean set operations and their mean values in order to generate the impact factors associated with internal-self-link web pages and external-link web pages.

Islam (2011) conducted a webometric study of all university websites in Bangladesh. Data for the study, obtained using AltaVista search engine was used to rank the websites based on webometric indicators. It is found that some universities in Bangladesh have higher number of web pages but their link pages are few and websites fall behind in their web impact factor. Some suggestions to improve the WIF of the university websites in Bangladesh were given.

Islam and Alam (2011) conducted a study on webometrics, especially on the impact of websites and the web impact factor. The study analyzed the websites of private universities in Bangladesh according to the webometrics indicator. It examines and explores the 44 private university websites in Bangladesh and identifies the number of web pages and link pages, and calculates the overall Web Impact Factor (WIF) and absolute Web Impact Factor (WIF). In a cross sectional study, all the websites were analyzed and compared using AltaVista search engine. The websites were then ranked based on these webometric indicators. The study revealed that some private universities in Bangladesh have higher number of web pages but their link pages are very small in number, thus the websites fall behind in their Overall WIF, selflink, external links and Absolute WIF. Finally, it is showed that these universities did not have much impact factor on the web and were not known internationally.

Jayshankar and Babu (2009) examined and explored through a webometric study of websites of 45 universities in Tamil Nadu comprising of 27 state and 18 private universities. They identified the domain systems of the websites; analyzed the number of web pages and link pages, and calculated the Simple Web Impact Factor (WIF), Self-link Web Impact Factor and external Web Impact Factor of the University websites in Tamil Nadu and ranks the websites as per the WIF. The study found that some universities in Tamil Nadu had higher number of web pages but

correspondingly their link pages were very small in number and websites fell behind in their simple, self-link and external link Web Impact Factor.

Noruzi (2005) investigated the WIFs for Iranian universities and introduced a new system of measurement. Counts of links to the websites of Iranian universities were calculated from the output of AltaVista search engine. Overall, Iranian university websites have a low inlink WIF. While specific features of sites may affect an institution's WIF, there is a significant correlation between the proportion of English-language pages at an institution's site and the institution's backlink counts.

Noruzi (2006) suggested that Web Impact Factors can be calculated as a way of comparing the attractiveness of websites or domains on the web. He concluded that while the WIF is arguably useful for quantitative intra-country comparison, application beyond this (i.e., to inter-country assessment) has little value.

Shukla and Vanlalfeli (2015) review the webometric development in web impact factor perspective through the literature available in the area. The growth and development of webometric researches has been divided into four categories – webometrics development, webometric analysis, link analysis, and web impact factor analysis; and reviewed accordingly. The paper finds that citation analysis and link analysis have no analogy with each other; significant correlation between the English-language pages and backlink counts; possibility with the information ignorance due to linguistic and geographic barriers that should be taken into account in the development of the Web; and concluded with the phrase that webometric researches must be conducted with caution

Smith (1999 a) explained the WIF for comparing the relative attractiveness or influence of web spaces, where the WIF is the number of pages linking to a web space divided by the number of pages in the web space. He compared WIFs for Australasian universities and for Australasian electronic journals.

Smith (2002) investigated the effectiveness of metadata on websites. Specifically, the study investigated whether the extent of metadata use by a site influences the WIF of the site. He has

calculated the WIF of electronic journals and NZ University websites. The most positive correlation was found between the substantive WIF of the electronic journal sites and the extent of Dublin Core metadata use.

Smith and Thelwall (2002) reported the results of an exploratory study of knowledge exchange between disciplines and subfields of science, based on bibliometric methods. The authors considered knowledge exchange between disciplines at a global level, by analyzing cross disciplinary citations in journal articles, based on the world publication output in 1999.

Thanuskodi (2011) conducted a study on webometrics analysis which calculated and compared the number of web pages, in links, external in links and also the overall and absolute WIF of private engineering colleges in Tamil Nadu. The study covered the active exclusive websites, compared and then ranked these universities according to webometric indicators. The study used AltaVista because of its ability to cover a broader range of the web as opposed to the other commercial search engines.

Thelwall (2000) conducted a survey in order test the coverage of search engines and to decide whether their partial coverage is indeed an obstacle to using them to calculate WIF. The results indicated that search engine coverage, even of large national domains was extremely uneven which may lead to misleading calculations.

Thelwall (2001a) explained the WIFs, the proposed web equivalent of Impact Factors for Journals, can be calculated by using search engines. The author presented a bespoke web crawler designed specifically for the calculation of reliable WIFs is presented. This crawler was used to calculate WIFs for a number of UK universities, and the results of these calculations are discussed.

Thelwall (2002) addressed the question of which is the best possible domain to count backlinks from, if research is the focus of interest. WIFs for British Universities calculated from several different source domains are compared, primarily the .edu, .ac.uk and .uk domains, and the entire web. The results showed that all four areas produce WIFs that correlate strongly with research ratings, but that none produce incontestably superior figures.

Thelwall *et al*. (2003) investigated the subjects that have the most impact on the web, and look for national differences in online subject visibility. The authors use link counts to identify the highest impact websites from the universities in Taiwan and Australia and classified them by domain type and by subject content. The highest impact sites were from computing, but there were major national differences in the impact of engineering and technology sites. Another difference was that Taiwan had more high impact non-academic sites hosted by universities.

Vaughan and Show (2003) compared bibliographic and web citations to articles in 46 journals in library and information science. For most journals (57%), web citations correlated significantly with both bibliographic citations listed in the Social Sciences Citation Index and the ISI's Journal Impact Factor. Web citation counts were typically higher than bibliographic citation counts for the same article. Journals with more web citations tended to have websites that provided tables of contents on the web, while less cited journals did not have such publicity from 1992-1997.

2.4 WEB CONTENT ANALYSIS

Verma and Devi (2016) analyzed the role of websites and stated that website plays an important role in every institution and every organisation. Websites are the gateway to an institution through online mode. Libraries' websites web pages help the users to get all the information online related to the facilities and services provided by their respective libraries of an institution. IIM are the pioneer management institutions and the libraries website/web page are to be maintained properly where the information should be easily accessible by the user without any hindrance. The study is based on the information available in the library webpage of the concerned universities. A checklist was designed and the library web-pages were evaluated based on the previous evaluations of websites conducted by different authors.

Devi and Verma (2016) attempted to evaluate and compare the web contents of the North-Eastern Hill University (NEHU) and Mizoram University (MZU). A structured checklist was prepared for the present study based on the previous evaluation of websites conducted by different authors. For analysing the contents of the university websites, a list of 73 criteria was prepared under the 14 headings. A quantitative three point rating scale was designed for the present study to determine a meaningful numerical rating for the individual features of the NEHU and MZU websites. It is observed from the present study that almost all the criteria listed for evaluation of the websites has been fulfilled by both the universities and both the websites are

found to be very simple and easily accessible by the users. The study reveals that NEHU scored the highest point, that is, 59 out of 69 to that of MZU (47). Based on this study, it has been suggested that both the university websites have to be evaluated frequently and the current information needs to be made available to their end users.

Thanuskodi (2012) focused on the web page content analysis of institutes of national importance libraries in India and moreover study concentrates evaluation of contents not on the link structures and other research area in webometrics. The study claimed that webometric techniques are still in experimental stage in testing whether the classical bibliometric methods applied to the web are reliable and feasible means of comparing the analysis of websites.

Thelwall (2003) introduced two web link count metrics to complement the existing Web Impact Factor. The first is provisionally cast as an indicator of the average degree of online informal scholarly communication and information use by the academics in a given university. The second has a similar construction use by the academics in a given university. The second has a similar construction but focuses on the degree of web interconnection in terms of both inlinks and outlinks. The latter metric is based upon a more elaborate mechanism than raw link counts: total ling the minimum number of links between universities over all distinct pairs in the chosen set that include the given institution.

Thelwall (2004a) explained that nature of the contents of academic websites is of direct relevance to the new field of scientific web intelligence, and for search engine and topic-specific crawler designers. The author analyzed word frequencies in nation's academic webs using the websites of three English-speaking nations: Australia, New Zealand and the UK. He found at least 26 % of pages contained no words. High frequency words included university names and acronyms, internet terminology, and computing product names: not always words in common usage away from the web. A minority of low frequency were spelling mistakes, with other common types including non-words, proper names, foreign language terms or computer science variable names.

Verma and Devi (2015) carried out for analyzing the contents available in the library webpage of the Central Universities of the North Eastern States in India. The study is based on the information available in the library webpage of the concerned universities. A checklist was

designed and the library web pages were evaluated based on the previous evaluations of websites conducted by different authors.

2.5 WEB LINK ANALYSIS

Changling and Xinjin (2009) examined the Link Analysis of 15 government websites based on Factor Analysis. The study reveals that the Beijing Government website does the best among all websites. The website which is better and prior were also found out by the study and all other websites were given suggestions to improve their perfectness in the near future. The total link and eternal link have given good performance in the evaluation of websites.

Jalal, Biswas and Mukhopadhyay (2010) investigated the effectiveness and relevance of Web Impact Factors (WIFs) for Indian universities' websites. They reviewed the web impact factor as to how this link-based metrics is developed and is applied. They also reported a case study on universities in West Bengal. SocSciBot was used to generate link data in order to develop micro link topology under study. The result of the study showed that all the NITs were closely related in the topology framework whereas nodes were not linked significantly in the case of state universities and central universities.

Li *et al*. (2003) found that web link based metrics can correlate with traditional research assessment at the university level. In this study, the author tested whether the same is true for the computer science departments in the UK. The relevant Web Impact Factors (WIFs) were calculated from the link data collected both from AltaVista and the special academic crawler of the University of Wolver Hampton. The numbers of staff members and web pages in each computer science department were used as denominators for the WIFs calculation. The number of inlinks to the computer science departments correlated significantly with their research productivities, and WIFs with numbers of staff members as denominators correlated significantly with their Research Assessment Exercise (RAE) ratings. The number of staff members was confirmed to be a better indicator of departmental size than the number of web pages within the department's domain.

Ortega and Aguillo (2007) studied the link relationships in the Nordic academic web comprised of 23 Finnish, 11 Danish and 28 Swedish academic web domains with the European one. The

results showed that the Nordic network is a cohesive network, set up by three well-defined subnet works and it rests on the Finnish and Swedish sub-networks. They concluded that the Danish network had less visibility than other Nordic countries. The Swedish one is the principal Nordic sub-network and the Finland network was slightly isolated from Europe, with the exception of the University of Helsinki.

Park (2004) traced South Korean web pages hyper linking pages hosted in Taiwan, using a search engine. The context in which Taiwan appeared in South Korean pages was also examined. Specifically, the structure of hyperlink connectivity from South Korea and Taiwan was analyzed. It was found that the hyperlink network was very sparsely connected in terms of the number of South Korean web pages hyper linking to the pages of the other country.

Payne and Thelwall (2004) presented the results of statistical analysis carried out on the web link structure text files of 111 UK universities. Mathematical linear relationships were observed between certain bivariate data with subsequent Pearson correlation analysis revealing a number of very strong correlation relationships, particularly between site size and number of source/target directories and pages.

Shukla and Poluru (2012) analyzed the web presence of 173 Indian state universities. This study showed that some state universities had more visibility compared with their counterparts. The data of was collected from Yahoo Site Explorer and Google Scholar. Web Indicators for Science, Technology and Innovation Research (WISER) ranking method was applied to see the visibility and connectivity of universities on the web. The study recommended the use of tools like blogs, social networking sites for scholarly and scientific communication of universities to increase the use of websites. Additionally, maintaining institutional repositories, open access and collaboration with other universities, online communication, etc. can help to increase the visibility of the website.

Shukla and Tripathi (2009) reported the backlink structure of institutes of national importance from India. Percentage of Deep Link Ratio, pattern of page pointing and pattern of link type relationship were also examined. Data were collected using software program called 'backlink analyzer'. Rankings of institutes of national importance were made on two different bases: which was discussed in the study. The study revealed that on average technical institutes had higher

backlinks than any other. They also found that Indian institutional websites attracted more citations from commercial web domains than educational or any other web domains.

Shukla and Tripathi (2014) examine the extent of back links to different category of WebPages of the library websites belonging to institutes of national importance and premier management institutions. This is a longitudinal study started from 2009 and finished in 2013 including five rounds of data collection having one year gap between each round. The study concludes that index page/home page of library websites attracts highest number of back links than any other category of library web pages. Further, it has been found that search engine Yahoo Site Explorer is good for Webometric research particularly for back links study. The hyperlink for index pages/home pages of library websites are generally not found in the index pages/homepages of their hosting institutions. This study mainly focuses on the extent of back links for seven categories of library web pages including four search engines which have not been studied earlier in the sense.

Sujithai, Maria and Jeyshankar (2013) analyzed the web pages of Indian Institute of Technology websites retrieved by commercial search engine and tested by Histogram, Scatter Plot and the Line of Best Fit for its reliability and then by Regression Analysis with the help of SPSS package, and it was found that External link web pages provided more than other link pages.

Thelwall (2001 b) attempted to provide an evidence through an evaluation of Ingwersen's proposed external Web Impact Factor for the original use of the web: the interlinking of academic research. In particular, it studies the case of the relationship between academic hyperlinks and research activity for universities in Britain, a country chosen for its variety of institutions and the existence of an official government rating exercise for research.

Thelwall (2001 c) noted that web log files are the useful source of information about visitor site use, navigation behaviour, and to some extent, demographics. But he proposed that log files can also reveal the existence of both web pages and search engine queries that are sources of new visitors. A significant correlation between the number of external links and the journal impact factor for LIS journals has been studied by Vaughan and Hysen (2002) Journals with higher journal impact factor scores tend to attract more links to their websites.

Thelwall (2004) stated that link analysis in various forms is an established technique in many different subjects, reflecting the perceived importance of links and that of the web. It is argued that the dynamic nature of the web, its lack of quality control and the online proliferation of copying and imitation mean that methodologies operating within a highly positivist, quantitative frameworks with which to guide research are appropriate, a theory of Link Analysis is not possible.

Thelwall (2006) explained that the order of the links in a search results page is often decided upon by an algorithm that takes into account the number and quality of links to all matching pages. The results indicated that around 66 percent of websites carried external links, most of which were targeted at a specific purpose, but that about 17 percent published general links, with implications for those designing and marketing websites.

Thelwall and Wilkinson (2008) stated that large sets of web page links, colinks, or URLs sometimes need to be counted or otherwise summarized by researchers to analyze web growth or publishing, and by computing professionals for website evaluation or search engine optimization. This article proposed a generic lexical framework to unify and extend existing methods through abstract notions of link lists and URL lists.

Vaughan (2004) stated that the earlier webometrics studies found a relationship between the number of inlinks to a commercial site and the company's business performance measures. However, those studies examined top-ranking information technology companies in the USA and China. The study included all information technology companies in the USA and Canada and gathered both business performance data and website data for these companies. The study found significant correlation between business performance measures and inlinks to the company websites.

Vaughan and Wu (2004) examined the websites of China's top 100 information technology (IT) companies. They found that link count to a company's website was correlated with the company's revenue, profit, and research and development expenses. This suggested that web hyperlinks to commercial sites can be a business performance indicator and thus a source of business information. As a comparison to IT companies, China's top 100 privately owned companies were

also studied. The study found no relationship between link count and the business performance measure for these companies due probably to the heterogeneous nature of this group.

Vaughan and You (2006) examined the feasibility of using web co-link data to compare business competitive positions. They hypothesized that the number of co-links to a pair of business websites is a measure of the similarity between the two companies. They selected 32 telecommunications companies for the study and collected co-link data to these companies from Yahoo! Multi-dimensional Scaling (MDS) analysis on the co-link data currently mapped these companies into telecommunication industry sectors. This proved their hypothesis and further confirmed the theory that links to business websites can be objects for web data mining.

Vaughan, Kipp and Gaon (2007) examined the reasons for the creation of co-links between pairs of business websites to determine whether co-linked business websites are really related. The study found that 61.4 percent of co-links were created to connect pairs of highly related businesses (related companies, related products and related services). Only 14.7 percent of colinks were created for non-business reasons. The remaining 23.8 per cent of co-linked sites showed a loose or marginal business relationship. The study also found that co-links targeting home pages (as opposed to non-homepages) were more likely to connect related businesses. Furthermore, co-links coming from commercial sites (as opposed to other sites such as educational sites) are more likely to link related businesses. The potential of web links to act as an indicator of collaboration through a detailed classification of 2600 links from universities to government, commercial and other domains was investigated by David, Thelwall and Harried (2007). Whilst there were significant differences in the proportion of web links that reflect collaboration, depending on the source page owner and the target page top-level domain, a majority of web links on a university web page did not reflect collaboration between the web page owner and the target web page owner.

Wilkinson, Thelwall and Li (2003) reviewed recent progress from the information science approach and summaries current techniques for extracting usable information from web links. The description is particularly aimed at those who are unfamiliar with the literature but who nevertheless wish to use web links to investigate some aspect of online behaviour, particularly informal scholarly communication.

2.6 WEB TECHNOLOGY ANALYSIS

Bar-Ilan (2008) introduced methods for evaluating search engine performance over a time period. The set of measures introduced may serve as a guideline for the search engines for testing and improving their functionality.

Mandava and Antony (2015) review technologies useful for design and development of web-based applications. We also discuss about the technologies that are used at the client side and server side of web application. Next, we compare different web application development frameworks. In addition, we discuss life cycle model and framework of web application development.

Mayr and Walter (2007) showed deficiencies in the coverage and up-to-datedness of the Google Scholar index. Furthermore, the study pointed out which web servers are the most important data providers for this search service and which information sources are highly represented. The study found that there was a relatively large gap in Google Scholar's coverage of German literature as well as weaknesses in the accessibility of open access content.

Opuszko and Ruhland (2012) designed a different machine learning applications based on Semantic Web technology which is important to create complex metadata descriptions for any problem domain, based on pre-defined ontology. In this paper we evaluate the use of a semantic similarity measure based on pre-defined ontology as an input for a classification analysis in the context of social network analysis. A link prediction between actors of two real world social networks is performed, which could serve as a recommendation system. The social networks involve different types of relations and nodes.

Smith (1999b) reviewed the literature in the emerging field of webometrics and reports on the author's ongoing research into the viability and reliability of existing internet search engines for

webometric research, and the development of appropriate methodology. The aim of the study was to measure the impact of the Australasian websites. Vaughan (2004b) proposed a set of measurements for evaluating the web search engine performance. He conducted an experiment to test these new measurements by applying them to a performance comparison of three commercial search engines: Google, AltaVista and Teoma.

Thelwall (2008b) compared the applications programming interfaces of Google, Yahoo! And Live Search for 1587 single word searches. The hit count estimates were broadly consistent but with Yahoo! and Google reporting 5-6 times more hits than Live Search. Yahoo! tended to return slightly more matching URLs than Google, with Live Search reporting significantly fewer. Yahoo!'s result URLs included a significantly wider range of domains and site than the other two and there was little consistency between the three engines in the number of different domains. Concluded that quantitative results from the three search engines are mostly consistent but with unexpected types of inconsistency that users should be aware of.

Vaughan and Zhang (2007) examined the search engine coverage of websites across countries and domains. Websites in four domains (commercial, educational, governmental and organizational) from four countries (U.S., China, Singapore, and Taiwan) were randomly sampled by custom-built computer programs and then manually filtered for their suitability for the study. They examined the representation of the 1,664 sampled sites in four major search engines (Google, Yahoo, MSN, and Yahoo! China) in terms of whether the site was covered and the number of pages indexed by the search engines. This study found that U.S. sites received higher coverage rates than their counterparts in other countries. Yahoo! China provided better coverage of sites from China and surrounding regions than its global counterpart, Yahoo! The poor coverage of Chinese commercial and governmental sites is noted and the implications are discussed in light of the tremendous development of the Web in China.

References:-

Babu, B. R, Jayshankar, R. and Rao, P. N. (2010). Websites of central universities in India: a webometric analysis. *Annals of Library and Information Studies, 30(4), 33-43.*

Bar-Ilan, Judit (2008). Methods for measuring search engine performance over time. *Journal of the*
American Society for Information Science and Technology, 53(4), 308-319.

Barjak, Franz, Li, Xuemei and Thelwall, Mike (2006). Which factors explain the web impact of scientists' personal homepages?. *Journal of the American Society for Information Science and Technology, 58(2), 200-211.*

Björneborn, Lennard and Ingwersen, Peter (2004). Towards a basic framework for Webometrics. *Journal of the American Society for Information Science and Technology, 55(14), 1216-1227.*

Björneborn, Lennart and Ingwersen, Peter (2001). Perspectives of webometrics. *Scientometrics, 50 (1), 65-82.*

Changling, Li., and Xinjin, Fu. (2009), Link Analysis on Government Website Based on Factor. *LNCS 5854, 108-115.*

Devi and Verma (2016).Comparison of Design and Content Features of North-Eastern Hill University (NEHU) and Mizoram University (MZU) Websites: A Study. *World Digital Libraries- An International Journal. 2016, Volume: 9, Issue: 1*

Ingwersen, P. (1998). The calculation of web impact factors. *Journal of Documentation, 54(2), 236-43.*

Islam, Md. Anwarul (2011). Webometric study of universities in Bangladesh. *Annals of Library and Information Studies, 58(4), 307-318.*

Islam, Md. Anwarul and Alam, Md. Saiful (2011). Webometric study of private universities in Bangladesh. *Malaysian Journal of Library & Information Science, 16(2), 115-126.*

Jalal, Samir Kumar, Biswas, Subal Chandra and Mukhopadhyay, Parthasarathi (2010) Web presence of selected Asian countries: a webometric analysis. *Collnet Journal of Scientometrics and Information Management, 4(2), 57-68.*

Jayshankar, R. and Babu, B. R. (2009). Websites of universities in Tamil Nadu: a webometrics study. *Annals of Library and Information Studies, 56(2), 69-79.*

Kothainayaki; S and Gopalakrishnan; S (2011). Webometric Analysis of Agricultural Universities in India. *Indian Journal of Science & Technology. 4 (3), 1-8*

Li, Xuemei et al. (2003). The relationship between the WIFs or inlinks of Computer Science Departments in UK and their RAE ratings or research productivities in 2001. *Scientometrics, 57(2), 239-255.*

Mandava ; Asha and Antony; Solomon (2015). A review and analysis of technologies for developing webapplications. *Annals of Library and Information Studies, 26(4),19-25.*

Mayr, Philip and Walter, Anne-Kathrin (2007). An exploratory study of Google Scholar. *Online Information Review, 31(6), 814-130.*

Noruzi, Alireza (2005). Web Impact Factors for Iranian universities. *Webology,2 (1),* Retrieved 24 September, 2016, from http://www.webology.ir/2005/v2nl/a11.html.

Noruzi, Alireza (2006). Web presence and impact factors for Middle-Eastern countries. *Online Magazine, 30(2), 22-28.*

Opuszko; Marek and Ruhland; Johannes (2012). Classification Analysis in Complex Online Social Networks Using Semantic Web Technologies. *IEEE/ACM International Conference on Advances in Social Networks Analysis and Mining*

Ortega, Jose Luis and Aguillo, Isidro F. (2007). Visualization of the Nordic academic web: link analysis using social network tools. *Information Processing and Management, 44(4), 1624-1633.*

Park, Han Woo (2004). Presence of Taiwan on the World Wide Web in South Korea: dynamics of digital and geographical presence on cyberspace. *The International Information & Library Review, 36(4), 329-340.*

Payne, Nigel and Thelwall, Mike (2004). A statistical analysis of UK academic web links. *Cybermetrics, 1(2).*

Ramesh Babu, B., Jeyshankar, R. and Rao, P. Nageswara (2010). Websites of central universities in India: a webometric analysis. *DESIDOC Journal of Library & Information Technology, 30(4), 33-43.*

Shukla Svetal H. and Poluru, Lalitha (2012). Webometric analysis and indicators of selected Indian state universities. *Information Studies, 18(2), 79-104.*

Shukla, Akhandanand and Tripathi, Aditya (2009). Webometric Analysis of Institutes of National Importance in India. *IASLIC Bulletin, 54(3), 165-180.*

Shukla; Akhandanand and Tripathi; Aditya (2014) Backlinks Analyses of Institutes of National Importance and Premier Management Institutions Library Websites. Journal of International Academic Research For Multidisciplinary. 2 (7), 560-575

Shukla and Vanlalfeli (2015).Conceptual Approach to Webometrics: An Exploratory Study. Abhitantriki. An International Journal of Engineering & Technology. Vol. 2, No. 1 (January, 2015)

Shukla, Akhandanand and Vanlalfeli (2015). Webometric Development in Web Impact Factor Studies:A Literary Review. *Journal of Advancements in Library Sciences.Volume 1,Issue 3*

Smith, Alastair G. (1999a). ANZAC Webometrics: exploring Australasian Web structures. *Retrieved on 24 September, 2016, from http://www.csu.edu.au/special/online99/ proceedings99/203b.html.*

Smith, Alastair G. (1999b). A tale of two web spaces: comparing sites using web impact factors. *Journal of Documentation, 55(5), 577-592.*

Smith, Alastair G. (2002). Does metadata count? A Webometric investigation. *Proceedings of the International Conference on Dublin Core and Metadata for e-communities 2002, October 13- 17, 2002, Florence, Italy: 133-138.*

Smith, Alastair G. and Thelwall, Mike (2002). Web impact factors for Australian universities. *Scientometrics, 54(3), 363-380.*

Sujithai, Maria and Jeyshankar, R. (2013). Web page analysis of Indian institute of technologies' (IITs) websites: a webometric study. *International Journal of Digital Library Services, 3(1), 55-65.*

Thanuskodi, S. (2011). Webometric analysis of private engineering college websites in Tamil Nadu. *Journal of Communications, 2(2), 73-81.*

Thelwall, Mike (2000). Web impact factors and search engine coverage. *Journal of Documentation, 56(2), 185-189.*

Thelwall, Mike (2001a). Extracting macroscopic information from web links. *Journal of the American Society for Information Science and Technology, 52(13), 1157-1168.*

Thelwall, Mike (2001b). Web log file analysis: backlinks and queries. *ASLIB Proceedings, 53(6), 217-223.*

Thelwall, Mike (2001c). Results from a web impact factor crawler. *Journal of Documentation, 57(2), 177-191.*

Thelwall, Mike (2002). A comparison of sources of links for academic Web Impact Factor calculations. *Journal of Documentation, 58(1), 66-78.*

Thelwall, Mike (2003). Web use and peer interconnectivity metrics for academic websites. *Journal of Information Science, 29(1), 1-10.*

Thelwall, Mike (2004a). Text Characteristics of English language university web sites. *Journal of the American Society for Information Science and Technology, 56(6), 609-619.*

Thanuskodi, S. (2012). A webometric analysis of selected institutes of national importance websites in India. *International Journal of Library Science, 1(1), 13-18.*

Thelwall, Mike (2004b). Interpreting social science link analysis research: a theoretical framework. *Journal of the American Society for Information Science and Technology, 57(1),60-68.*

Thelwall, Mike (2006). Commercial website links internet research. *Electronic Networking Applications and Policy, 11(2), 114-124.*

Thelwall, Mike (2008a). Bibliometrics to webometrics. *Journal of Information Science, 34(4), 605- 621.*

Thelwall, Mike (2008b). Quantitative Comparisons of search engine results. *Journal of the American Society for Information Science and Technology, 59(11), 1702-1710.*

Thelwall, Mike and Wilkinson, David (2003). Three target document range metrics for university websites. *Journal of the American Society for Information Science and Technology, 54(6), 489-496.*

Thelwall, Mike and Wilkinson, David (2008). A generic lexical URL segmentation framework for counting links, colinks or URLs. *Library and Information Science Research, 30(2), 94-101.*

Thelwall, Mike et al. (2002). European Union associated university websites. *Scientometrics, 53(1), 95-111.*

Thelwall, Mike et al. (2003). Which academic subjects have most online impact? A pilot study and a new classification process. *Online Information Review, 27(5), 333-343.*

Vaughan, Lewin and Shaw D. (2003). Bibliographic and web citation: What is difference? *Journal of American Society for Information Science and Technology, 54(14), 1313-1322.*

Vaughan, Lewin and Zhang, Y. (2007). Equal representation by search engines? A comparison of

Websites across countries and domains. *Journal of Computer-Mediated Communication, 12(3).* Retrieved on 23 September, 2016, from http://jcmc.indiana.edu/ vol12/issue3/vaughan.html.

Vaughan, Liwen (2004a). Exploring website features for business information. *Scientometrics, 61(3), 467-477.*

Vaughan, Liwen and Wu, Guozhu. (2004). Links to commercial websites as a source of business information. *Scientometrics, 60(3), 487-496.*

Vaughan, Liwen and You, Justin (2006). Comparing business competition positions based on web co-link data: The global market vs. the Chinese market. *Scientometrics, 68(3), 611-628.*

Vaughan, Liwen, Kipp, Margaret and Gaon, Yijun (2007). Are co-linked business websites really related? A link classification study. *Online Information Review, 31(4), 440-450.*

Verma and Devi (2015). Content Analysis of Central Universities Library Websites of North Eastern States of India: A Survey. *Journal of Research in Librarianship - Vol.2 (5) Sep-Oct, 2015*

Verma and Devi (2016). Web Content and Design Trends of Indian Institutes of Management (IIMs) Libraries Website: An Analysis. DESIDOC Journal of Library & Information Technology, Vol. 36, No. 4, July 2016, pp. 220-227

Walia, P.K. and kaur, Prabhjeet (2008). Webometric Analysis of Associations' Website of India, *IASLIC Bulletin, 53(3), 131-143.*

Wilkinson, David, Thelwall, Mike, and Li, Xuemei (2003). Exploiting Hyperlinks to Study Academic Web Use. *Social Science Computer Review, 21(3), 340-351.*

3 .1 INTRODUCTION

The internet is one of the most important and complicated inventions in the history of mankind. Millions of users access the internet every day for various beneficial purposes from hobby and communications to research and learning (Germain, 2000; Maharana *et al.* 2006). Internet has become an important information resource in various fields of knowledge especially in science and technology including Library and Information Science. Library and Information Science is concerned with how different information resources and information structures (interrelated of information resources) are generated, organized, distributed and utilized by different users indifferent contexts. Core research areas in Library and Information Science are concerned with documents (broadly defined as information carries containing texts, graphics, audio, video, and so on), document represents (for example bibliographic data metadata), and relations between the documents or document representations (for instance, link, cross-references, citations, co-citations and bibliographic couplings) (Mark 2004).

Library and information science (LIS) and related fields in the sociology of science and science and technology studies have developed a range of theories and methodologies including webometrics concerning quantitative aspects of how different types of information are generated, organized, disseminated and used by different users in different contexts. Historically, this development arose during first half of the twentieth century from statistical studies of bibliographies and scientific journals (Hertzel, 1987).

3.2 CONCEPT OF WEBOMETRICS

From many years several quantitative methods have been used by Information professionals to evaluate information resources and services to evaluate its objectivity and affectivity. These quantitative methods are named as Bibliometrics in 1960's, Scientometrics in 1970's and Informatics in the midst of 1980's. In present day with the advent of information technology, the concepts of Webometrics and Cybermetrics have emerged during the 1990's (Sangam,2008). The Bibliometrics techniques are used for measuring scholarly communication; identify research trends and growth of knowledge; identify users of different subjects; estimate comprehensiveness of secondary periodicals; forecast past, present and future publishing trends; identify authorship and its trends in documents on various subjects; predict productivity of publishers or individual authors etc. The Webometrics is very much related with Scientometrics and Bibliometrics

because of its similar research methods which but it applied on the World Wide Web (WWW) to extract and analyze information from the hyperlink structure and content on the Web.

The original idea of Webometrics was that hyperlinks between Websites may be a valuable source of information, in a similar way that citations are a valuable source of information about use and visibility of scientific articles and about the connections between different authors and different articles. Both links on the Web and citations in scientific articles are used in a similar way i.e., to reference something, some other source of information and because of this similarity. Webometrics is a quantitative study of web related phenomena and this study can be applied to web with commercial search engines providing the raw data.

3.2.1 Beginning of Webometrics

Webometrics is nothing but the quantitative study of web based phenomena, has analogy with bibliometrics. It was originally formulated by the application of citation analysis methods of Institute for Scientific Information (ISI) citation databases. First time Almind and Ingwersen (1997) coined the term "webometrics" whereas first time basic idea of webometrics has been identified by Rodriguez i Gairin (1997) and further pursued by Aguillo (1998). Larson (1996) was the first researcher who extensively explored link structure analysis. First time Rousseau (1997)studied the informetric analysis of the web.

3.2.2 Origin and Development of Webometrics

The science of study of web was named "webometrics" by Almind and Ingwersen (1997) however the term "cybermetrics" is used for the same by Journal of Cybermetrics. Webometrics is the combination theories of informetrics, scientometrics and application of bibliometrics. For example, counting and analysis of outgoing links from the website, known as outlinks, and of links pointing to the website, called inlinks, can be seen as similar to citation analysis (Bjorneborn & Ingwersen, 2001). Later Bjorneborn (2004) elaborated webometrics as *" study of the quantitative aspects of the construction and use of information resources, structures and technologies on the web, drawing on bibliometric and informetric approaches".* He further stated that there are four areas of webometric research: web page content analysis; web link structure analysis; web usage analysis; and web technology analysis. Webometric researches mainly cover search engines' coverage and quality analysis, web page property analysis and web impact factor (WIF) analysis, domain and sub-domain analysis, and TLDs analysis.

3.2.3 History of Webometrics

The term *Webometrics* was coined in 1997 by Tomas Almind and Peter Ingwersen, which identified the web as an important source for measuring documents and information. Shortly after this, information scientists recognized that many powerful web measurements could be conducted using the new powerful advanced search features of one of the top search engines of the day: Alta Vista (Ingwersen, 1998; Rodriguezi Gairin, 1997). In particular, Alta Vista's link search capabilities provided large-scale link measurements to be conducted for the first time. This was illustrated in a study that included a count of the number of web pages in each Scandinavian country that linked to the pages of each other Scandinavian country (Ingwersen, 1998).

The ability to research web links using Alta Vista proved particularly influential in triggering Webometric research. This was because hyperlinks are structurally similar to academic citations in the sense that they point from a source document to a target document. Academic citations have been used for many years before the web by those wishing to track or assess the impact of research (Borgman & Furner, 2002; Garfield, 1972; Moed, 2002; Nicolaisen,2007). The similarity of links and citations, together with universities being early adopters of the web, resulted in the emergence of a number of important natural research goals. These attempted to assess whether hyperlinks could be used in similar ways to academic citations, the validity of using link counts and Alta Vista data in research, and the best ways of counting links (e.g., Thelwall, 2001). In parallel with link analysis strand, other information scientists investigated the reliability and coverage of search engines and changes in the content of the web or individual collections of web pages (Bar- Ilan, 2008). These three types of web-based measurement research came to be collectively known as Webometrics.

3.3 JOURNEY FROM LIBRAMETRICS TO WEBOMETRICS

Dr. Ranganathan coined the term 'Librametry' suggesting that there was necessity of developing librametry on the basis of biometry, psychometry and econometry because any operations in the library work involved a large number of people. He suggested librametry in 1948 but he applied the elements of statistical calculus to short out library problems in1925. He applied this technique in the day-to-day work of a library and this was demonstrated in analyzing the strength of staff, book selection, classification and cataloguing etc. Although, the early attempts had taken by Dr. Ranganathan but the subject could not be developed till 1969 when Alan Pitchard used the term bibliometrics which was synonymous to the term librametry.

The term was defined by Ranganathan as 'Quantitative Analysis' of various facets of library activities and library document by application of mathematical and statistical calculus to seek solution to library problem. It not only covers different services and problems of libraries but also to the fundamental units comprising them. It is also concerned with the incoming and outgoing macro and micro documents of library. Thus, Librametrics was concerned mainly with management of libraries

3.3.1 Bibliometrics

Bibliometrics is a type of research method used in library and information science. It utilizes quantitative analysis and statistics to describe patterns of publication within a given field or body of literature. Researchers may use bibliometric methods of evaluation to determine the influence of a single writer, for example, or to describe the relationship between two or more writers or works.

Hawkins (1997) defined bibliometrics as "the application of quantitative analysis in the bibliographic references of the body of literature"

Laws of Bibliometrics

One of the main areas in bibliometric research concerns the application of bibliometric laws. The three most commonly used laws in bibliometrics are: Lotka's law of scientific productivity, Bradford's law of scatter, and Zipf's law of word occurrence.

- ➤ **Lotka's Law:** This law emphasis the productivity of authors in a discipline or other field;
- ➤ **Bradford's Law:** This law emphasis the pattern of scattering of literature in various periodicals;
- ➤ **Zipf's Law:** This law emphasis the frequency of occurrence of the word distribution.

The bibliometrics studies are used to identify the pattern of publications, authorship, andsecondary journal coverage in the hope that such studies can give an insight into the dynamics area under consideration. This consequently leads to better organization of information resources which is essential for their effective and efficient use.

3.3.2 Scientometrics

Scientometrics is the study of quantitative aspects of science. Wikipedia defines "Scientometrics is the science of measuring and analyzing science" Practically, scientometrics is the study of

scientific literature by applying bibliometric and statistical techniques. According to Nalimov and Mulchenko (1969)scientometrics is the application of quantitative methods, which deals with the analysis of science viewed as an information process. In practice, **scientometrics** is often done using bibliometrics which is a measurement of the impact of (scientific) publications.

3.3.3   Informetrics

Informetricsis the study of thequantitative aspects of information in any form it includes the production, dissemination and use of all forms of information, regardless of its form or origin, not just records or bibliographies, and in any social group, not just scientists. Thus, it looks at the quantitative aspects of informal or spoken communication, as well as recorded, and of information needs and uses of the disadvantaged, not just the intellectual elite. It can incorporate, utilize, and extend the many studies of the measurement of information that lie outside the boundaries of both bibliometrics and scientometrics.

3.3.4   CybermetricsVis-a-Vis Webometrics

Cybermetrics has been proposed for analysis of web documents before the term Webometrics. Cybermetrics is "the study of the quantitative aspects of the construction and use of information resources, structures and technologies on the whole internet, drawing on bibliometric and informetric approaches". Cybermetrics thus encompasses statistical studies of discussion groups, mailing lists and other computer mediated communication on the internet including the web. The breadth of coverage of Cybermetrics is limited and whereas webometrics implies large overlaps with proliferating computer science based approaches in analysis of web contents, link structures and web usage and web technologies.

3.3.5   Webometrics

The term, 'Webometric' was coined from two English words i.e. "web" & "metrics". The word 'web' is the short of World Wide Web and 'metrics' denotes the mathematical theory of measurement. The ODLIS defines Webometrics as "description and evaluation of the impact of the Internet as a scholarly communication tool, primarily by means of quantitative analysis of web-based scholarly and scientific communications" (ODLIS). Sometimes it is used synonymously with 'cybermetrics'.

Simply, Webometrics, therefore, the study of the quantitative aspects of the construction and use of information resources, structures and technologies on the Web drawing on Bibliometrics and informatics approaches.

Webometrics is a new concept in Library and Information Science in the order of Librametry, Bibliometrics, Scientometrics, Informatics, and Cybermetrics .Webometrics is the combination of two words 'web' and 'metrics'. The term was coined for the quantitative analysis of web related phenomena as Bibliometrics evaluate the printed materials, Scientometrics deals with scientific publication, Informatics treats with all types of information, and Cybermetrics is for social network analysis.

3.3.6 Relationship between 5 Metric Sciences (IBSCW)

Between these five metrics sciences, bibliometrics first came in existence in 1969. It is the statistical analysis method of publication pattern and the like. The other metric sciences: informetrics, scientometrics, cybermetrics and webometrics, are also statistical methods and have their origin on the basis of bibliometrics. But all of them have their different subject areas.
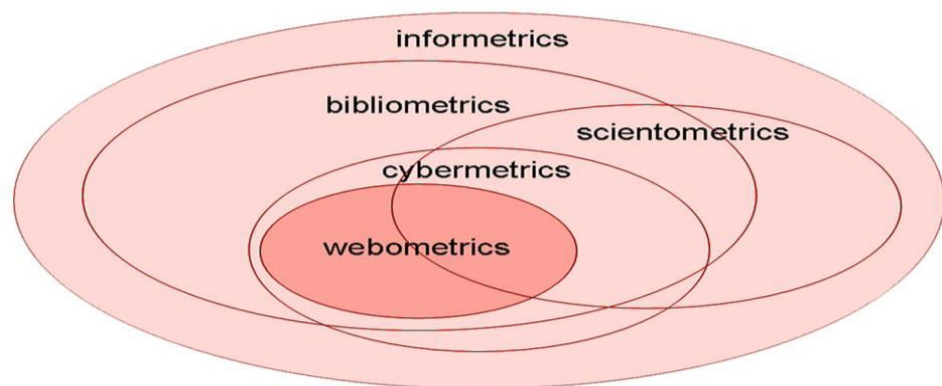
Figure- 3.1: Relationship between the LIS field of Informetrics,Bibliometrics, Scientometrics, Cybermetrics, and Webometrics
(Source:Björneborn, Lennart and Ingwersen, Peter.2004)

In the Figure 3.1 the relationship among the various metrics is depicted clearly. Sizes of the overlapping ellipses are made for the sake of clarity only. If one looks at the relationship between Informetrics, Bibliometrics, Scientometrics, Cybermetrics and Webometrics, can observe that Webometrics associates with Bibliometrics and overlaps Scientometrics to an extent. Further it shows that the field of Informetrics embracing the overlapping fields of Bibliometrics and

Scientometrics. In this context, the field of Webometrics may be seen as entirely encompassed by Bibliometrics, because web documents, whether text or multimedia, are recorded information stored on the web servers while field of Cybermetrics exceeds the boundaries of Bibliometrics, because some activities in cyberspace are normally not recorded, but communicated simultaneously as in chart rooms. One of the most visible outputs of Webometrics is the ranking of Educational Institutions based upon their websites and online impact.

The inclusion of Webometrics expands the field of Bibliometrics, as Webometrics inevitably will contribute with further methodological developments of specific approaches. As ideas rooted in Bibliometrics, Scientometrics and Informetrics have contributed to the emergence of Webometrics.

3.4 WEBOMETRICS AND ITS TECHNIQUES

Bojorneborn and Ingwersen (2001) explained all four main research areas including longitudinal studies of changes on the dynamic web, for example, page contents, link structures and usage pattern. So-called web archaeology in this webometrics context could be important for recovering historical web development, for instance, by means of the internet archive, an approach already used in webometrics.

In addition to one recent application: the analysis of Web 2.0 phenomena. Note that there is some research into developing web-based metrics for websites to evaluate various aspects of their constructions, such as usability and information content, but this will not be reviewed here.

3.4.1 Web Page Content Analysis or Citation Analysis

A number of webometric investigations have focused not on web sites but on academic publications; using the web to count how often journal articles are cited. Vaughan and Shaw (2003)[8] discussed online citations which are relatively trivial, for example appearing in journal contents lists rather than in the reference sections of academic articles. If this can be automated then it would give an interesting alternative to the ISI citation indexes.

    i) The web page content analysis can be used to analyze content of the websites

    ii) It provides hits on the systematic organization of web based information sources.

    ii) It enables the users to reduce their time in the choice of right sources.

iii) It compares the efficiency of search engines in retrieving the required information sources.

iv) It will be useful for students, researchers, scientists who seek information through www.

v) Simplistic counts and content analysis of web pages are like traditional publication analysis.

3.4.2 Web Link Structure Analysis

Link analysis is the quantitative study of hyperlinks between webpages. It has been used successfully for deciding which web pages to add to the collection of documents (i.e., which pages to *crawl*), and how to order the documents matching a user query (i.e., how to *rank* pages). It has also been used to categorize web pages, to find pages that are related to given pages, to find duplicated web sites, and various other problems related to web information retrieval.

The web link structure analysis provides **hyperlinks or self-links** between documents and records of user behaviour. To be precise, hypertexts (i.e. collections of documents connected by hyperlinks) could provide analysis of the following:

i) It counts and analysis of outgoing links from web pages, here named ***outlinks or external links***.

ii) Links to web pages or links coming from the other websites called ***inlinks or incoming links.*** The concept covers all links from other websites pointing to a certain webpage or website. An incoming link is similar to receiving a citation in a document. This links also known as backward links or ingoing links.

iii) ***Reciprocal Link:*** It two webpages or two websites have a link pointing to each other, the link is known as a reciprocal link.

Bojorneborn (2004) explained the link relations between the web nodes, as briefly outlined in Fig.3.2 below.
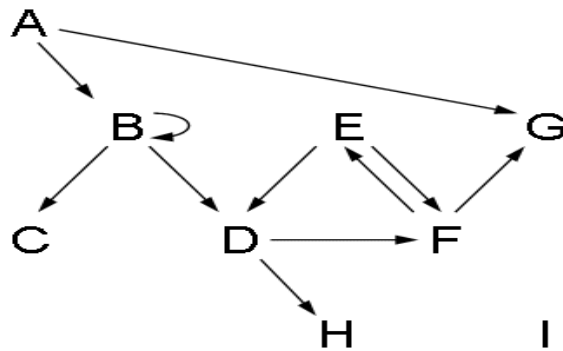
Figure-3.2: Basic Webometric Link Terminology

(Source: Björneborn 2004)

The letters A-H represent different web node levels, such as web pages, web directories, web sites or top-level domains of countries or generic sectors. And, the arrows represent the linking pattern of these nodes among one another.

- B has an *inlink* from A; B is inlinked; A is inlinking
- B has an *outlink* to C; B is outlinking; C is outlinked
- B has a *selflink; BB is self-linking*
- E and F have*reciprocally* links; E and F are reciprocally linked
- A has a *transversal outlink*to G: functioning as a shortcut
- H is *reachable* from A by a directed *link path*
- I has neither in- nor *outlinks;* I is *isolated*
- B and E are *co-linking* to D; B and E have *co-outlinks*
- C and D are *co-linked* from B; C and D have *co-inlinks*

The terms *inlink*and *outlink*were used in computer science based web studies by Broder et.al (2000), Chen et al, (1998), and Pirolli et al. (1996).The terms *outlink* and *inlink* have analogous characteristics with the terms *reference* and *citation* in bibliometrics, respectively. Price (1970)

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has elaborated the conceptual difference between the terms *reference* and citation and matched the difference between *outlink* and *inlink.*

On the web ‚*self-links* are used for a variety purposes. This reflects a special case of the general difference between *outlinks / inlinks* and *references / citations* (Bjorneborn, 2004). *Self-links* are of two types: page *self-links* and site *self-links.* The *page self-links* point from one section to another within the same page while site *self-links* are basically navigational pointers fromonepage to another within the same website. Reciprocal *links* are mutual *inlinks* and *outlinks* between two web nodes. *Transversal links* (Bjorneborn, 2001; 2004; Brorneborn & Ingwersen, 2001) span across dissimilar topical domains on the web.

3.4.3 Web Usage Analysis

It is an analysis performed on the record of user accesses to the application pages, collected in a **Web** server log. After **Web** applications are deployed, **Web usage analysis** can be employed to analyze how users exploit and browse the information provided by the **Web** site. For instance, it can help discovering those navigation patterns which correspond to high **Web usage**, or those which correspond to early leaving. Web usage analysis covers;

- ➢ Log files for users searching
- ➢ Browsing behaviour
- ➢ Log analysis for security applications
- ➢ Web usage preprocessing
- ➢ Novel techniques for discovery and analysis of Web usage patterns
- ➢ Integrating semantics and domain knowledge in Web usage mining and analysis
- ➢ Reliability and consistency of Webometrics
- ➢ Integration of click stream data with back-end data and related metrics
- ➢ Intelligent summarization/explanation of changes in Web usage metrics (Thelwall, Vaughan, and Bjorneborn, 2005).

3.4.4 Web Technology Analysis – Search Engine Performance

Technology is a term, which denotes the quality. It includes different search engine performances (eg. Google, Altavista, Yahoo etc.), because search engines are such type of websites, which incorporates more technology than other websites. The result of search engine comes as the big

list of URL's of different website of a particular subject. In short it can be said that technology itself is a very broad phenomenon but as for as webometrics study is concerned, it is measurable and a useful study tool for web based study.

The search engines performance determines following information:

➢ Measuring the search engines.
➢ Total number of hits retrieved.
➢ Number of relevant hits retrieved.
➢ The content of the page like what is the page all about etc.
➢ Ranking of search engine.

3.4 CONCLUSION

This Chapter gives an overview of webometrics and its history and development have highlighted the relationship of five metrics sciences. Webometrics research has been conducted by both information scientists and computer scientists, with different motivations within information science. Webometrics techniques will continue to evolve in response to new web developments such as webpage analysis, social network analysis etc. in order to gain the benefit of more quantitative techniques.

References:

Almind, T. C. and Ingwersen, Peter (1997). Informetrics analysis on the www: methodological

approach to webometrics. *Journals of Documentation, 53(4), 404-426.*

Aquillo, I.F. (1998). STM information on the web and the development of new Internet R & D

databases and indicators. *Online Information 98:Proceedings (pp.239-243). Oxford: Learned Information*

Bar-Ilan, Judit (2008). Methods for measuring search engine performance over time. *Journal of*

the *American Society for Information Science and Technology, 53*(4), 308-319.

Björneborn, L (2004). Small-world link structures across an academic web space: *a library and*

information *science approach (Doctoral Dissertation). Copenhagen, Denmark: Royal School of Library and Information Science.*

Broder, A.et.al (2000). Graph structure in the web. *Computer Networks, 33 (33(1-6), 309-320.* Available at http://www.almaden.ibm.com/cs/k53/www9.final

Björneborn, Lennart and Ingwersen, Peter (2001). Perspectives of webometrics. *Scientometrics, 50(1), 65-82.*

Bjorneborn, Lennard and Ingwersen, Peter (2004). Towards a basic framework for Webometrics.*Journal of the American Society for Information Science and Technology, 55(14), 1216-1227.*

Borgman CL, Furner J. (2002). Scholarly communication and bibliometrics.*Annu Rev Inform Sci Technol. 2002;36: 3–72.*

Chen, C et.al (1998). How did university departments interweave the web: *a study of*

connectivity and underlying factors.Interacting with Computers, 10,353-373

Germain, C. A. (2000). URLs: Uniform resource locators or unreliable resource locators. *College and Research Libraries, 61(4), 359-365.*

Garfield, E (1972). Citation analysis as a tool in journal evaluation. *Science, 178 (4060), 471-479*

Hartzel, D. H. (1987).History of the development of ideas in bibliometrics.*Encyclopedia of Library and Information Science, 42, Supplement 7, 144-219. New York: Marcel Dekker.* Retrieved from http://en.wikipedia.org/wiki/Main_Page.

Hawkins, D.T. (1997). Unconventional uses of on-line information retrieval systems: on-line bibliometrics studies. *Journal of the American Society for Information Science,28 (1), 13-18*

Ingwersen, P. (1998). The calculation of web impact factors. *Journal of Documentation*, 54(2),
236-43.

Larson, R.R. (1996). Bibliometrics of the World Wide Web: an exploratory analysis of the intellectual structure of cyberspace. In S. Hardin (Ed.), *Proceedings of the 59th Annual Meeting, ASIS 96, Baltimore, Maryland* (99.71-79)

Maharana, B., Nayak, K. and Sahu, N. K. (2006). Scholarly use of web resources in LIS research: a citation analysis. *Library Review, 55(9), 598-607.*

Mark, Maybury T. (2004). Universal multimedia information access. *Universal Access in the Information Society, 2(2), 96-104.*

Moed, H. F. (2002). The impact factors debate: the ISI's uses and limits. *Nature*, *415, 731-732.*

Nalimov, V.V. &Mulchenko, Z.M. (1969).Scientometrics, study of the development of science
as an information process. *Moscow: Nauka*

Nicolaisen, Jeppe (2007). Citation analysis. .*Annual Review of Information Science and Technology Volume 41, Issue 1, pages 609–641*

Pirolli, P., Pitkow, J &Rao, R. (1996). Silk from a sow's ear: extracting usable structures from the web. *CHI 96 Electronic Proceedings.* Available at http://www. acm. org/ sigchi/chi96/proceedings/papers.Pirolli_2/pp2.html

Price, Derek de Solla (1970). Citation measures of hard science, soft science, technology and nonscience. In C.E. Nelson & D.K. Pollock (Eds.), Communication among scientists and engineers (pp. 3-22).*Lexington: Heath Lexington Books.*

Ranganathan, S. R. (1949). Library and its scope.*Bangalore: DRTC Seventh Seminar Volume, Paper DA, 1995, 285-301.*

Rodriguez i Gairin, J.M. (1997). Impact assessment of information on the Internet: AltaVista, the citation index of the web. *RevistaEspanola De Documentacion Cientifica, 20(2), 175-181.*

Rousseau, R (1997). Sitations: an exploratory study. *Cybermetrics, 1(1),* Available at http://www.cindoc.csic.es/cybermetrics/articles/v2ilpl.html

Shukla, A. (2009). Measuring effectiveness of institutional websites: a case study of central universities of India. *Research Digest,* 4 (3).

Shukla, A. &Tripathi, A. (2009).Webometric analysis of institutes of national importance in India. *IASL1C Bulletin, 54(3), 165-180.*

Shukla, A. &Tripathi, A. (2014).Backlinks analyseof institutes of national importance and premier management institutions library websites. *Journal of International Academic Research for Multidisciplinary, 2(7),* 560-575.

Shukla, A. &Vanlalfeli. (2014), Webometricanalyses : websites of Indian Institutes of Technology. *Advancements in Library Sciences, 2(2}, 34-48.*

Shukla, A. &Tripathi, A. (2015).*Webometrics Studies and Libraries. 22-61*

Smith, A. G. &Thelwall, M. (2002). Web impact Australasian universities.

Scientometrics, 54(3).363

Tomas C. Almind& Peter Ingwersen (1997). "Informetric analyses on the World Wide Web: Methodological approaches to 'webometrics'". *Journal of Documentation.* **53** *(4): 404 – 426.*

Thelwall, M (2001 a). A publicly accessible database of UK university website links and a discussion of the need for human intervention in web crawling. *University of Wolverhampton. 24(2).*63

Thelwall, M. (2001 b).Exploring the link structure of the web with network diagrams. *Journal of Information Science, 27(6),* 393-402.

Thelwall, M. (2001 c).Extracting macroscopic information from web links.*Journal of the American Society for Information Science and Technology, 52(13), 1157-1168.*

Thelwall, M. (2001 d), Results from a web impact factor crawler. *Journal of Documentation, 57(2), 177-191.*

Vaughan, Lewin and Shaw D. (2003). Bibliographic and web citation: What is difference? *Journal of American Society for Information Science and Technology*, *54*(14), 1313-1322.

Verma.,Manoj Kumar and Devi, Krishna (2015) Content Analysis of Central Universities Library Websites of North Eastern States of India: A Survey. *Journal of Research in Librarianship* - Vol.2(5) Sep-Oct, 2015

Verma.,Manoj Kumar., and Devi, Krishna (2016) Web Content and Design Trends of Indian Institutes of Management (IIMs) Libraries Website: An Analysis. *DESIDOC Journal of Library & Information Technology, Vol. 36, No. 4, July 2016, pp. 220-227*

Web Usage Analysis Retrieved 21 November, 2016 from Google http://www.igi-global.com/dictionary/web-usage-analysis/32383

4.1 INTRODUCTION

In present study, the URL's of websites of nineteen (19) IIMs was suffered and search queries were made using the search engine "Google". The data has been collected in five rounds using the selected search engine for retrieving inlinks, outlinks and number of web pages of IIM's websites. To evaluate the chosen websites, the methodology used was investigative in nature. This data have been tabulated and analyzed based on the objectives of the present study.

4.2 URL ANALYSIS OF IIM's WEBSITES

A uniform resource locator (URL) also known as web address is a specific character string that constitutes a reference to a resource. The first part of the URL consists of the transfer protocol, the second specifies the domain names which is followed by directory and file name. For studying the URL of the website the domain name have been taken onto account wherein Table 4.1represent the most frequently used TLDs by the IIM's for their website.

Table 4.1: TLDs of IIM's Websites

Name of IIM's	Uniform Resource Locator (URL)	Top Level Domain	
		Genetic Top Level Domain (gTLD)	Country Code Top Level Domain (ccTLD)
IIMC	http://www.iimcal.ac.in/	.ac	.in
IIMA	http://www.iimahd.ernet.in/	.ernet	.in
IIMB	http://www.iimb.ernet.in/	.ernet	.in
IIML	http://www.iiml.ac.in/	.ac	.in
IIMK	http://www.iimk.ac.in/	.ac	.in
IIMI	http://www.iimidr.ac.in/	.ac	.in
IIMS	http://www.iimshillong.ac.in/	.ac	.in
IIMRTK	http://www.iimrohtak.ac.in/	.ac	.in
IIMRNCH	http://www.iimranchi.ac.in/	.ac	.in
IIMRP	http://www.iimraipur.ac.in/	.ac	.in
IIMT	http://www.iimtrichy.ac.in/	.ac	.in
IIMU	https://iimu.ac.in/	.ac	.in
IIMKSP	http://www.iimkashipur.ac.in/	.ac	.in
IIMN	http://iimnagpur.ac.in/	.ac	.in
IIMBG	http://www.iimbg.ac.in/	.ac	.in
IIMV	http://www.iimv.ac.in/	.ac	.in
IIMAMT	http://iimamritsar.ac.in/	.ac	.in
IIMSMBL	http://www.iimsambalpur.ac.in/	.ac	.in
IIMSMR	http://www.iiml.ac.in/iimsirmaur/	.ac	.in

Table 4.1 shows the total number of top Level Domains of IIMs and it revealed that TLDs of IIMs websites which are .ac, .ernet, and .in. The TLD .ac .in is used by 17 IIMs websites i.e.89.47 % of IIMs websites whereas only 2 IIM's websites i.e. 10.52 % have used .ernet.in. The TLDs are further divides into generic TLD (gTLD) and country code TLD (ccTLD). The gTD .ernet stands for Education and Research Network is used by two IIMS (IIM-A & IIM-B) websites (i.e. 10.52%). The ccTLD .in stands for the country India has been used by all of the IIM's websites (i.e. 100%).There are 15.78% IIMs (IIMU, IIMN & IIMAMT) websites having sub-sites (eg. https://iimu.ac.in/) whereas 16 (84.21%) IIMs websites are following directory structure (e.g. http://www.iimcal.ac.in/)

4.3 F ILE FORMATS SUPPORTED BY IIM's WEBSITES

A file format is a standard in which the information is encoded for storage in a computer file. A file format describes the way data is stored in a file. It defines the data structure (how the data is organized in the file) as well the type of data that the file contains. The format of a file is based on the end of its name i.e., the letter following the final period. For example images file such as GIF, Jpeg are identify by their name that end with .GIF or .Jpeg etc. The following table shows the type of file formats used by IIMs websites which are used for scholarly communication on their websites.

Table 4.2: File Format Supported by IIM's Websites

Name of IIM	HTML	PDF	MS-Word	MS- Excel	JPG / JPEG	PNG	WNA	Total file format
IIMC	✓	✓	✓	✓	✓	✓	✓	7
IIMA	✓	✓	✓	✗	✓	✓	✗	5
IIMB	✓	✓	✓	✗	✓	✓	✗	5
IIML	✓	✓	✓	✗	✓	✗	✗	4
IIMK	✓	✓	✗	✗	✓	✓	✓	5
IIMI	✓	✓	✗	✗	✓	✓	✗	4
IIMS	✓	✓	✓	✓	✓	✓	✗	6
IIMRTK	✓	✓	✗	✗	✓	✓	✗	4
IIMRNC	✓	✓	✓	✗	✓	✓	✗	5
IIMRP	✓	✓	✗	✗	✓	✗	✗	3
IIMT	✓	✓	✗	✗	✓	✗	✗	3

IIM-U	✓	✓	✗	✗	✓	✓	✗	4
IIMKSP	✓	✓	✗	✗	✓	✓	✗	4
IIMN	✓	✓	✗	✗	✓	✗	✗	3
IIMBG	✓	✓	✓	✓	✗	✓	✗	5
IIMV	✓	✓	✗	✗	✓	✓	✗	4
IIMAMT	✓	✓	✗	✗	✓	✗	✗	3
IIMSMBL	✓	✓	✓	✗	✓	✓	✗	5
IIMSMR	✓	✓	✗	✗	✓	✓	✗	4
Percentage	100 %	100 %	42.10%	15.78 %	94.73 %	73.68 %	10.52 %	

After analyzing all the web pages (page wise) inside the IIMs websites, document file format (.html, .pdf, .doc, .excel,), image file format (.jpg / .jpeg, .png, etc) have been used to display information on the website. From the table 4.2, it was cleared that all the IIM's websites are using HTML (100%) followed by PDF (100 %), MS-Word (42.10%), MS-Excel (15.78%) under the document file format. In image file formats, JPG / JPEG (94.73%), PNG (73.68 %) in IIMs websites. IIMC (IIM-Calcutta) have used maximum file format (7) to represent the information content of website followed by IIMS (IIM- Shillong) second and the least file format (3) have been used by IIMRP (IIM-Raipur), IIMT (IIM-Trichy), IIMN (IIM-Nagpur) and IIM (IIM-Amritsar). While analyzing the file format of IIM website it have been found that 12 IIM Library website i.,e 63.15 % are using a Web-Opac in their websites.

4.4 SEARCH ENGINE PERFORMANCE IN WEBOMETRICS RESEARCH OF IIMs WEBSITES

The search engine performance is one of the important criterions in webometric research for evaluating the reliability of the search engines taken for the study. Table 4.9 shows the differences in performance of search result by using same search expression without gap after command and with gap after command. The search expressions used for this study are given below:

1) Search expression (without gap)

Site:www.iimcal.ac.in/

2) Search expression (with gap)

site: www.iimcal.ac.in/

Table 4.3: Search Engine Performance in Webometrics Data Collection

(With site command **site:URL** and **site: URL**)

(Round 1 Data collection Date &Time:14.10.2016 between 11:23am to 12:14 pm)

Search Expression (Without gap)	No of Hits	Search Expression (With gap)	No. of Hits
site:www.iimcal.ac.in/	2,630	site: www.iimcal.ac.in/	13,400
site:www.iimahd.ernet.in/	19,000	site: www.iimahd.ernet.in/	55,300
site:www.iimb.ernet.in/	15,900	site: www.iimb.ernet.in/	10,20,000
site:www.iiml.ac.in/	1	site: www.iiml.ac.in/	8,29,000
site:www.iimk.ac.in/#5	13,900	site: www.iimk.ac.in/#5	4,08,000
site:www.iimidr.ac.in/	2,430	site: www.iimidr.ac.in/	1,46,000
site:www.iimshillong.ac.in/	267	site: www.iimshillong.ac.in/	99,600
site:www.iimrohtak.ac.in/	638	site: www.iimrohtak.ac.in/	82,200
site:www.iimranchi.ac.in/	1,780	site: www.iimranchi.ac.in/	94,700
site:www.iimraipur.ac.in/	1,680	site: www.iimraipur.ac.in/	59,800
site:www.iimtrichy.ac.in/	660	site: www.iimtrichy.ac.in/	35,400
site:www.iimu.ac.in/	166	site: www.iimu.ac.in/	1,17,000
site:www.iimkashipur.ac.in/	1,560	site: www.iimkashipur.ac.in/	51,500
site:www.iimnagpur.ac.in/		site: www.iimnagpur.ac.in/	24,600
site:www.iimbg.ac.in/	1	site: www.iimbg.ac.in/	1,690
site:www.iimv.ac.in/	27	site: www.iimv.ac.in/	30,80,000
site:www.iimamritsar.ac.in/	43	site: www.iimamritsar.ac.in/	7,830
site:www.iimsambalpur.ac.in/	92	site: www.iimsambalpur.ac.in/	16,900
site:www.iiml.ac.in/iimsirmaur/	1	site: www.iiml.ac.in/iimsirmaur/	2,960

Table 4.3 depicts that search expression with gap are having more number of hits in comparison to search expression without gap. Through logically, search expressions without gap are corrects. The command **site:URL** means the number of all the pages inside the URL. There is huge variation in data given by the same search engine for the same search expression. So, utmost care should be taken for such kind of study.

Table 4.4: Search Engine Performance in Webometrics Data Collection

(With link command link**:URL** and link**: URL**)

(Round 1 Data collection Date &Time: 14.10.2016 between 11:23 am to 12:14 pm)

Search Expression (Without gap)	No of Hits	Search Expression (With gap)	No. of Hits
link:www.iimcal.ac.in/	111	link: www.iimcal.ac.in/	11,700
link:www.iimahd.ernet.in/	273	link: www.iimahd.ernet.in/	29,200
link:www.iimb.ernet.in/	208	link: www.iimb.ernet.in/	3,02,000
link:www.iiml.ac.in/		link: www.iiml.ac.in/	2,52,000
link:www.iimk.ac.in/#5		link: www.iimk.ac.in/#5	4,02,000
link:www.iimidr.ac.in/	14	link: www.iimidr.ac.in/	10,200
link:www.iimshillong.ac.in/		link: www.iimshillong.ac.in/	1,95,000
link:www.iimrohtak.ac.in/	31	link: www.iimrohtak.ac.in/	79,800
link:www.iimranchi.ac.in/	30	link: www.iimranchi.ac.in/	1,07,000
link:www.iimraipur.ac.in/	9	link: www.iimraipur.ac.in/	51,800
link:www.iimtrichy.ac.in/	32	link: www.iimtrichy.ac.in/	29,300
link:www.iimu.ac.in/		link: www.iimu.ac.in/	1,01,000
link:www.iimkashipur.ac.in/	16	link: www.iimkashipur.ac.in/	43,700
link:www.iimnagpur.ac.in/		link: www.iimnagpur.ac.in/	23,300
link:www.iimbg.ac.in/		link: www.iimbg.ac.in/	1,500
link:www.iimv.ac.in/		link: www.iimv.ac.in/	42,70,000
link:www.iimamritsar.ac.in/		link: www.iimamritsar.ac.in/	5,610
link:www.iimsambalpur.ac.in/		link: www.iimsambalpur.ac.in/	14,700
link:www.iiml.ac.in/iimsirmaur/		link: www.iiml.ac.in/iimsirmaur/	2,040

Table 4.4 shows the same kind of result with link command for all the IIMs websites. The command **link:URL** means the total number of web pages which have links to given URL.

Table 4.5: Search Engine Performance in Webometrics Data Collection

(With site command site:URL and **site: URL**)

(Round 2 Data collection Date &Time: 30.10.2016 between 01:15pm to 1:50 pm)

Search Expression (Without gap)	No of Hits	Search Expression (With gap)	No. of Hits
site:www.iimcal.ac.in/	2,690	site: www.iimcal.ac.in/	13,400
site:www.iimahd.ernet.in/	21,600	site: www.iimahd.ernet.in/	58,700
site:www.iimb.ernet.in/	16,200	site: www.iimb.ernet.in/	11,00,000
site:www.iiml.ac.in/	1	site: www.iiml.ac.in/	10,90,000
site:www.iimk.ac.in/#5	14,000	site: www.iimk.ac.in/#5	4,15,000
site:www.iimidr.ac.in/	2,460	site: www.iimidr.ac.in/	1,42,000
site:www.iimshillong.ac.in/	273	site: www.iimshillong.ac.in/	93,900
site:www.iimrohtak.ac.in/	638	site: www.iimrohtak.ac.in/	70,900
site:www.iimranchi.ac.in/	1,840	site: www.iimranchi.ac.in/	91,200
site:www.iimraipur.ac.in/	1,690	site: www.iimraipur.ac.in/	35,500
site:www.iimtrichy.ac.in/	652	site: www.iimtrichy.ac.in/	35,000
site:www.iimu.ac.in/	176	site: www.iimu.ac.in/	87,700
site:www.iimkashipur.ac.in/	1,540	site: www.iimkashipur.ac.in/	51,300
site:www.iimnagpur.ac.in/	-	site: www.iimnagpur.ac.in/	10,300
site:www.iimbg.ac.in/	-	site: www.iimbg.ac.in/	1,680
site:www.iimv.ac.in/	24	site: www.iimv.ac.in/	29,70,000
site:www.iimamritsar.ac.in/	46	site: www.iimamritsar.ac.in/	6,400
site:www.iimsambalpur.ac.in/	91	site: www.iimsambalpur.ac.in/	16,600
site:www.iiml.ac.in/iimsirmaur/	1	site: www.iiml.ac.in/iimsirmaur/	2,920

Tables 4.5 depict the second round of data collection and have observed that search expression with gap are having more number of hits in comparison to search expression without gap.

Search Expression (Without gap)	No of Hits	Search Expression (With gap)	No. of Hits
link:www.iimcal.ac.in/	112	link: www.iimcal.ac.in/	11,800
link:www.iimahd.ernet.in/	271	link: www.iimahd.ernet.in/	30,100
link:www.iimb.ernet.in/	208	link: www.iimb.ernet.in/	3,05,000
link:www.iiml.ac.in/	-	link: www.iiml.ac.in/	3,23,000
link:www.iimk.ac.in/#5	-	link: www.iimk.ac.in/#5	5,91,000
link:www.iimidr.ac.in/	14	link: www.iimidr.ac.in/	10,500
link:www.iimshillong.ac.in/	-	link: www.iimshillong.ac.in/	1,87,000
link:www.iimrohtak.ac.in/	31	link: www.iimrohtak.ac.in/	66,600
link:www.iimranchi.ac.in/	30	link: www.iimranchi.ac.in/	1,01,000
link:www.iimraipur.ac.in/	9	link: www.iimraipur.ac.in/	41,100
link:www.iimtrichy.ac.in/	32	link: www.iimtrichy.ac.in/	28,700
link:www.iimu.ac.in/	-	link: www.iimu.ac.in/	1,17,000
link:www.iimkashipur.ac.in/	16	link: www.iimkashipur.ac.in/	41,300
link:www.iimnagpur.ac.in/	-	link: www.iimnagpur.ac.in/	25,200
link:www.iimbg.ac.in/	-	link: www.iimbg.ac.in/	1,500
link:www.iimv.ac.in/	-	link: www.iimv.ac.in/	41,50,000
link:www.iimamritsar.ac.in/	-	link: www.iimamritsar.ac.in/	4,560
link:www.iimsambalpur.ac.in/	-	link: www.iimsambalpur.ac.in/	14,500
link:www.iiml.ac.in/iimsirmaur/	2,920	link: www.iiml.ac.in/iimsirmaur/	2,920

Table 4.6 reveals the second round of data collection and have observed that search expression with **link: URL** with gap are having more number of hits in comparison to search expression without gap.

4.5 DOMAIN AUTHORITY AND PAGE AUTHORITY OF IIMs WEBSITE

Domain authority is a metric, developed by SEOMoz, to predict the ability of a website/ domain to rank in search engines. Domain authority uses a 0 to 100 logarithmic scale. A high Domain authority score means your complete website/ all the pages on your domain have the potential to rank well in search engine results.

Page authority is a metric, developed by SEOMoz, to predict the ability for a specific page to rank in search engines. Page authority uses a 0 to 100 logarithmic scale. A high Page authority score means your page has the potential to rank well in search engine results.

For Accessing the Data of Domain Authority and Page Authority of IIMs Websites *"Open Site Explorer"* free online tools have been used for collecting the data.

Table 4.7: Domain Authority and Page Authority of IIMs Websites.

Sl. No.	Name of IIMs	Domain Authority	Page authority
1	IIMC	54	47
2	IIMA	73	46
3	IIMB	73	41
4	IIML	48	39
5	IIMK	50	45
6	IIMI	48	56
7	IIMS	1	1
8	IIMRTK	1	1
9	IIMRNCH	36	47
10	IIMRP	35	27
11	IIMT	43	43
12	IIMU	43	50
13	IIMKSP	35	34
14	IIMN	30	40
15	IIMBG	19	32
16	IIMV	25	36
17	IIMAMT	25	35
18	IIMSMBL	20	1
19	IIMSMR	48	39
Total		**707**	**660**

Table 4.7 shows the Domain Authority and Page Authority of Indian Institutes of Management websites, in which Domain Authority of IIMA (IIM-Ahmedabad) and IIMB (IIM-Bangalore) is in the highest position with 73 among the All IIMs websites, followed by IIMC (IIM-Calcutta) 54 and IIMK (IIM-Kozhikode) 50, IIMS (IIM-Shillong) and IIMRTK (IIM-Rohtak) have the lowest Domain Authority i.e. 01.

In Page Authority, IIMI (IIM-Indore) with 56 is the highest, followed by IIMU (IIM-Udaipur) 50 and IIMC (IIM-Calcutta) 47. Among the IIMs websites, IIMS (IIM-Shillong), IIMRTK (IIM-Rohtak) and IIMSMBL (IIM-Sambalpur) have the Lowest Page Authority i.e. 01.

4.6 TOTAL INTERNAL AND TOTAL EXTERNAL LINKS OF IIMs WEBSITES

Internal links are links that go from one page on a domain to a different page on the same domain. They are commonly used in main navigation. These types of links allow users to navigate a website. They help in establish information hierarchy for the given website and help in spreading link juice (ranking power) around websites.

External Links are hyperlinks that point at (target) any domain other than the domain the link exists on (source).In layman's terms, if another website links to you; this is considered an external link to your site. Similarly, if you link out to another website, this is also considered an external link. SEOs believe that external links are the most important source of ranking power. External links pass "link juice" (ranking power) differently than internal links because the search engines consider them as third-party votes.

Table 4.8: Total Internal Links and Total External Links of IIMs Websites

Sl. No.	Name of IIMs	Internal Links	External Links	Total Links
1	IIMC	1	336	337
2	IIMA	1	45	46
3	IIMB	0	25	25
4	IIML	1	8	9
5	IIMK	45	51	96
6	IIMI	770	2054	2824
7	IIMS	0	0	0
8	IIM-RTK	0	0	0
9	IIMRNCH	11	653	664
10	IIMRP	0	5	5
11	IIMT	188	7	195
12	IIMU	2	665	657

13	IIMKSP	31	16	47
14	IIMN	16	470	486
15	IIMBG	1	372	373
16	IIMV	1	376	377
17	IIMAMT	1	447	448
18	IIMSMBL	0	0	0
19	IIMSMR	1	8	9
	Total	**1070**	**5538**	**6598**

Table 4.8 shows the ranking of Indian Institutes of Management websites on the basis of Total Internal Links and Total External Links. The result visualized that total 1070 total Internal Links and 5538 total External Links was reported from all IIMs websites. In Internal Links analysis IIM-Indore leads with 770 internal links followed by IIM-Trichy(188) which occupies second place and IIM- Kozhikode (45) occupies third place while five IIMs (IIM -Bangalore, Shillong, Rohtak, Raipur and Sambalpur) have no Internal Links. In Extenal Link analysis, again IIM-Indore with 2054, External Links occupied the first place among IIMs websites, followed by IIM-Udaipur (665) which occupied second place and IIM-Ranchi with 653 External Links occupied the third place while three IIMs (IIM- Shillong, Rohtak and Sambalpur) have not a single external link till now.

Total Links (total internal links & total external links) result visualized that IIM-Indore leads with 2824 Total Links followed by IIM-Ranchi (664) which occupies the second place and IIM-Udaipur with 657 Total Links occupies third place.

4.7 INTERNAL EQUITY-PASSING LINKS AND EXTERNAL EQUITY-PASSING LINKS

Equity links can be internal and external links. The difference between external and internal links:

- External links are links pointing from another domain (external website) to a page on your website. For example, somewebsite.com is linking to yourwebiste.com/products/.
- Internal links are links pointing to pages inside your website. For example-yourwebiste.com/products/ is linking to yourwebiste.com/product-a/.

Table 4.9: Total Links of IIMs Websites

Sl. No.	Name of IIMs	Internal Equity-Passing Links	External Equity-Passing Links	Total Equity-Passing Links
1	IIMC	0	325	325
2	IIMA	1	35	36
3	IIMB	0	15	15
4	IIML	0	3	3
5	IIMK	45	45	90
6	IIMI	770	1990	2760
7	IIMS	0	0	0
8	IIMRTK	0	0	0
9	IIMRNCH	11	624	635
10	IIMRP	0	3	3
11	IIMT	188	5	193
12	IIMU	2	623	625
13	IIMKSP	31	13	44
14	IIMN	16	465	481
15	IIMBG	1	371	372
16	IIMV	16	373	374
17	IIMAMT	1	444	445
18	IIMSMBL	0	0	0
19	IIMSMR	0	3	3
Total		**1082**	**5337**	**6404**

Table 4.9 shows the ranking of Indian Institutes of Management websites on the basis of Equity passing links. The result visualized that total 1082 total Internal Equity Passing Links and 5337 total External Equity Passing Links was reported from all IIMs websites. In Internal Equity Passing Links analysis result visualized that IIM-Indore has the highest number of Internal Equity-Passing Links with 770, followed by IIM-Trichy (188) occupied second place and IIM-Kozhikode with 45, which occupies the third place while External Equity Passing Links analysis result visualized that again IIM-Indore has the highest number of Internal Equity-Passing Links with 770, followed by IIM- Trichy (188) and IIM-Kozhikode with 45, which occupies the second and third place respectively.

Total Equity-Passing Links (total internal & total external Equity-Passing Links) result visualized that IIM-Indore leads with 2760 among the all IIMs websites, followed by IIM-Ranchi with 635 occupies the second position and IIM-Udaipur with 625 occupies the third position.

4.8 INDIVIDUALIZED DOMAINS OF IIMs WEBSITES

The following definition should be read carefully before going to the table of the individualized Domains of IIMs websites:-.

a) Domain: Domain names serve as memorizable names for websites and other services on the Internet. However, computers access Internet devices by their IP addresses. DNS translates domain names into IP addresses, allowing you to access an Internet location by its domain name. All devices sharing a common part of the IP address are said to be in the same domain. When referring to an Internet address or name a **domain** or **domain name** is the location of a website. For example, the domain name "computerhope.com" points to the IP address "45.79.151.23", but it is generally easier to remember a name rather than a long string of numbers. A domain name can be a maximum of sixty-three characters with one character minimum, and is entered after the protocol in the URL, as you can see in the following example.

b) Linking Root Domains: The number of unique domains linking to your domain or page. When a site links to another one or more than one time in Search Engine Optimization, site A is said to be a linking root domain.

c) Domain Authority: Domain authority is one of the main factors that define how well your website will rank in search engines.

Domain authority is a metric which was created by Moz (SaaS company), for the purpose of rating a website on a scale of 1-100, (100 being the best and 1 being the worst). So the higher the domain authority of a website, the higher its ranking in search engines.

Table 4.10: Individualized Domains of IIMs Websites

Sl. No.	Name of the IIMs	Name of the Linking Root Domain	Domain Authority	Linking Root Domains
1	IIMC	blogspot.com/	90	1749634
		ku.edu.tr/	62	2051
		poetsandquants.com/	57	1059
		iimcal.ac.in	54	653
		jagranjosh.com/	50	749
2	IIMA	weebly.com/	95	573,053
		ernet.in/	73	10,389
		departures.com/	67	1,519
		nextbillion.net/	65	1,218
		jagranjosh.com/	50	747
3	IIMB	prnewswire.com	91	84,062
		jagranjosh.com/	50	747
		puducherry.gov.in/	45	341
		edtechreview.in/	42	604
		coolavenues.com/	36	242
4	IIML	jagranjosh.com/	50	747
		prurgent.com/	44	957
		sscbankgk.in/	25	51
		vatsnew.com/	24	8
		websitelists.in/	17	9
5	IIMK	webindia123.com/	50	2,855
		iimk.ac.in/	50	462
		jagranjosh.com/	50	747
		careerindia.com/	41	231
		pmi.org.in/	35	123
6	IIMI	weebly.com/	95	573,053
		github.io/	94	120,395
		sfu.ca/	92	27,553
		blogspot.com/	90	1,749,634

		cuny.edu/	82	30,161
7	**IIMS**	**-**	0	0
8	**IIMRTK**	**-**	0	0
9	**IIMR**	**iitb.ac.in/**	70	4,454
		webometrics.info/	69	2,400
		iitd.ac.in/	69	1,960
		blogspot.in/	67	65,742
		mhrd.gov.in/	67	2,035
10	**IIMRP**	**jagranjosh.com/**	50	747
		mbarendezvous.com/	29	40
		cresttal.com/	25	97
		websitelists.in/	17	9
11	**IIMT**	**jagranjosh.com/**	50	747
		iimtrichy.ac.in/	43	300
		saanj.net/	38	701
		recruitment-career.co.in/	24	85
		iwebsiteworth.com/	18	11
12	**IIMU**	**ibm.com/**	98	118,117
		ted.com/	96	134,426
		repec.org/	80	10,179
		uni-erlangen.de/	74	12,335
		apics.org/	70	1,761
13	**IIMKSP**	**secureserver.net/**	90	340,748
		rti.gov.in/	63	878
		righttoinformation.gov.in/	54	453
		jagranjosh.com/	50	747
		ua.nic.in/	41	223
14	**IIMN**	**blogspot.com/**	90	1,749,634
		secureserver.net/	90	340,748
		ernet.in/	73	10,389
		webometrics.info/	69	2,400
		mhrd.gov.in/	67	2,035

15	**IIMBG**	**mhrd.gov.in/**	67	2,035
		caluniv.ac.in/	53	610
		iimbg.ac.in/	19	4
16	**IIMV**	**secureserver.net/**	90	340,748
		mhrd.gov.in/	67	2,035
		caluniv.ac.in/	53	610
		yourgoal.in/	31	34
		iimv.ac.in/	25	16
17	**IIMAMT**	**mhrd.gov.in/**	67	2,035
		iimk.ac.in/	50	462
		iimamritsar.ac.in/	25	11
		websitelists.in/	17	9
18	**IIMSBL**	**-**	0	0
19	**IIMSMR**	**jagranjosh.com/**	50	747
		prurgent.com/	44	957
		sscbankgk.in/	25	51
		vatsnew.com/	24	8
		websitelists.in/	17	9

Table 4.10 illustrates the Individualized Domains of IIMs and from the analysis of IIM Calcutta result visualized that the **blogspot.com/** with Domain Authority of 90and the Linking Root Domains with 1749634 is the highest among all domain of search.

The IIM-Ahmedabad visualized that the **weebly.com/with the Domain Authority of 95 and Linking Root Domains of** 573,053**is the highest.**

In IIM-Bangalore analysis visualized thatprnewswire.com/ with the Domain Authority of 91 and Linking Root Domains of84,062 is the highest.

In IIM-Lucknow analysis visualized that **jagranjosh.com/with the Domain Authority of 50 got the highest and prurgent.com/ with Linking Root Domains of** 957 is the highest.
In IIM-Kozhikode analysis visualized that the Domain Authority **webindia123.com/, iimk.ac.in/ and jagranjosh.com/**with 50 **got the highest and the Linking Root Domains of webindia123.com/ with**2,855**is the highest.**

In IIM-Indore analysis visualized **that the Domain Authority of the weebly.com/with 95 is the highest and the Linking Root Domains of blogspot.com/with**1749634**is the highest.**

The Individualized Domains of IIM-Shillong and Rohtak are found zero.

In IIM-Ranchi analysis visualized that **Domain Authority ofiitb.ac.in/with** 70**is the highest**, and the **Linking Root Domains of blogspot.in/with** 65,742**is the highest**.

In IIM-Raipur analysis visualized that the **jagranjosh.com/with Domain Authority of 50 and the Linking Root Domains of**747**is the highest.**

In IIM-Trichy analysis result visualized that the **jagranjosh.com/with Domain Authority of 50 and has the Linking Root Domains of** 747 is the highest.

In IIM-Udaipur analysis visualized that the **Domain Authority of ibm.com/with 98 is the highest, while the Linking Root Domains of ted.com/with**134,426**is the highest.**

In IIM-Kashipur analysis visualized that the **secureserver.net/with** Domain Authority of 90 **and the Linking Root Domain with 340,748** is the highest.

In IIM-Nagpur analysis t visualized that the **blogspot.com/and secureserver.net/with Domain authority of 90 is the highest and the Linking Root Domains of blogspot.com/** with 1,749,634 is the highest.

In IIM-Bodh Gaya analysis visualized that the **mhrd.gov.in/**with Domain Authority of 67 and Linking Root Domains of 2,035 is the highest.

In IIM-Visakhapatnam analysis visualized that the**secureserver.net/with** Domain Authority of 90 and Linking Root Domains of 340,748 is the highest.

In IIM-Amritsar analysis visualized that the**mhrd.gov.in/**with Domain Authority of 67 and Linking Root Domains of 2,035 is the highest.

In IIM-Sambalpur analysis result visualized that Individualized Domains is found zero.

In IIM-Sirmaur analysis visualized that the **Domain Authority ofjagranjosh.com/with 50 and the Linking Root Domains of prurgent.com/with** 957 is the highest.

4.9 WEB IMPACT FACTOR (WIF) OF IIM's WEBSITES

For calculating the WIF, the links of the IIMS websites were collected using the command i.e. site:URL and link:URL in search engine Google. By using the textual queries the number of web page and number of links present in the library websites have been collected. Then, these links were analyzed based on the formula given by Ingwerson (As given in Chapter 1 under heading 1.5.2).

4.9.1 WIF and Ranking of IIMs Websites in First Round

Table 4.11: WIF of IIMs Websites in First Round
(Data collection Date & Time: 25.08.2016 between 8:23 PM to 9:47 pm)

Name of IIM (Coded form)	No of Web Page (A)	Total Link (B)	In Link (C)	Self Link (D)	WIF E=(B/A)	Self Link WIF F=(D/A)	Inlink WIF G=(C/A)	Rank (based on RWIF)
IIML	1	23	12	11	23	11	12	1
IIMRTK	586	32	7	25	0.054607	0.042662	0.011945	2
IIMC	2,490	112	26	86	0.044979	0.034538	0.010441	3
IIMT	603	43	6	37	0.07131	0.061359	0.00995	4
IIMI	2360	14	13	1	0.005932	0.000423	0.005508	5
IIMRP	1670	10	5	5	0.005988	0.002994	0.002994	6
IIMB	16000	213	47	166	0.013312	0.010375	0.002937	7
IIMKSP	1590	20	4	16	0.012578	0.010062	0.002515	8
IIMRNCH	1820	31	3	28	0.017032	0.015384	0.001648	9
IIMA	21000	275	29	246	0.013095	0.011714	0.00138	10
IIMK	15100	0	0	0	0	0	0	
IIMS	202	0	0	0	0	0	0	
IIMU	117	0	0	0	0	0	0	
IIMBG	1	0	0	0	0	0	0	
IIMV	26	0	0	0	0	0	0	
IIMAMT	5	0	0	0	0	0	0	
IIMSMBL	80	0	0	0	0	0	0	
IIMSMR	1	0	0	0	0	0	0	
IIMN	Data not collected due to non availability of the websites during the period of data collection							

Table 4.11 shows the WIF of IIMs Websites in First Round, it has been observed that some IIM's websites have been indexed thoroughly in Google's search engine database whereas some IIM websites have not been indexed thoroughly (e.g. IIML). It has been observed that website having numbers of indexed pages in Google have very less numbers of links and inlinks pages. On the basis of revised WIF it has been found that IIML has the highest RWIF data which leads to 1st rank in first round of data. IIMRTK have obtained 2nd rank, IIMC (IIM-Calcutta) have obtained 3rd rank and IIMT & IIMI have obtained 4th & 5th rank respectively.

IIMRP, IIMB, IIMKSP, IIMRNCH & IIMA have obtained 6th, 7th, 8th, 9th and 10th ranks. It has been observed that some websites which are having indexing pages in Google has no total link from other sources (e.g. IIMK, IIMS, IIMU, IIMBG, IIMV, IIMAMT, IIMSMBL, IIMSMR and IIMN) and their RWIF was zero. IIMBG & IIMSMR have the same indexing pages in Google like IIML but total links could not be established which gives zero result. WIF of IIMN data is not collected due to non availability of the websites during the period of data collection.

4.9.2 WIF and Ranking of IIMs Websites in Second Round

Table 4.12: WIF of IIMs Websites in Second Round

(Data collection Date & Time: 10.09.2016 between 2:50 PM to 3:49 pm)

Name of IIM (Coded form)	No of Web Page (A)	Total Link (B)	In Link (C)	Self Link D=(B/C)	WIF E=(B/A)	Self Link WIF F=(D/A)	Inlink WIF G=(C/A)	Rank (based on RWIF)
IIML	1	23	12	11	23	11	12	1
IIMC	2,490	112	28	84	0.044979	0.033734	0.011245	2
IIM-RTK	601	32	6	26	0.053244	0.043261	0.009983	3
IIMT	688	36	5	31	0.052325	0.045058	0.007267	4
IIMI	2,350	14	13	1	0.005957	0.000425	0.005532	5
IIMB	16,400	210	45	165	0.012804	0.010060	0.002744	6
IIMRP	1,680	9	4	5	0.005357	0.002976	0.002381	7
IIMKSP	1,590	18	3	15	0.011320	0.009433	0.001887	8
IIMRNCH	1,800	31	3	28	0.017222	0.015555	0.001667	9
IIMA	20,500	276	28	248	0.013463	0.012097	0.001366	10
IIMK	14,700	0	0	0	0	0	0	
IIMS	43	0		0	0	0	0	
IIMU	36	0	0	0	0	0	0	
IIMV	30	0	0	0	0	0	0	
IIMAMT	5	0	0	0	0	0	0	
IIMSMBL	81	0	0	0	0	0	0	
IIMSMR	1	0	0	0	0	0	0	
IIMN	Data not collected due to non availability of the websites during the period of data collection							
IIMBG	Data not collected due to non availability of the websites during the period of data collection							

Table 4.12 shows the WIF of IIMs Websites in Second Round, it has been observed that some IIMs websites have been indexed thoroughly in Google's search engine database (e.g. IIMC, IIMA etc) whereas some IIM websites have not been indexed thoroughly. Till the second round of the data collection it has been observed that website having number of indexed pages in Google can have no links and inlinks to the websites. From the Table 4.12 shows that IIMs Website having less number of indexed pages and less links leads to higher WIF (e.g. IIML, IIMRTK) than those having more number of indexing pages and more links on the website. On the basis of Rank based on RWIF, it has been found that by having only single number (1) of indexing pages in Google and having an equivalent number of web pages, links etc to the First round of data collection, IIML has the highest data of RWIF, Self Link WIF and Inlinks WIF and leads to 1st rank of RWIF data in Second round of data collection. IIMC, IIMRTK, IIMT and IIMI have obtained 2nd, 3rd, 4th and 5th ranks respectively with the RWIF ranging between 0.011245 to 0.005532. IIMB have come up to 6th ranks while IIMRP have come down to 7th ranks. IIMKSP have the same 8th ranks as in first round of data collection. IIMRNCH have obtained 9th ranks while IIMA have obtained 10th ranks in the second round of data collection. The rest of the seven (7) IIM's website are having indexing pages in Google but has no links from other sources lead to zero WIF. While IIMN and IIMBG data is not collected due to non-availability of the websites during the period of data collection. From the above Table 4.12 we can see that the ranking of IIM's websites have little changes as compared to the first round.

4.9.3 WIF and Ranking of IIMs Websites in Third Round

Table 4.13: WIF of IIMs Websites in Third Round

(Data collection Date & Time: 26.09.2016 between 11:48 am to 12:43 pm)

Name of IIM (Coded form)	No of Web Page (A)	Total Link (B)	In Link (C)	Self Link D=(B/C)	WIF E=(B/A)	Self Link WIF F=(D/A)	Inlink WIF G=(C/A)	Rank (based on RWIF)
IIML	1	23	12	11	23	11	12	1
IIMC	2,490	112	28	84	0.044979	0.033734	0.011245	2
IIM-RTK	601	32	6	26	0.053244	0.043261	0.009983	3
IIMT	688	36	5	31	0.052325	0.045058	0.007267	4
IIMI	2,350	14	13	1	0.005957	0.000425	0.005532	5
IIMB	16,400	210	45	165	0.012804	0.010060	0.002744	6
IIMRP	1,680	9	4	5	0.005357	0.002976	0.002381	7

IIMKSP	1,590	18	3	15	0.011325	0.009433	0.001887	8
IIMRNCH	1,800	31	3	28	0.017222	0.015555	0.001667	9
IIMA	20,500	276	28	248	0.013463	0.012097	0.001366	10
IIMK	14,700			0	0	0	0	
IIMS	43			0	0	0	0	
IIMU	36			0	0	0	0	
IIMV	30			0	0	0	0	
IIMAMT	5			0	0	0	0	
IIMSMBL	81			0	0	0	0	
IIMSMR	1			0	0	0	0	
IIMN	Data not collected due to non availability of the websites during the period of data collection							
IIMBG	Data not collected due to non availability of the websites during the period of data collection							

Table 4.13 shows the WIF of IIMs Websites in Third Round and it observed that some IIM's websites IIMC, IIMA, IIMB have been indexed thoroughly in Google's search engine database. Till the third round of the data collection it has been observed that website having number of indexed pages in Google can have no links and inlinks to the websites (eg. IIMK, IIMS etc). From the above Table 4.13 it can be observe that IIMs Website having less number of indexed pages and at less links leads to higher WIF (e.g. IIML, IIMT, IIMRTK) than those having more number of indexing pages and more links (e.g. IMC, IIMA etc.). On the basis of Rank based on RWIF, it has been found that the same data i.e. number of indexing, links etc IIML has the highest rank of RWIF. This is due to less number of indexing wed pages with less numbers of links. IIMC, IIMRTK, IIMT & IIMI have obtained 2nd, 3rd, 4th and 5th ranks respectively with the RWIF ranging between 0.011245 to 0.005532. IIMB have obtained 6th ranks and IIMB again has the same data like in second round with a number(16400) of indexing number (210) of total link and number (45) of in links with a number (165) of Self link. From table 4.13 it has been found again IIMK, IIMS, IIMU, IIMV, IIMAMT, IIMSMBL, IIMSMR have no links. While IIMN & IIMBG data cannot be collected due to non availability of the websites during the period of data collection.

4.9.4 WIF and Ranking of IIMs Websites in Fourth Round

Table 4.14: WIF of IIMs Websites in Fourth Round

(Data collection Date & Time: 12.10.2016 between 12:14 pm to 12:53 pm)

Name of IIM (Coded form) (A)	No of Web Page (A)	Total Link (B)	In Link (C)	Self Link D=(B/C)	WIF E=(B/A)	Self Link WIF F=(D/A)	Inlink WIF G=(C/A)	Rank (based on RWIF)
IIMRTK	626	33	8	25	0.052715	0.039936	0.012779	1
IIMC	2,520	112	28	84	0.044444	0.033333	0.011111	2
IIMT	756	32	5	27	0.042328	0.035714	0.006613	3
IIMI	2,410	13	12	1	0.005394	0.000414	0.004979	4
IIMB	16,800	210	45	165	0.0125	0.009821	0.002678	5
IIMRP	1,710	9	4	5	0.005263	0.002923	0.002339	6
IIMRNCH	1,850	31	3	28	0.016756	0.015135	0.001621	7
IIMA	20,700	274	31	243	0.013236	0.011739	0.001497	8
IIMKSP	1,590	16	2	14	0.010062	0.008805	0.001257	9
IIML	1	0	0	0	0	0	0	
IIMK	15,700	0	0	0	0	0	0	
IIMS	252	0	0	0	0	0	0	
IIMU	124	0	0	0	0	0	0	
IIMBG	1	0	0	0	0	0	0	
IIMV	27	0	0	0	0	0	0	
IIMAMT	5	0	0	0	0	0	0	
IIMSMBL	94	0	0	0	0	0	0	
IIMSMR	1	0	0	0	0	0	0	
IIMN	Data not collected due to non availability of the websites during the period of data collection							

The above Table 4.14 shows the WIF of IIMs Websites in fourth round, it has been found again that some IIM's websites have not been indexed thoroughly in Google's search engine database while some IIM's websites (e.g. IIMC, IIMA, IIMB) have been indexed thoroughly in Google's search engine database. It is found that till the fourth round of data collection some of the IIM's website having indexed pages in Google's don't have any links to the websites (e.g. IIMK, IIMS. etc). In this fourth round of data collection IIML which top the rank in the previous 1st to 3rd round of data collection have no links to the websites, which lead IIMRTK the highest rank of RWIF data. IIMC, IIMT, IIMI and IIMAB have obtained 2nd, 3rd, 4th and 5th ranks respectively with the RWIF ranging between 0.011111 to 0.002678. IIMRP have obtained 6th ranks and websites of IIMRNCH, IIMA & IIMKSP have obtained 7th, 8th and 9th ranks. From the above

table 4.14 unlike the previous round of data it can be found that there are only nine (9) IIM's websites which can have ranks while the rest of the nine (9) IIM's websites are having number of indexing pages in Google but have no link pages. The data of IIMN cannot be collected due to non availability of the websites during the period of data collection.

4.9.5 WIF and Ranking of IIMs Websites in Fifth Round

Table 4.15: WIF of IIMs Websites in Fifth Round

(Data collection Date & Time: 28.10.2016 between 02:23 pm to 02:59 pm)

Name of IIM (Coded form)	No of Web Page (A)	Total Link (B)	In Link (C)	Self Link D=(B/C)	WIF E=(B/A)	Self Link WIF F=(D/A)	Inlink WIF G=(C/A)	Rank (based on RWIF)
IIM-RTK	626	31	8	23	0.04952	0.036741	0.012779	1
IIMC	2,580	112	26	86	0.04341	0.033333	0.010077	2
IIMT	737	32	5	27	0.043419	0.036635	0.006784	3
IIMI	2,420	13	12	1	0.005371	0.000413	0.004958	4
IIMB	16,800	211	43	168	0.012559	0.01	0.002559	5
IIMRP	1,720	9	4	5	0.005232	0.002907	0.002325	6
IIMKSP	1,590	17	3	14	0.010691	0.008805	0.001886	7
IIMA	20,600	273	34	239	0.013252	0.011602	0.00165	8
IIMRNCH	1,850	31	3	28	0.016756	0.015135	0.001621	9
IIML	1			0	0	0	0	
IIMK	14,600			0	0	0	0	
IIMS	252			0	0	0	0	
IIMU	144			0	0	0	0	
IIMBG	1			0	0	0	0	
IIMV	28			0	0	0	0	
IIMAMT	44			0	0	0	0	
IIMSMBL	93			0	0	0	0	
IIMSMR	1			0	0	0	0	
IIMN	Data not collected due to non availability of the websites during the period of data collection							

Table 4.15 shows the WIF of IIMs websites in till the fifth round of data collection, it has been found that some IIM's websites have been indexed thoroughly in Google's search engine database (e.g. IIMC, IIMA & IIMB etc.) while some of the IIM's websites has been found not thoroughly indexed in Google's search engine. From the above Table 4.15 till the fifth round of data

collection it have been found again that some of the IIM's websites having an indexing pages in Google's don't have any links to the websites (e.g. IIML, IIMK, IIMS etc). IIMRTK has the highest ranking of RWIF (i.e. 0.0127796). IIMC, IIMT, IIMI & IIMB have been obtained 2nd, 3rd, 4th and 5th ranks respectively with the RWIF ranging between 0.010075 to 0.0025595. IIMRP have obtained 6th ranks while IIMKSP, IIMA & IIMRNCH have obtained 7th, 8th& 9th ranks. The data of IIMN cannot be collected due to non availability of the websites during the period of data collection.

4.9.6 Overall Average of Inlink WIF of IIMs Websites

Table 4.16: Overall Average of Inlinks WIF of IIMs Websites

IIM	Round 1	Round 2	Round 3	Round 4	Round 5	Average	Rank
IIML	12	12	12	0	0	7.2	1
IIMRTK	0.011945	0.009983	0.009967	0.01278	0.01278	0.011491	2
IIMC	0.010442	0.011245	0.010442	0.011111	0.010078	0.010663	3
IIMT	0.00995	0.007267	0.007267	0.006614	0.006784	0.007576	4
IIMI	0.005508	0.005532	0.005439	0.004979	0.004959	0.005283	5
IIMB	0.002938	0.002744	0.002744	0.002679	0.00256	0.002733	6
IIMRP	0.002994	0.002381	0.002339	0.002339	0.002326	0.002475	7
IIMKSP	0.002516	0.001887	0.001911	0.001258	0.001887	0.001891	8
IIMRNCH	0.001648	0.001667	0.001676	0.001622	0.001622	0.001647	9
IIMA	0.001381	0.001366	0.001493	0.001498	0.00165	0.001477	10
IIMK	0	0	0	0	0	0	11
IIMS	0	0	0	0	0	0	12
IIMU	0	0	0	0	0	0	13
IIMBG	0	0	0	0	0	0	14
IIMV	0	0	0	0	0	0	15
IIMAMT	0	0	0	0	0	0	16
IIMSMBL	0	0	0	0	0	0	17
IIMSMR	0	0	0	0	0	0	18
IIMN	Data not collected due to non availability of the websites during the period of data collection						

Table 4.16 shows the overall average of Inlinks i.e., RWIF of IIMs websites collection of a data in five round. Among the IIMs websites IIML (IIM-Lucknow) have the highest average rank category of Inlinks RWIF (i.e.7.2) while IIMRTK (IIM-Rohtak) and IIMC (IIM-Calcutta) ranked

second and third with RWIF 0.011491 and 0.010663 respectively. IIMN (IIM-Nagpur) could not be included in the study due to lack of websites during data collection. From the above ranking and RWIF data for five rounds, it has been inference that *inlinks* of the IIMs websites remains constant during the whole study period and the results based on the RWIF proves that IIMs websites are having a very low visibility on the web as measured from the link analysis.

4.10 MAJOR FINDINGS

The major findings of the study based on the objectives are:

1. The 17 (89.47%) IIMs are using .ac .in URL and only 2 (10.52%) IIMs websites (IIM-Ahmedabad and IIM-Bangalore) used .ernet .in URL. The country code TLD (ccTLD) .in is used by all of the IIM's (i.e. 100%) websites.

2. IIMs websites supported many file formats. All the IIMs' websites are using HTML which is by- default web page designing language. The document file formats (.html, .pdf, .doc, .excel) and image file format (.jpg / .jpeg, .png) are used by IIM's website. IIM-Calcutta, have used maximum file formats (7) to represent the information content of website while IIM-Raipur, IIM-Trichy, IIM-Nagpur and IIM-Amritsar used minimum (3) file formats. It have been found that 12 IIM Library website i.,e 63.15 % are using a web-Opac in their websites.

3. In search engine performance evaluation it was found that search expression with gap having more number of hits in all IIMs websites comparison to search expression without gap in both site command and link command sites and huge variations in data was found. Although, conceptually search expression without gap is more logical.

4. The IIM-Ahmadabad and IIM-Bangalore have highest (73) domain authority among the IIMs websites followed by IIM-Calcutta (54) and IIM-Kozhikode (50) while IIM-Shillong and IIM-Rohtak have the lowest (01) domain authority.

5. IIM Indore have highest (56) page authority among all IIMs followed by IIM-Udaipur (50) and IIM-Calcutta (47) while IIM-Shillong, IIM-Rohtak and IIM-Sambalpur have the lowest page authority (01).

6. In Total 1070 internal linke, IIM-Indore lead first position with 770 total internal links followed by IIM-Trichy (188) and IIM-Kozhikode (45) while five IIMs (IIM-Banglore, ,Shillong, Rohtak, Raipur and Sambalpur) have zero (0) Internal Links.

7. In total 5538 External Links reported in all IIMs websites, again IIM Indore with 2054 External Links occupied the first place among IIMs websites, followed by IIM Udaipur (665) and IIM Ranchi (653) while three IIMs (IIM- Shillong, Rohtak and Sambalpur) have not a single external link till now.

8. In ranking of IIMs websites on the basis of Total Links (total internal links & total external links) analysis IIM-Indore leads with 2824 Total Links followed by IIM-Ranchi (664) with second place and IIM-Udaipur (657) with third rank.

9. Total 1082 Internal Equity Passing Links was reported from all IIMs websites. IIM-Indore has the highest number of Internal Equity-Passing Links (770), followed by IIM-Trichy (188) and IIM-Kozhikode (45).

10. Total 5337 External Equity Passing Links was reported from all IIMs websites in which IIM- Indore has the highest number of Internal Equity-Passing Links with 770, followed by IIM-Trichy (188) and IIM-Kozhikode (45), which occupies the second and third place respectively.

11. In ranking of IIMs websites on the basis of Total Equity-Passing Links (total internal & total external Equity-Passing Links), IIM-Indore leads with 2760 among the all IIMs websites, followed by IIM-Ranchi with 635 occupies the second position and IIM-Udaipur with 625 occupies the third position in ranking.

12. Till 3rd round of data collection, IIM-Lucknow have1[st] rank on the basis of RWIF where as last two round (i.e. 4th& 5th) IIM-Rohtak have ranked 1st. In overall ranking of 19 IIM's website, IIM-Lucknow has the highest (7.2) average RWIF and ranked 1st, while IIM-Rohtak and IIM-Calcutta ranked second and third with RWIF 0.011491 and 0.010663 respectively.

References:

Bar-Ilan, Judit (2008). Methods for measuring search engine performance over time. *Journal of the American Society for Information Science and Technology, 53(4), 308-319.*

Germain, C. A. (2000). URLs: Uniform resource locators or unreliable resource locators. *College and Research Libraries, 61(4), 359-365.*

Domain of a website. Retrieved 23 October, 2016 from *http://www.computerhope.com/ jargon/d/domain.htm*

Indian Institutes of Management. Retrieved 20 October, 2016 From Wikipedia *https://en.wikipedia.org/wiki/Indian_Institutes_of_Management*

Indian Institutes of Management Calcutta. Retrieved 22 October, 2016 from Google *https://www.iimcal.ac.in/events*

Indian Institutes of Management Ahmedabad. Retrieved 22 October, 2016 from Google *http://www.iimahd.ernet.in/*

Indian Institutes of Management Bangalore. Retrieved 22 October, 2016 from Google *http://www.iimb.ernet.in/*

Indian Institutes of Management Lucknow. Retrieved 22 October, 2016 from Google *http://www.iiml.ac.in*

Indian Institutes of Management Kozhikode. Retrieved 22 October, 2016 from Google *http://www.iimk.ac.in/*

Indian Institutes of Management Indore. Retrieved 22 October, 2016 from Google *http://www.iimidr.ac.in/*

Indian Institutes of Management Shillong. Retrieved 22 October, 2016 from Google *http://www.iimshillong.ac.in/*

Indian Institutes of Management Rohtak. Retrieved 22 October, 2016 from Google *http://www.iimrohtak.ac.in/*

Indian Institutes of Management Ranchi. Retrieved 22 October, 2016 from Google *http://www.iimranchi.ac.in/*

Indian Institutes of Management Raipur. Retrieved 22 October, 2016 from Google

http://www.iimraipur.ac.in/

Indian Institutes of Management Tiruchirappalli. Retrieved 22 October, 2016 from Google
http://www.iimtrichy.ac.in/

Indian Institutes of Management Udaipur. Retrieved 22 October, 2016 from Google
http://iimu.ac.in/

Indian Institutes of Management Kashipur. Retrieved 22 October, 2016 from Google
http://www.iimkashipur.ac.in/

Indian Institutes of Management Nagpur. Retrieved 22 October, 2016 from Google
http://iimnagpur.ac.in/

Indian Institutes of Management Bodh Gaya. Retrieved 22 October, 2016 from Google
http://www.iimbg.ac.in/

Indian Institutes of Management Visakhapatnam. Retrieved 22 October, 2016 from Google
http://www.iimv.ac.in/

Indian Institutes of Management Amritsar. Retrieved 22 October, 2016 from Google
http://iimamritsar.ac.in/

Indian Institutes of Management Sambalpur. Retrieved 22 October, 2016 from Google
http://www.iimsambalpur.ac.in/

Indian Institutes of Management Sirmaur. Retrieved 22 October, 2016 from Google
http://www.iiml.ac.in/iimsirmaur

Ingwersen, P. (1998). The calculation of web impact factors.*Journal of Documentation*, 54(2), 236-43.

Linking Root Domain of a website. Retrieved 23 October, 2016 from *http://ecommerce-platforms.com/glossary/linking-root-domains*

Maharana, R. K.; Panda, K. & Sahoo, J. Web impact factor (WIF) and link analysis of Indian institute of technologies (IITs): A Webometric Study. *Lib. Philosophy and Practice (e-journal),* 2012, *Paper 789*, 1-11.

Shukla, A. (2009). Measuring effectiveness of institutional websites: a case study of central universities of India. *Research Digest,* 4 (3).

Shukla, A. & Tripathi, A.(2009).Webometric analysis of institutes of national importance in India.*IASL1C Bulletin, 54(3), 165-180.*

Shukla, A. & Tripathi, A.(2014).Backlinks analyseof institutes of national importance and premier management institutions library websites. *Journal of International Academic Research for Multidisciplinary, 2(7),* 560-575.

Shukla, A. &Vanlalfeli. (2014), Webometricanalyses : websites of Indian Institutes of Technology. *Advancements in Library Sciences, 2(2},* 34-48.

Shukla, A. &Tripathi, A. (2015).*Webometrics Studies and Libraries. 22-61*

Stuart, D.; Thelwall, M. & Harries, G. UK academic web links and collaboration: an exploratory study. *Journal of Inf. Sc.,* 2007, *33*(2), 231-246.

Thelwall, M. (2001 b).Exploring the link structure of the web with network diagrams.*Journal of Information Science, 27(6),* 393-402.

Thelwall, M. (2001 d), Results from a web impact factor crawler. *Journal of Documentation, 57(2),* 177-191.

Vijakumar, M.; Kannappanavar, B. & Kumar , K. S. Webometric analysis of web presence and links of SAARC countries. *DESIDOC J. of Lib. & Inf. Tech,* 2012, *32*(1), 70-76.

Conclusion:

The World Wide Web (WWW) is used to access huge quantity of information available through Internet and become main source of information for academic and research activities. To cope-up the growing demand of users for information exchange, the easiest and effective way is websites. In the recent years, websites plays a key role through which information is disseminated effectively and efficiently. A website is a collection of web pages, images, videos or other digital materials that are linked with a common Uniform Resource Locator (URL) and it is hosted on web server accessible via network such as Internet or local area network. The web services, rendered through websites have been gathering significant momentum in both academia and R &D institutions in the recent years. The Web is playing a main role in diverse application domains such as business, education, industry and entertainment. As a result, there are increasing concerns about the ways in which websites are developed and the degree of quality delivered. Developing a website should be passed through several design guidelines to ensure that the website can achieve the purposes and goals intended to be accomplished. Additionally, an academic organization's website is a gateway to its information, products and services. As such, it should ideally be a reflection of the needs of the clients it serves. Unfortunately, website design is often driven by technology, organizational structure or business objectives, rather than by users needs.

The academic websites are the primary source of all the information to their hosting institutions or organizations. An university website is increasingly used for the variety of purposes like attracting new students, information regarding courses, syllabus, job vacancies, library catalogue, acts as centre place for news and announcements. The academic library websites has to serve diverse category of students and researchers who are looking for reliable, relevant and quality information. Students need information for studying, achieving academic purpose and doing assignments. Researchers need information for their research and new information or knowledge. Since web portals are the integral part of the institutions, it also provides direct access to library and their digital resources.

Web resources are apple of information professional's eye due to its value added services to meet their current and diversified information needs. In the WWW, the web pages are the entities of information, with hyperlinks from them acting as citations. Quantitative analysis on the WWW is being carried out in the same way, as is tradition in citation databases. As information on web increases towards entropy, it is needed to apply some theory/ metrics (measurement) to develop new methods, modeling techniques and metaphors to examine this emerging complex network.

Through webometric study one can observe that how users actually react and use specific web document. The web is beyond control in growth, which means opportunities exist where good system architecture and diligent analysis can be applied for everyone's benefit. The Webometrics is a very important segment in the field of library and information science through which analysis of websites has been conducted by many information professionals. In the present digital era, web became the master source of information and plays an important role in its dissemination because people became more webs centric to find their information.

After analyzing all the nineteen IIM's websites, it is found that the URL of the IIM's websites is in two domains which are: .ac, and .ernet. The TLD .ac .in is used by 17 IIMs websites i.e. 89.47 % of IIMs websites whereas only 2 IIM's websites i,e. 10.52 % have used .ernet .in. It is clear that different websites supported different file format which is used for accessing file in their websites. HTML file is used in all of IIMs websites for representing their content. Only few IIMs website mention updated date and time in their homepage .Majority of the IIMs websites have more numbers of hits when it search with gap in both link and site command while number of hits are very less when it search without command. IIMs which were established before 2009 have high number of domain authority and page authority which may be due to their year of establishment but some new IIMs also have good number of domain authority and page authority. There are less total internal links are found in comparison to total external link and same way internal passing link are very less in comparison to external passing links in IIMs website, its need to enhance the performance of IIMs website.

In analysis of five round of revised WIF it is found that some websites are not indexed thoroughly in Google search engine. IIM's websites which are having higher number of web pages but no links lead to lower WIF and RWIF. This may be due to structural problems in websites, instability of web servers, less indexing of websites etc. In overall ranking of IIM's website, IIM-Lucknow has the highest (7.2) average RWIF and ranked 1st, while IIM-Rohtak and IIM-Calcutta ranked second and third with RWIF 0.011491 and 0.010663 respectively.

Suggestions:

On the basis of observations during study and analysis of findings following suggestions suggested to improving IIM websites visibility and accessibility:

1. It was observed that majority of the websites have not mentioned the date of updating their websites. Thus every websites need to add the date of last update.

2. Web OPAC file format was used by 12 IIM website. This format should be used by all IIMs websites

3. The web designs and the links between pages need to be updated constantly so that the

   search engines can easily access and index the latest materials uploaded on the websites

   and users can easily find their relevant information in quickest possible time.

4. During study it was observed that some IIMs websites thoroughly linking with some others websites but not linked with all IIMs websites. Thus all the IIMs websites should be link with each other.

5. There is need to improve the search engine performance of many IIMs websites because their search hits number is very less.

6. The Internal Equity Passing link should be enhancing in IIMs website.

BIBLIOGRAPHY

Aguillo, Isidro F., Ortega, J. L. and Ferna´ndez, Mario. (2008). Webometric ranking of world universities: introduction, methodology, and future developments. *Higher Education in Europe*, *33*(2/3).

Almind, T. C. and Ingwersen, Peter (1997). Informetrics analysis on the www: methodological approach to webometrics. *Journals of Documentation, 53(4), 404-426.*

Aquillo, I.F. (1998). STM information on the web and the development of new Internet R & D databases and indicators. *Online Information 98:Proceedings (pp.239-243). Oxford: Learned Information*

Babu, B. R, Jayshankar, R. and Rao, P. N. (2010). Websites of central universities in India: a webometric analysis. *Annals of Library and Information Studies, 30(4), 33-43.*

Babu, B. Ramesh, Jeyshankar, R., & Rao, P. Nagesware. "Websites of central universities in India: a webometrics analysis." *DESIDOC Journal of Library & Information Technology* 30.4 (2010): 33-43.

Bakeri, Ahmad and Leyni, Nur (2015) Webometric Study of World Class Universities Websites.*Qualitative and Quantitative Methods in Libraries (QQML) Special Issue Bibliometrics and Scientometrics: 105-115*

Bar-Ilan, Judit (2008). Methods for measuring search engine performance over time. *Journal of the American Society for Information Science and Technology, 53(4), 308-319.*

Barjak, Franz, Li, Xuemei and Thelwall, Mike (2006). Which factors explain the web impact of scientists' personal homepages?. *Journal of the American Society for Information Science and Technology, 58(2), 200-211.*

Björneborn, L (2004). Small-world link structures across an academic web space: *a library and information science approach (Doctoral Dissertation). Copenhagen, Denmark: Royal School of Library and Information Science.*

Bjorneborn, Lennard and Ingwersen, Peter (2004). Towards a basic framework for Webometrics.*Journal of the American Society for Information Science and Technology, 55(14), 1216-1227.*

Björneborn, Lennart and Ingwersen, Peter (2001). Perspectives of webometrics. *Scientometrics, 50 (1), 65-82.*

Borgman CL, Furner J. (2002). Scholarly communication and bibliometrics.*Annu Rev Inform Sci Technol. 2002;36: 3–72.*

Broder, A.et.al (2000). Graph structure in the web. *Computer Networks, 33 (33(1-6), 309-320.* Available at http://www.almaden.ibm.com/cs/k53/www9.final

Cache Computer. Retrieved 24 September, 2016. From Wikipedia. *https://en.wikipedia.org /wiki/Cache_(computing).*

Changling, Li., and Xinjin, Fu. (2009), Link Analysis on Government Website Based on Factor. *LNCS 5854, 108-115.*

Chen, C et.al (1998). How did university departments interweave the web: *a study of connectivity and underlying factors.Interacting with Computers, 10,353-373*

Comer, E. D. (1997). *Computer networks and Internet.* New Jersey: Prentice-Hall Inc.

Country code top-level domain name. (n.d.). Retrieved on September 18, 2015, from http://en.wikipedia.org/wiki/country_code_top_level_domain_name

Devi and Verma (2016).Comparison of Design and Content Features of North-Eastern Hill University (NEHU) and Mizoram University (MZU) Websites: A Study. *World Digital Libraries- An International Journal. 2016, Volume: 9, Issue: 1*

Domain of a website. Retrieved 23 October, 2016 from *http://www.computerhope.com/ jargon/d/domain.htm*

Domain Name. (n.d.). Retrieved on September 18, 2016, from http://en.wikipedia.org/wiki/domain_name

Domain Name System. (n.d.). Retrieved on September 18, 2016, from http://en.wikipedia.org/wiki/domain_name_system

Garfield, E (1972). Citation analysis as a tool in journal evaluation. *Science, 178 (4060), 471-479*

Germain, C. A. (2000). URLs: Uniform resource locators or unreliable resource locators. *College and Research Libraries, 61(4), 359-365.*

Goel, M. K. (2010). *World Wide Web.* New Delhi: Rajat Publications.

Goswami, P. "Webometric study of universities websites of Uttar Pradesh."*M.Phil Diss.* Ujjain: Vikram University, 2007.

Goswami, Prashant., et.al.. (2008),TheWebometrics. *International Caliber,* 1-4

Hartzel, D. H. (1987).History of the development of ideas in bibliometrics.*Encyclopedia of Library and Information Science, 42, Supplement 7, 144-219. New York: Marcel Dekker.* Retrieved on 20th September, 16 from http://en.wikipedia.org/wiki/Main_Page.

Hawkins, D.T. (1997). Unconventional uses of on-line information retrieval systems: on-line bibliometrics studies. *Journal of the American Society for Information Science,28 (1), 13-18*

Henzinger, M. (2000). Link analysis in web information retrieval. *Bulletin of the IEEE Computer Society Technical Committee on Data Engineering*, 23(3), 1-7. Retrieved on September 20,2016, from citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.32.4054 &rep=rep1&type=pdf#page=5

HTML.Retrieved 24 September, 2016.From Webopedia.
http://www.webopedia.com TERM/H/HTML.html

Indian Institutes of Management Ahmedabad. Retrieved 22 October, 2016 from Google
http://www.iimahd.ernet.in/

Indian Institutes of Management Amritsar. Retrieved 22 October, 2016 from Google
http://iimamritsar.ac.in/

Indian Institutes of Management Bangalore. Retrieved 22 October, 2016 from Google
http://www.iimb.ernet.in/

Indian Institutes of Management Bodh Gaya. Retrieved 22 October, 2016 from Google
http://www.iimbg.ac.in/

Indian Institutes of Management Calcutta. Retrieved 22 October, 2016 from Google
https://www.iimcal.ac.in/events

Indian Institutes of Management Indore. Retrieved 22 October, 2016 from Google
http://www.iimidr.ac.in/

Indian Institutes of Management Kashipur. Retrieved 22 October, 2016 from Google
http://www.iimkashipur.ac.in/

Indian Institutes of Management Kozhikode. Retrieved 22 October, 2016 from Google
http://www.iimk.ac.in/

Indian Institutes of Management Lucknow. Retrieved 22 October, 2016 from Google
http://www.iiml.ac.in

Indian Institutes of Management Nagpur. Retrieved 22 October, 2016 from Google
http://iimnagpur.ac.in/

Indian Institutes of Management Raipur. Retrieved 22 October, 2016 from Google
http://www.iimraipur.ac.in/

Indian Institutes of Management Ranchi. Retrieved 22 October, 2016 from Google
http://www.iimranchi.ac.in/

Indian Institutes of Management Rohtak. Retrieved 22 October, 2016 from Google
http://www.iimrohtak.ac.in/

Indian Institutes of Management Sambalpur. Retrieved 22 October, 2016 from Google
http://www.iimsambalpur.ac.in/

Indian Institutes of Management Shillong. Retrieved 22 October, 2016 from Google
http://www.iimshillong.ac.in/

Indian Institutes of Management Sirmaur. Retrieved 22 October, 2016 from Google
http://www.iiml.ac.in/iimsirmaur

Indian Institutes of Management Tiruchirappalli. Retrieved 22 October, 2016 from Google
http://www.iimtrichy.ac.in/

Indian Institutes of Management Udaipur. Retrieved 22 October, 2016 from Google
http://iimu.ac.in/

Indian Institutes of Management Visakhapatnam. Retrieved 22 October, 2016 from Google
http://www.iimv.ac.in/

Indian Institutes of Management. Retrieved 20 October, 2016 From Wikepedia
https://en.wikipedia.org/wiki/Indian_Institutes_of_Management

Indian Institutes of Management. Retrieved 20 October, 2016 From Wikipedia
https://en.wikipedia.org/wiki/Indian_Institutes_of_Management

Ingwersen, P. (1998). The calculation of web impact factors. *Journal of Documentation, 54(2), 236-43.*

Ingwersen, P. (1998). The calculation of web impact factors. *Journal of Documentation*, 54(2), 236-43.

Ingwersen, P. (1998). The calculation of web impact factors.*Journal of Documentation*, 54(2), 236-43.

Internet Users.Retrieved 24 September, 2016.From Google Search engine *http://www.internetlivestats.com/internet-users/*

Islam, Md. Anwarul (2011). Webometric study of universities in Bangladesh. *Annals of Library and Information Studies, 58(4), 307-318.*

Islam, Md. Anwarul and Alam, Md. Saiful (2011). Webometric study of private universities in Bangladesh. *Malaysian Journal of Library & Information Science, 16(2), 115-126.*

Jalal, Samir Kumar, Biswas, Subal Chandra and Mukhopadhyay, Parthasarathi (2010) Web presence of selected Asian countries: a webometric analysis. *Collnet Journal of Scientometrics and Information Management, 4(2), 57-68.*

Jayasundari , A and Jeyshankar, R (2014) Web Credibility of Indian Institute of Management (IIMs) Web Sites: *Journal of Advances in Library and Information ScienceVol. 3. No.3. 2014.p 222-232*

Jayshankar, R. and Babu, B. R. (2009). Websites of universities in Tamil Nadu: a webometrics study. *Annals of Library and Information Studies, 56(2), 69-79.*

Jeyshankar R., & Sujithai, M. (n.d). Webometrics tools and techniques: an overview. Available at http://dc370.4shared.com/doc/NOdc4LqQ/preview.html

Kothainayaki, S andGopalakrishnan, S (2011) Webometric analysis of agriculturaluniversities in India. *Indian Journal of Science and Technology 4 (3): 1-7.*

Kothainayaki; S and Gopalakrishnan; S (2011). Webometric Analysis of Agricultural Universities in India. *Indian Journal of Science & Technology. 4 (3), 1-8*

Larson, R.R. (1996). Bibliometrics of the World Wide Web: an exploratory analysis of the intellectual structure of cyberspace. In S. Hardin (Ed.), *Proceedings of the 59th Annual Meeting, ASIS 96, Baltimore, Maryland* (99.71-79)

Li, Xuemei et al. (2003). The relationship between the WIFs or inlinks of Computer Science Departments in UK and their RAE ratings or research productivities in 2001. *Scientometrics, 57(2), 239-255.*

Linking Root Domain of a website. Retrieved 23 October, 2016 from *http://ecommerce-platforms.com/glossary/linking-root-domains*

Madhusudhan ;Margam&Prakash; Shashi (2013). Websites of Indian Institutes of Technology: A Webometric Study. *International Journal of Library and Information Studies*Vol.*3 (4) Oct-Dec, 2013. P 1-3*

Maharana, B., Nayak, K. and Sahu, N. K. (2006). Scholarly use of web resources in LIS research: a citation analysis. *Library Review, 55(9), 598-607.*

Maharana, R. K.; Panda, K. & Sahoo, J. Web impact factor (WIF) and link analysis of Indian institute of technologies (IITs): A Webometric Study. *Lib. Philosophy and Practice (e - journal),* 2012, *Paper 789*, 1-11.

Maharana, Rabindra K.; K. C. Panda, C.K.; and Sahoo, J (2012) Web Impact Factor (WIF) and Link Analysis of Indian Institute of Technologies (IITs) A Webometric Study: *National Institute of Science Education and Research. 5-18*

Mandava ; Asha and Antony; Solomon (2015). A review and analysis of technologies for developing webapplications. *Annals of Library and Information Studies, 26(4),19-25.*

Mark, Maybury T. (2004). Universal multimedia information access. *Universal Access in the Information Society, 2(2), 96-104.*

Mayr, Philip and Walter, Anne-Kathrin (2007). An exploratory study of Google Scholar. *Online Information Review, 31(6), 814-130.*

Moed, H. F. (2002). The impact factors debate: the ISI's uses and limits. *Nature, 415, 731-732.*

Mukherjee, B. (2011). Bibliometrics to webometrics: The changing context of quantitative research. *IASLIC Bulletin*, 56(2), 97-110.

Nair, R. R. (2002). *Internet for information services*. New Delhi: Ess Ess Publications.

Nalimov, V.V. &Mulchenko, Z.M. (1969).Scientometrics, study of the development of science as an information process. *Moscow: Nauka*

Nicolaisen, Jeppe (2007). Citation analysis. *.Annual Review of Information Science and Technology Volume 41, Issue 1, pages 609–641*

Noruzi, Alireza (2005). Web Impact Factors for Iranian universities. *Webology,2 (1),* Retrieved 24 September, 2016, from http://www.webology.ir/2005/v2nl/a11.html.

Noruzi, Alireza (2006). Web presence and impact factors for Middle-Eastern countries. *Online Magazine, 30(2), 22-28.*

Noruzi, A. (2006). The web impact factors: A critical review. *Electronic Library*, 24(4), 490-500.

Opuszko; Marek and Ruhland; Johannes (2012). Classification Analysis in Complex Online Social Networks Using Semantic Web Technologies. *IEEE/ACM International Conference on Advances in Social Networks Analysis and Mining*

Ortega, Jose Luis and Aguillo, Isidro F. (2007). Visualization of the Nordic academic web: link analysis using social network tools. *Information Processing and Management, 44(4), 1624-1633.*

Park, Han Woo (2004). Presence of Taiwan on the World Wide Web in South Korea: dynamics of digital and geographical presence on cyberspace. *The International Information & Library Review, 36(4), 329-340.*

Pavlina, Kresimir (2012) Webometric ranking of European universities. *Elsevier* (*46): 3788 – 3792.*

Payne, Nigel and Thelwall, Mike (2004). A statistical analysis of UK academic web links. *Cybermetrics, 1(2).*

Pirolli, P., Pitkow, J &Rao, R. (1996). Silk from a sow's ear: extracting usable structures from the web. *CHI 96 Electronic Proceedings.* Available at http://www. acm. org/ sigchi/chi96/proceedings/papers.Pirolli_2/pp2.html

Price, Derek de Solla (1970). Citation measures of hard science, soft science, technology and nonscience. In C.E. Nelson & D.K. Pollock (Eds.), Communication among scientists and engineers (pp. 3-22).*Lexington: Heath Lexington Books.*

R. Jeyshankar , B Ramesh Babu and P. NageswaraRao. (May 2014) "Websites of Indian Institutes of Management (IIMs): A Webometric Study". *e-Library Science Research JournalVol.2, Issue.7.*

Ramesh Babu, B., Jeyshankar, R. and Rao, P. Nageswara (2010). Websites of central universities in India: a webometric analysis. *DESIDOC Journal of Library & Information Technology, 30(4), 33-43.*

Ranganathan, S. R. (1949). Library and its scope.*Bangalore: DRTC Seventh Seminar Volume, Paper DA, 1995, 285-301.*

Ratha, Bhupendra (2012), Webometrics Study of IIT Libraries Websites. *DESIDOC Journal of Library & Information Technology, 1-5*

Rodriguez i Gairin, J.M. (1997). Impact assessment of information on the Internet: AltaVista, the citation index of the web. *RevistaEspanola De Documentacion Cientifica, 20(2), 175-181.*

Rousseau, R (1997). Sitations: an exploratory study. *Cybermetrics, 1(1),* Available at http://www.cindoc.csic.es/cybermetrics/articles/v2ilpl.html

Sharma C.K, (2005). Webometrics: An Overview. Journal of Library and Information Technology, (1) 5-8.

Shukla and Vanlalfeli (2015).Conceptual Approach to Webometrics: An Exploratory Study. Abhitantriki. An International Journal of Engineering & Technology. Vol. 2, No. 1

Shukla Svetal H. and Poluru, Lalitha (2012). Webometric analysis and indicators of selected Indian state universities. *Information Studies, 18(2), 79-104.*

Shukla, A. & Tripathi, A.(2009).Webometric analysis of institutes of national importance in India.*IASL1C Bulletin, 54(3), 165-180.*

Shukla, A. & Tripathi, A.(2014).Backlinks analyseof institutes of national importance and premier management institutions library websites. *Journal of International Academic Research for Multidisciplinary, 2(7),* 560-575.

Shukla, A. &Tripathi, A. (2015).*Webometrics Studies and Libraries. 22-61*

Shukla, A. & Vanlalfeli. (2014), Webometricanalyses : websites of Indian Institutes of Technology. *Advancements in Library Sciences, 2(2}, 34-48.*

Shukla, A. (2009). Measuring effectiveness of institutional websites: a case study of central universities of India. *Research Digest,* 4 (3).

Shukla, Akhandanand and Vanlalfeli (2015). Webometric Development in Web Impact Factor Studies:A Literary Review. *Journal of Advancements in Library Sciences.Volume 1,Issue 3*

Shukla, Akhandanand., and Tripathi, Aditya (2014), Backlinks Analyses of Institutes of National Importance And Premier Management Institutions Library Websites. *Journal of International of Academies Research for Multidisciplinary*, *1-15*

Shukla, Akhandanand., and Tripathi, Aditya (2015),Webometric Studies and Libraries 1-175

Shukla, S. H., &Poluru, L. (2012).Webometric analysis and indicators of selected Indian state universities. *Information Studies*, *18(2), 79-104.*

Smith, A. G. &Thelwall, M. (2002). Web impact Australasian universities. *Scientometrics, 54(3).363*

Smith, Alastair G. (1999a). ANZAC Webometrics: exploring Australasian Web structures. *Retrieved on 24 September, 2016, from http://www.csu.edu.au/special/online99/ proceedings99/203b.html.*

Smith, Alastair G. (1999b). A tale of two web spaces: comparing sites using web impact factors. *Journal of Documentation, 55(5), 577-592.*

Smith, Alastair G. (2002). Does metadata count? A Webometric investigation. *Proceedings of the International Conference on Dublin Core and Metadata for e-communities 2002, October 13- 17, 2002, Florence, Italy: 133-138.*

Smith, Alastair G. and Thelwall, Mike (2002). Web impact factors for Australian universities. *Scientometrics, 54(3), 363-380.*

Stuart, D.; Thelwall, M. & Harries, G. UK academic web links and collaboration: an exploratory study. *Journal of Inf. Sc.,* 2007, **33**(2), 231-246.

Sujithai, Maria and Jeyshankar, R. (2013). Web page analysis of Indian institute of technologies' (IITs) websites: a webometric study. *International Journal of Digital Library Services, 3(1), 55-65.*

Thanuskodi, S. (2011). Webometric analysis of private engineering college websites in Tamil Nadu. *Journal of Communications, 2(2), 73-81.*

Thanuskodi, S. (2012). A webometric analysis of selected institutes of national importance websites in India. *International Journal of Library Science, 1(1), 13-18.*

Thanuskodi, S. (2013). A webometric analysis of selected Institutes of national Importance Websites in India, *International Journal of Library Science, 1 (1), 13-18*

Thelwall, M (2001 a). A publicly accessible database of UK university website links and a discussion of the need for human intervention in web crawling. *University of Wolverhampton. 24(2).63*

Thelwall, M. (2001 b).Exploring the link structure of the web with network diagrams. *Journal of Information Science, 27(6),* 393-402.

Thelwall, M. (2001 c).Extracting macroscopic information from web links.*Journal of the American Society for Information Science and Technology, 52(13), 1157-1168.*

Thelwall, M. (2001 d), Results from a web impact factor crawler. *Journal of Documentation, 57(2), 177-191.*

Thelwall, Mike (2000). Web impact factors and search engine coverage. *Journal of Documentation, 56(2), 185-189.*

Thelwall, Mike (2001a). Extracting macroscopic information from web links. *Journal of the American Society for Information Science and Technology, 52(13), 1157-1168.*

Thelwall, Mike (2001b). Web log file analysis: backlinks and queries. *ASLIB Proceedings, 53(6), 217-223.*

Thelwall, Mike (2002). A comparison of sources of links for academic Web Impact Factor calculations. *Journal of Documentation, 58(1), 66-78.*

Thelwall, Mike (2003). Web use and peer interconnectivity metrics for academic websites. *Journal of Information Science, 29(1), 1-10.*

Thelwall, Mike (2004a). Text Characteristics of English language university web sites. *Journal of the American Society for Information Science and Technology, 56(6), 609-619.*

Thelwall, Mike (2004b). Interpreting social science link analysis research: a theoretical framework. *Journal of the American Society for Information Science and Technology, 57(1),60-68.*

Thelwall, Mike (2006). Commercial website links internet research. *Electronic Networking Applications and Policy, 11(2), 114-124.*

Thelwall, Mike (2008a). Bibliometrics to webometrics. *Journal of Information Science, 34(4), 605- 621.*

Thelwall, Mike (2008b). Quantitative Comparisons of search engine results. *Journal of the American Society for Information Science and Technology, 59(11), 1702-1710.*

Thelwall, Mike and Wilkinson, David (2003). Three target document range metrics for university websites. *Journal of the American Society for Information Science and Technology, 54(6), 489-496.*

Thelwall, Mike and Wilkinson, David (2008). A generic lexical URL segmentation framework

for counting links, colinks or URLs. *Library and Information Science Research, 30(2), 94-101.*

Thelwall, Mike et al. (2002). European Union associated university websites. *Scientometrics, 53(1), 95-111.*

Thelwall, Mike et al. (2003). Which academic subjects have most online impact? A pilot study and a new classification process. *Online Information Review, 27(5), 333-343.*

Tomas C. Almind& Peter Ingwersen (1997). "Informetric analyses on the World Wide Web: Methodological approaches to 'webometrics'". *Journal of Documentation.* ***53** (4): 404 – 426.*

Uniform Resource Identifier.Retrieved 24 September, 2016.From Wikipedia. *https://en.wikipedia.org/wiki/Uniform_Resource_Identifier*

Vaughan, Lewin and Shaw D. (2003). Bibliographic and web citation: What is difference? *Journal of American Society for Information Science and Technology, 54(14), 1313-1322.*

Vaughan, Lewin and Shaw D. (2003). Bibliographic and web citation: What is difference? *Journal of American Society for Information Science and Technology*, 54(14), 1313-1322.

Vaughan, L. & Thelwall, M. (2003). Scholarly use of the web: what are the key inducers of links to journal websites?. *Journal of the American Society for Information Science and Technology, 54(1), 29-38.*

Vaughan, Lewin and Zhang, Y. (2007). Equal representation by search engines? A comparison of Websites across countries and domains. *Journal of Computer-Mediated Communication, 12(3).* Retrieved on 23 September, 2016, from http://jcmc.indiana.edu/vol12/issue3/vaughan.html.

Vaughan, Liwen (2004a). Exploring website features for business information. *Scientometrics, 61(3), 467-477.*

Vaughan, Liwen and Wu, Guozhu. (2004). Links to commercial websites as a source of business information. *Scientometrics, 60(3), 487-496.*

Vaughan, Liwen and You, Justin (2006). Comparing business competition positions based on web co-link data: The global market vs. the Chinese market. *Scientometrics, 68(3), 611-628.*

Vaughan, Liwen, Kipp, Margaret and Gaon, Yijun (2007). Are co-linked business websites really related? A link classification study. *Online Information Review, 31(4), 440-450.*

Verma and Devi (2015). Content Analysis of Central Universities Library Websites of North Eastern States of India: A Survey. *Journal of Research in Librarianship - Vol.2 (5) Sep-Oct, 2015*

Verma and Devi (2016). Web Content and Design Trends of Indian Institutes of Management (IIMs) Libraries Website: An Analysis. *DESIDOC Journal of Library & Information Technology, Vol. 36, No. 4, July 2016, pp. 220-227*

Verma.,Manoj Kumar and Devi, Krishna (2015) Content Analysis of Central Universities Library Websites of North Eastern States of India: A Survey.*Journal of Research in Librarianship* - Vol.2(5) Sep-Oct, 2015

Verma.,Manoj Kumar., and Devi, Krishna (2016) Web Content and Design Trends of Indian Institutes of Management (IIMs) Libraries Website: An Analysis. *DESIDOC Journal of Library & Information Technology, Vol. 36, No. 4, July 2016, pp. 220-227*

Vijakumar, M.; Kannappanavar, B. & Kumar , K. S. Webometric analysis of web presence and links of SAARC countries. *DESIDOC J. of Lib. & Inf. Tech,* 2012, *32*(1), 70-76.

Walia, P.K. and kaur, Prabhjeet (2008). Webometric Analysis of Associations' Website of India, *IASLIC Bulletin, 53(3), 131-143*.

Wallia, P.K. &Kaur, Prabhjeet. (2008) Webometric analysis of library association's websites of India. *IASLIC Bulletin*, 53(3), 131-43.

Web Browser.Retrieved 23 September, 2016.From Webopedia. *http://www.webopedia.com/TERM/B/browser.html*

Web Browser.Retrieved 23 September, 2016.From Wikipedia. *https://en.wikipedia.org/wiki/Web_browser*

Web Impact Factor.Retrieved 27 January, 2016.From Wikipedia. *https://de.wikipedia.org/wiki/Web_Impact_Factor*

Web Server.Retrieved 24 September, 2016.From Webopedia. *http://www.webopedia.com/TERM/W/Web_server.html*

Web Usage Analysis Retrieved 21 November, 2016 from Google http://www.igi-global.com/dictionary/web-usage-analysis/32383

Webometrics Research. Retrieved 27 January , 2016. From Wikipedia *http://research.webometrics.info/.*

Webometrics.Retrieved 27 January, 2016. From Wikipedia
https://en.wikipedia.org/wiki/Webometrics.

Wilkinson, David, Thelwall, Mike, and Li, Xuemei (2003). Exploiting Hyperlinks to Study Academic Web Use. *Social Science Computer Review, 21(3), 340-351.*

World Wide Web History.Retrieved 23 September, 2016, from Wikipedia.
https://en.wikipedia.org/wiki/History_of_the_World_Wide_Web

World Wide Web.Retrieved 23 September, 2016, from Wikipedia.
https://en.wikipedia.org/wiki/World_Wide_Web.

BIBLIOGRAPHY

Aguillo, Isidro F., Ortega, J. L. and Ferna´ndez, Mario. (2008). Webometric ranking of world universities: introduction, methodology, and future developments. *Higher Education in Europe*, *33*(2/3).

Almind, T. C. and Ingwersen, Peter (1997). Informetrics analysis on the www: methodological approach to webometrics. *Journals of Documentation, 53(4), 404-426.*

Aquillo, I.F. (1998). STM information on the web and the development of new Internet R & D databases and indicators. *Online Information 98:Proceedings (pp.239-243). Oxford: Learned Information*

Babu, B. R, Jayshankar, R. and Rao, P. N. (2010). Websites of central universities in India: a webometric analysis. *Annals of Library and Information Studies, 30(4), 33-43.*

Babu, B. Ramesh, Jeyshankar, R., & Rao, P. Nagesware. "Websites of central universities in India: a webometrics analysis." *DESIDOC Journal of Library & Information Technology* 30.4 (2010): 33-43.

Bakeri, Ahmad and Leyni, Nur (2015) Webometric Study of World Class Universities Websites.*Qualitative and Quantitative Methods in Libraries (QQML) Special Issue Bibliometrics and Scientometrics: 105-115*

Bar-Ilan, Judit (2008). Methods for measuring search engine performance over time. *Journal of the American Society for Information Science and Technology, 53(4), 308-319.*

Barjak, Franz, Li, Xuemei and Thelwall, Mike (2006). Which factors explain the web impact of scientists' personal homepages?. *Journal of the American Society for Information Science and Technology, 58(2), 200-211.*

Björneborn, L (2004). Small-world link structures across an academic web space: *a library and information science approach (Doctoral Dissertation). Copenhagen, Denmark: Royal School of Library and Information Science.*

Bjorneborn, Lennard and Ingwersen, Peter (2004). Towards a basic framework for Webometrics.*Journal of the American Society for Information Science and Technology, 55(14), 1216-1227.*

Björneborn, Lennart and Ingwersen, Peter (2001). Perspectives of webometrics. *Scientometrics, 50 (1), 65-82.*

Borgman CL, Furner J. (2002). Scholarly communication and bibliometrics.*Annu Rev Inform Sci Technol. 2002;36: 3–72.*

Broder, A.et.al (2000). Graph structure in the web. *Computer Networks, 33 (33(1-6), 309-320.* Available at http://www.almaden.ibm.com/cs/k53/www9.final

Cache Computer. Retrieved 24 September, 2016. From Wikipedia. *https://en.wikipedia.org /wiki/Cache_(computing).*

Changling, Li., and Xinjin, Fu. (2009), Link Analysis on Government Website Based on Factor. *LNCS 5854, 108-115.*

Chen, C et.al (1998). How did university departments interweave the web: *a study of connectivity and underlying factors.Interacting with Computers, 10,353-373*

Comer, E. D. (1997). *Computer networks and Internet*. New Jersey: Prentice-Hall Inc.

Country code top-level domain name. (n.d.). Retrieved on September 18, 2015, from http://en.wikipedia.org/wiki/country_code_top_level_domain_name

Devi and Verma (2016).Comparison of Design and Content Features of North-Eastern Hill University (NEHU) and Mizoram University (MZU) Websites: A Study. *World Digital Libraries- An International Journal. 2016, Volume: 9, Issue: 1*

Domain of a website. Retrieved 23 October, 2016 from *http://www.computerhope.com/ jargon/d/domain.htm*

Domain Name. (n.d.). Retrieved on September 18, 2016, from http://en.wikipedia.org/wiki/domain_name

Domain Name System. (n.d.). Retrieved on September 18, 2016, from http://en.wikipedia.org/wiki/domain_name_system

Garfield, E (1972). Citation analysis as a tool in journal evaluation. *Science, 178 (4060), 471-479*

Germain, C. A. (2000). URLs: Uniform resource locators or unreliable resource locators. *College and Research Libraries, 61(4), 359-365.*

Goel, M. K. (2010). *World Wide Web*. New Delhi: Rajat Publications.

Goswami, P. "Webometric study of universities websites of Uttar Pradesh."*M.Phil Diss.* Ujjain: Vikram University, 2007.

Goswami, Prashant., et.al.. (2008),TheWebometrics. *International Caliber,* 1-4

Hartzel, D. H. (1987).History of the development of ideas in bibliometrics.*Encyclopedia of Library and Information Science, 42, Supplement 7, 144-219. New York: Marcel Dekker.* Retrieved on 20th September, 16 from http://en.wikipedia.org/wiki/Main_Page.

Hawkins, D.T. (1997). Unconventional uses of on-line information retrieval systems: on-line bibliometrics studies. *Journal of the American Society for Information Science,28 (1), 13-18*

Henzinger, M. (2000). Link analysis in web information retrieval. *Bulletin of the IEEE Computer Society Technical Committee on Data Engineering*, 23(3), 1-7. Retrieved on September 20,2016, from citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.32.4054 &rep=rep1&type=pdf#page=5

HTML.Retrieved 24 September, 2016.From Webopedia.
http://www.webopedia.com TERM/H/HTML.html

Indian Institutes of Management Ahmedabad. Retrieved 22 October, 2016 from Google
http://www.iimahd.ernet.in/

Indian Institutes of Management Amritsar. Retrieved 22 October, 2016 from Google
http://iimamritsar.ac.in/

Indian Institutes of Management Bangalore. Retrieved 22 October, 2016 from Google
http://www.iimb.ernet.in/

Indian Institutes of Management Bodh Gaya. Retrieved 22 October, 2016 from Google
http://www.iimbg.ac.in/

Indian Institutes of Management Calcutta. Retrieved 22 October, 2016 from Google
https://www.iimcal.ac.in/events

Indian Institutes of Management Indore. Retrieved 22 October, 2016 from Google
http://www.iimidr.ac.in/

Indian Institutes of Management Kashipur. Retrieved 22 October, 2016 from Google
http://www.iimkashipur.ac.in/

Indian Institutes of Management Kozhikode. Retrieved 22 October, 2016 from Google
http://www.iimk.ac.in/

Indian Institutes of Management Lucknow. Retrieved 22 October, 2016 from Google
http://www.iiml.ac.in

Indian Institutes of Management Nagpur. Retrieved 22 October, 2016 from Google
http://iimnagpur.ac.in/

Indian Institutes of Management Raipur. Retrieved 22 October, 2016 from Google
http://www.iimraipur.ac.in/

Indian Institutes of Management Ranchi. Retrieved 22 October, 2016 from Google
http://www.iimranchi.ac.in/

Indian Institutes of Management Rohtak. Retrieved 22 October, 2016 from Google
http://www.iimrohtak.ac.in/

Indian Institutes of Management Sambalpur. Retrieved 22 October, 2016 from Google
http://www.iimsambalpur.ac.in/

Indian Institutes of Management Shillong. Retrieved 22 October, 2016 from Google
http://www.iimshillong.ac.in/

Indian Institutes of Management Sirmaur. Retrieved 22 October, 2016 from Google
http://www.iiml.ac.in/iimsirmaur

Indian Institutes of Management Tiruchirappalli. Retrieved 22 October, 2016 from Google
http://www.iimtrichy.ac.in/

Indian Institutes of Management Udaipur. Retrieved 22 October, 2016 from Google
http://iimu.ac.in/

Indian Institutes of Management Visakhapatnam. Retrieved 22 October, 2016 from Google
http://www.iimv.ac.in/

Indian Institutes of Management. Retrieved 20 October, 2016 From Wikepedia
https://en.wikipedia.org/wiki/Indian_Institutes_of_Management

Indian Institutes of Management. Retrieved 20 October, 2016 From Wikipedia
https://en.wikipedia.org/wiki/Indian_Institutes_of_Management

Ingwersen, P. (1998). The calculation of web impact factors. *Journal of Documentation, 54(2), 236-43.*

Ingwersen, P. (1998). The calculation of web impact factors. *Journal of Documentation*, 54(2), 236-43.

Ingwersen, P. (1998). The calculation of web impact factors.*Journal of Documentation*, 54(2), 236-43.

Internet Users.Retrieved 24 September, 2016.From Google Search engine
http://www.internetlivestats.com/internet-users/

Islam, Md. Anwarul (2011). Webometric study of universities in Bangladesh. *Annals of Library and Information Studies, 58(4), 307-318.*

Islam, Md. Anwarul and Alam, Md. Saiful (2011). Webometric study of private universities in Bangladesh. *Malaysian Journal of Library & Information Science, 16(2), 115-126.*

Jalal, Samir Kumar, Biswas, Subal Chandra and Mukhopadhyay, Parthasarathi (2010) Web presence of selected Asian countries: a webometric analysis. *Collnet Journal of Scientometrics and Information Management, 4(2), 57-68.*

Jayasundari , A and Jeyshankar, R (2014) Web Credibility of Indian Institute of Management (IIMs) Web Sites: *Journal of Advances in Library and Information ScienceVol. 3. No.3. 2014.p 222-232*

Jayshankar, R. and Babu, B. R. (2009). Websites of universities in Tamil Nadu: a webometrics study. *Annals of Library and Information Studies, 56(2), 69-79.*

Jeyshankar R., & Sujithai, M. (n.d). Webometrics tools and techniques: an overview. Available at http://dc370.4shared.com/doc/NOdc4LqQ/preview.html

Kothainayaki, S andGopalakrishnan, S (2011) Webometric analysis of agriculturaluniversities in India. *Indian Journal of Science and Technology 4 (3): 1-7.*

Kothainayaki; S and Gopalakrishnan; S (2011). Webometric Analysis of Agricultural Universities in India. *Indian Journal of Science & Technology. 4 (3), 1-8*

Larson, R.R. (1996). Bibliometrics of the World Wide Web: an exploratory analysis of the intellectual structure of cyberspace. In S. Hardin (Ed.), *Proceedings of the 59th Annual Meeting, ASIS 96, Baltimore, Maryland* (99.71-79)

Li, Xuemei et al. (2003). The relationship between the WIFs or inlinks of Computer Science Departments in UK and their RAE ratings or research productivities in 2001. *Scientometrics, 57(2), 239-255.*

Linking Root Domain of a website. Retrieved 23 October, 2016 from *http://ecommerce-platforms.com/glossary/linking-root-domains*

Madhusudhan ;Margam&Prakash; Shashi (2013). Websites of Indian Institutes of Technology: A Webometric Study. *International Journal of Library and Information Studies*Vol.*3 (4) Oct-Dec, 2013. P 1-3*

Maharana, B., Nayak, K. and Sahu, N. K. (2006). Scholarly use of web resources in LIS research: a citation analysis. *Library Review, 55(9), 598-607.*

Maharana, R. K.; Panda, K. & Sahoo, J. Web impact factor (WIF) and link analysis of Indian institute of technologies (IITs): A Webometric Study. *Lib. Philosophy and Practice (e - journal),* 2012, *Paper 789*, 1-11.

Maharana, Rabindra K.; K. C. Panda, C.K.; and Sahoo, J (2012) Web Impact Factor (WIF) and Link Analysis of Indian Institute of Technologies (IITs) A Webometric Study: *National Institute of Science Education and Research. 5-18*

Mandava ; Asha and Antony; Solomon (2015). A review and analysis of technologies for developing webapplications. *Annals of Library and Information Studies, 26(4),19-25.*

Mark, Maybury T. (2004). Universal multimedia information access. *Universal Access in the Information Society, 2(2), 96-104.*

Mayr, Philip and Walter, Anne-Kathrin (2007). An exploratory study of Google Scholar. *Online Information Review, 31(6), 814-130.*

Moed, H. F. (2002). The impact factors debate: the ISI's uses and limits. *Nature*, *415, 731-732.*

Mukherjee, B. (2011). Bibliometrics to webometrics: The changing context of quantitative research. *IASLIC Bulletin*, 56(2), 97-110.

Nair, R. R. (2002). *Internet for information services*. New Delhi: Ess Ess Publications.

Nalimov, V.V. &Mulchenko, Z.M. (1969).Scientometrics, study of the development of science as an information process. *Moscow: Nauka*

Nicolaisen, Jeppe (2007). Citation analysis. .*Annual Review of Information Science and Technology Volume 41, Issue 1, pages 609–641*

Noruzi, Alireza (2005). Web Impact Factors for Iranian universities. *Webology,2 (1),* Retrieved 24 September, 2016, from http://www.webology.ir/2005/v2nl/a11.html.

Noruzi, Alireza (2006). Web presence and impact factors for Middle-Eastern countries. *Online Magazine, 30(2), 22-28.*

Noruzi, A. (2006). The web impact factors: A critical review. *Electronic Library*, 24(4), 490-500.

Opuszko; Marek and Ruhland; Johannes (2012). Classification Analysis in Complex Online Social Networks Using Semantic Web Technologies. *IEEE/ACM International Conference on Advances in Social Networks Analysis and Mining*

Ortega, Jose Luis and Aguillo, Isidro F. (2007). Visualization of the Nordic academic web: link analysis using social network tools. *Information Processing and Management, 44(4), 1624-1633.*

Park, Han Woo (2004). Presence of Taiwan on the World Wide Web in South Korea: dynamics of digital and geographical presence on cyberspace. *The International Information & Library Review, 36(4), 329-340.*

Pavlina, Kresimir (2012) Webometric ranking of European universities. *Elsevier (46): 3788 – 3792.*

Payne, Nigel and Thelwall, Mike (2004). A statistical analysis of UK academic web links. *Cybermetrics, 1(2).*

Pirolli, P., Pitkow, J &Rao, R. (1996). Silk from a sow's ear: extracting usable structures from the web. *CHI 96 Electronic Proceedings.* Available at http://www. acm. org/ sigchi/chi96/proceedings/papers.Pirolli_2/pp2.html

Price, Derek de Solla (1970). Citation measures of hard science, soft science, technology and nonscience. In C.E. Nelson & D.K. Pollock (Eds.), Communication among scientists and engineers (pp. 3-22).*Lexington: Heath Lexington Books.*

R. Jeyshankar , B Ramesh Babu and P. NageswaraRao. (May 2014) "Websites of Indian Institutes of Management (IIMs): A Webometric Study". *e-Library Science Research JournalVol.2, Issue.7.*

Ramesh Babu, B., Jeyshankar, R. and Rao, P. Nageswara (2010). Websites of central universities in India: a webometric analysis. *DESIDOC Journal of Library & Information Technology, 30(4), 33-43.*

Ranganathan, S. R. (1949). Library and its scope.*Bangalore: DRTC Seventh Seminar Volume, Paper DA, 1995, 285-301.*

Ratha, Bhupendra (2012), Webometrics Study of IIT Libraries Websites. *DESIDOC Journal of Library & Information Technology, 1-5*

Rodriguez i Gairin, J.M. (1997). Impact assessment of information on the Internet: AltaVista, the citation index of the web. *RevistaEspanola De Documentacion Cientifica, 20(2), 175-181.*

Rousseau, R (1997). Sitations: an exploratory study. *Cybermetrics, 1(1),* Available at http://www.cindoc.csic.es/cybermetrics/articles/v2ilpl.html

Sharma C.K, (2005). Webometrics: An Overview. Journal of Library and Information Technology, (1) 5-8.

Shukla and Vanlalfeli (2015).Conceptual Approach to Webometrics: An Exploratory Study. Abhitantriki. An International Journal of Engineering & Technology. Vol. 2, No. 1

Shukla Svetal H. and Poluru, Lalitha (2012). Webometric analysis and indicators of selected Indian state universities. *Information Studies, 18(2), 79-104.*

Shukla, A. & Tripathi, A.(2009).Webometric analysis of institutes of national importance in India.*IASL1C Bulletin, 54(3), 165-180.*

Shukla, A. & Tripathi, A.(2014).Backlinks analyseof institutes of national importance and premier management institutions library websites. *Journal of International Academic Research for Multidisciplinary, 2(7),* 560-575.

Shukla, A. &Tripathi, A. (2015).*Webometrics Studies and Libraries. 22-61*

Shukla, A. & Vanlalfeli. (2014), Webometricanalyses : websites of Indian Institutes of Technology. *Advancements in Library Sciences, 2(2}, 34-48.*

Shukla, A. (2009). Measuring effectiveness of institutional websites: a case study of central universities of India. *Research Digest,* 4 (3).

Shukla, Akhandanand and Vanlalfeli (2015). Webometric Development in Web Impact Factor Studies:A Literary Review. *Journal of Advancements in Library Sciences.Volume 1,Issue 3*

Shukla, Akhandanand., and Tripathi, Aditya (2014), Backlinks Analyses of Institutes of National Importance And Premier Management Institutions Library Websites. *Journal of International of Academies Research for Multidisciplinary*, *1-15*

Shukla, Akhandanand., and Tripathi, Aditya (2015),Webometric Studies and Libraries 1-175

Shukla, S. H., &Poluru, L. (2012).Webometric analysis and indicators of selected Indian state universities. *Information Studies*, *18(2), 79-104.*

Smith, A. G. &Thelwall, M. (2002). Web impact Australasian universities. *Scientometrics, 54(3).363*

Smith, Alastair G. (1999a). ANZAC Webometrics: exploring Australasian Web structures. *Retrieved on 24 September, 2016, from http://www.csu.edu.au/special/online99/ proceedings99/203b.html.*

Smith, Alastair G. (1999b). A tale of two web spaces: comparing sites using web impact factors. *Journal of Documentation, 55(5), 577-592.*

Smith, Alastair G. (2002). Does metadata count? A Webometric investigation. *Proceedings of the International Conference on Dublin Core and Metadata for e-communities 2002, October 13- 17, 2002, Florence, Italy: 133-138.*

Smith, Alastair G. and Thelwall, Mike (2002). Web impact factors for Australian universities. *Scientometrics, 54(3), 363-380.*

Stuart, D.; Thelwall, M. & Harries, G. UK academic web links and collaboration: an exploratory study. *Journal of Inf. Sc.,* 2007, **33**(2), 231-246.

Sujithai, Maria and Jeyshankar, R. (2013). Web page analysis of Indian institute of technologies' (IITs) websites: a webometric study. *International Journal of Digital Library Services, 3(1), 55-65.*

Thanuskodi, S. (2011). Webometric analysis of private engineering college websites in Tamil Nadu. *Journal of Communications, 2(2), 73-81.*

Thanuskodi, S. (2012). A webometric analysis of selected institutes of national importance websites in India. *International Journal of Library Science, 1(1), 13-18.*

Thanuskodi, S. (2013). A webometric analysis of selected Institutes of national Importance Websites in India, *International Journal of Library Science, 1 (1), 13-18*

Thelwall, M (2001 a). A publicly accessible database of UK university website links and a discussion of the need for human intervention in web crawling. *University of Wolverhampton. 24(2).*63

Thelwall, M. (2001 b).Exploring the link structure of the web with network diagrams. *Journal of Information Science, 27(6),* 393-402.

Thelwall, M. (2001 c).Extracting macroscopic information from web links.*Journal of the American Society for Information Science and Technology, 52(13), 1157-1168.*

Thelwall, M. (2001 d), Results from a web impact factor crawler. *Journal of Documentation, 57(2), 177-191.*

Thelwall, Mike (2000). Web impact factors and search engine coverage. *Journal of Documentation, 56(2), 185-189.*

Thelwall, Mike (2001a). Extracting macroscopic information from web links. *Journal of the American Society for Information Science and Technology, 52(13), 1157-1168.*

Thelwall, Mike (2001b). Web log file analysis: backlinks and queries. *ASLIB Proceedings, 53(6), 217-223.*

Thelwall, Mike (2002). A comparison of sources of links for academic Web Impact Factor calculations. *Journal of Documentation, 58(1), 66-78.*

Thelwall, Mike (2003). Web use and peer interconnectivity metrics for academic websites. *Journal of Information Science, 29(1), 1-10.*

Thelwall, Mike (2004a). Text Characteristics of English language university web sites. *Journal of the American Society for Information Science and Technology, 56(6), 609-619.*

Thelwall, Mike (2004b). Interpreting social science link analysis research: a theoretical framework. *Journal of the American Society for Information Science and Technology, 57(1),60-68.*

Thelwall, Mike (2006). Commercial website links internet research. *Electronic Networking Applications and Policy, 11(2), 114-124.*

Thelwall, Mike (2008a). Bibliometrics to webometrics. *Journal of Information Science, 34(4), 605- 621.*

Thelwall, Mike (2008b). Quantitative Comparisons of search engine results. *Journal of the American Society for Information Science and Technology, 59(11), 1702-1710.*

Thelwall, Mike and Wilkinson, David (2003). Three target document range metrics for university websites. *Journal of the American Society for Information Science and Technology, 54(6), 489-496.*

Thelwall, Mike and Wilkinson, David (2008). A generic lexical URL segmentation framework for counting links, colinks or URLs. *Library and Information Science Research, 30(2), 94-101.*

Thelwall, Mike et al. (2002). European Union associated university websites. *Scientometrics, 53(1), 95-111.*

Thelwall, Mike et al. (2003). Which academic subjects have most online impact? A pilot study and a new classification process. *Online Information Review, 27(5), 333-343.*

Tomas C. Almind& Peter Ingwersen (1997). "Informetric analyses on the World Wide Web: Methodological approaches to 'webometrics'". *Journal of Documentation.* **53** *(4): 404 – 426.*

Uniform Resource Identifier.Retrieved 24 September, 2016.From Wikipedia. *https://en.wikipedia.org/wiki/Uniform_Resource_Identifier*

Vaughan, Lewin and Shaw D. (2003). Bibliographic and web citation: What is difference? *Journal of American Society for Information Science and Technology, 54(14), 1313-1322.*

Vaughan, Lewin and Shaw D. (2003). Bibliographic and web citation: What is difference? *Journal of American Society for Information Science and Technology*, *54*(14), 1313-1322.

Vaughan, L. & Thelwall, M. (2003). Scholarly use of the web: what are the key inducers of links to journal websites?. *Journal of the American Society for Information Science and Technology, 54(1), 29-38.*

Vaughan, Lewin and Zhang, Y. (2007). Equal representation by search engines? A comparison of Websites across countries and domains. *Journal of Computer-Mediated Communication, 12(3).* Retrieved on 23 September, 2016, from http://jcmc.indiana.edu/ vol12/issue3/vaughan.html.

Vaughan, Liwen (2004a). Exploring website features for business information. *Scientometrics, 61(3), 467-477.*

Vaughan, Liwen and Wu, Guozhu. (2004). Links to commercial websites as a source of business information. *Scientometrics, 60(3), 487-496.*

Vaughan, Liwen and You, Justin (2006). Comparing business competition positions based on web co-link data: The global market vs. the Chinese market. *Scientometrics, 68(3), 611-628.*

Vaughan, Liwen, Kipp, Margaret and Gaon, Yijun (2007). Are co-linked business websites really related? A link classification study. *Online Information Review, 31(4), 440-450.*

Verma and Devi (2015). Content Analysis of Central Universities Library Websites of North Eastern States of India: A Survey. *Journal of Research in Librarianship - Vol.2 (5) Sep-Oct, 2015*

Verma and Devi (2016). Web Content and Design Trends of Indian Institutes of Management (IIMs) Libraries Website: An Analysis. *DESIDOC Journal of Library & Information Technology, Vol. 36, No. 4, July 2016, pp. 220-227*

Verma.,Manoj Kumar and Devi, Krishna (2015) Content Analysis of Central Universities Library Websites of North Eastern States of India: A Survey.*Journal of Research in Librarianship* - Vol.2(5) Sep-Oct, 2015

Verma.,Manoj Kumar., and Devi, Krishna (2016) Web Content and Design Trends of Indian Institutes of Management (IIMs) Libraries Website: An Analysis. *DESIDOC Journal of Library & Information Technology, Vol. 36, No. 4, July 2016, pp. 220-227*

Vijakumar, M.; Kannappanavar, B. & Kumar , K. S. Webometric analysis of web presence and links of SAARC countries. *DESIDOC J. of Lib. & Inf. Tech,* 2012, *32*(1), 70-76.

Walia, P.K. and kaur, Prabhjeet (2008). Webometric Analysis of Associations' Website of India, *IASLIC Bulletin, 53(3), 131-143*.

Wallia, P.K. &Kaur, Prabhjeet. (2008) Webometric analysis of library association's websites of India. *IASLIC Bulletin*, 53(3), 131-43.

Web Browser.Retrieved 23 September, 2016.From Webopedia. *http://www.webopedia.com/TERM/B/browser.html*

Web Browser.Retrieved 23 September, 2016.From Wikipedia. *https://en.wikipedia.org/wiki/Web_browser*

Web Impact Factor.Retrieved 27 January, 2016.From Wikipedia. *https://de.wikipedia.org/wiki/Web_Impact_Factor*

Web Server.Retrieved 24 September, 2016.From Webopedia. *http://www.webopedia.com/TERM/W/Web_server.html*

Web Usage Analysis Retrieved 21 November, 2016 from Google http://www.igi-global.com/dictionary/web-usage-analysis/32383

Webometrics Research. Retrieved 27 January , 2016. From Wikipedia *http://research.webometrics.info/.*

Webometrics.Retrieved 27 January, 2016. From Wikipedia
https://en.wikipedia.org/wiki/Webometrics.

Wilkinson, David, Thelwall, Mike, and Li, Xuemei (2003). Exploiting Hyperlinks to Study Academic Web Use. *Social Science Computer Review, 21(3), 340-351.*

World Wide Web History.Retrieved 23 September, 2016, from Wikipedia. *https://en.wikipedia.org/wiki/History_of_the_World_Wide_Web*

World Wide Web.Retrieved 23 September, 2016, from Wikipedia. *https://en.wikipedia.org/wiki/World_Wide_Web*.

ABSTRACT

ON

"Webometric Study of Indian Institutes of Management (IIMs) Website: A Study"

Dissertation Submitted to the Mizoram University for the fulfillment Degree o Master of Philosophy in Library and Information Science

Submitted by

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1. INTRODUCTION

The internet and websites became one of the most popular communication tools to the world in the age of Information and Communication Technology (ICT). The World Wide Web (www) which is the most popular part of the Internet is the result of the project initiated by CERN High Energy Physics Lab in Switzerland in 1990 for allowing the researchers to share information with each other. The internet has made it available to individuals all the information globally at just one click. So, there is an extreme need for developing and updating the websites. The development of technology has made a tremendous change in every sphere of life. So, there is always a need of developing the libraries to cope up with the pace of time. In the present era, people prefer browsing websites and collecting all the necessary information at one time rather than visiting physically, which is yet time saving too. Henceforth, the responsibility of website developer has become more important in updating the correct data so that it could reach in every nook and corner of the world. The World Wide Web (WWW) is a system of interlinked hypertext documents accessed via the Internet. With a web browser, one can view web pages that may contain text, images, videos and other multimedia, and navigate between them via hyperlinks (Wikipedia). It is a system of Internet servers that support specially formatted documents. The documents are formatted in a markup language called HTML (Hyper Text Markup Language) that supports links to other documents, as well as graphics, audio, and video files. This means one can jump from one document to another simply by clicking on hot spots.

In the WWW, the web pages are the entities of information, with hyperlinks from them acting as citations. Quantitative analysis on the WWW is being carried out in the same way, as is tradition in citation databases. As information on Web increases towards entropy, it is needed to apply some theory/ metrics (measurement) to develop new methods, modeling techniques and metaphors to examine this emerging complex network. Through webometric study one can observe that how users actually react and use specific web document. The web is beyond control in growth, which means opportunities exist where good system architecture and diligent analysis can be applied for everyone's benefit. On the basis of the study and conception, the definition of webometric is given, "the webometric study is based on quantitative measurement − indirectly includes the qualitative aspect also of structure, use of information resources and technologies on WWW drawing on bibliometric and info metric approach" (Goswami, 2007).

Webometrics covers research of all networking activities based on informatics and other quantitative measures. It is evident that informatics methods using word counts and similar techniques can be applied to the WWW. The WebPages are the entities of information with hyperlinks from them acting as citations. When applying the informatics methodologies to the internet, Search engine plays important role i.e., if the search engine is weak and affected by commercial interests, then searching for the perfect algorithm; matching the perfect user's perfectly well defined need of information (Fugl,2001).

2. WEBOMETRICS

Webometrics is a scientific discipline that studies the quantitative aspects of information sources and their use. In other words, **webometrics** try to measure the World Wide Web, analyses technology usage and allows us a simple content analysis.

The science of webometrics (also cybermetrics) tries to measure the World Wide Web to get knowledge about the number and types of hyperlinks, structure of the World Wide Web and usage patterns. According to Bjornborn and Ingwersen (2004), the definition of webometrics is "the study of the quantitative aspects of the construction and use of information resources, structures and technologies on the Web drawing on bibliometric and informetric approaches". The Tern webometrics was first coined by Almind and Ingwersen (1997). A second definition of webometrics has also been introduced, "the study of web-based content with primarily quantitative methods for social science research goals using techniques that are not specific to one fields of study" (Thelwall,2009), which emphasizes the development of applied methods for use in the wider social sciences. The purpose of this alternative definition was to help publicize appropriate methods outside of the information science discipline rather than to replace the original definition within information science.. The Webometrics concentrates on the Construction and Usage sides of the Web which mainly cover four areas namely:

    a) Web page content analysis
    b) Web link structure analysis (e.g. hyperlink, self link and external link)
    c) Web usage analysis (e.g. exploiting log files for users searching and browsing behavior)
    d) Web technology analysis (including search engine performance)

Web page content analysis is a kind of subject analysis based on the content of the website. Web link structure is an analysis that provides links to other web page/ sites. Web usage

analysis is an analysis performed on the record of user accesses to the application pages, collected in a Web server log. Web technology analysis refers to an information systems evaluation including engine performance.

3. SIGNIFICANT OF THE STUDY

The Webometrics is a very important segment in the field of library and information science through which analysis of websites has been conducted by many information professionals..In the present digital era, web became the master source of information and plays an important role in its dissemination because people became more webs centric to find their information. They want all the information should be at their fingertips at anytime from anywhere and any pattern. It means the information must be available in the web domain so that users can access it in 24X7 modes. Therefore, all the institutes has designed and developed their website to provide information through web. It initiates the research in the area of web analysis, which developed conceptually from Bibliometrics. There are number of studies on Webometrics which have been conducted in India as well as over the globe to analyze institute websites but no detail study has been conducted to analyze the websites of apex management institutions of India. In the case of IIM's websites, few webometric studies have been conducted. So, the study is an attempt to fill up the gap. Therefore, through this study the scholar will try to investigate the effectiveness IIMs websites by analyzing the URL analysis, calculating web impact factor (WIF), link pattern and search engine's performance. Find out the Domain Authority of IIM's websites and Find out the Internal and External Link page of IIM's Websites. Examine the link-equity in IIM's websites and indentify the individualized Domain of each IIM's websites. Thus, present study will help to show the current status of websites by webomeric analysis.

4. SCOPE OF THE STUDY

The present study is confined to websites of Indian Institutes of Management (IIMs). IIMs are the apex educational institutions for imparting education and research in Management. Presently there are nineteen (19) IIMs in the country which are registered as societies under the Indian Societies Registration Act. The lists of nineteen (19) Indian Institutes of Management (IlM's) are given in the table 1.The findings of the study may helpful to webmasters in redesigning their institute website to a more interactive and informative way.

5. INDIAN INSTITUTES OF MANAGEMENT (IIMS)

The **Indian Institutes of Management** (**IIMs**) is a group of public, autonomous institutes of management educationand research in India. Presently there are nineteen (19) IIMs in the

country as listed in MHRD website (http://mhrd.gov.in/iims) and situated in different part of the country.

IIMs are registered as societies under the Indian Societies Registration Act. Each IIM is autonomous and exercises independent control over its day-to-day operations. However, the administration of all IIMs and the overall strategy of IIMs is overseen by the IIM council. The IIM Council is headed by India's Minister of Human Resource Development and consists of the chairpersons and directors of all IIMs and senior officials from the Ministry of Human Resource Development of the Government of India. Business schools are colleges or institutes, which are conducting courses on business administration and management. These are either autonomous or would have affiliated to a university. The prominence of a business school is purely based on the quality of education, faculty, campus placement facility etc. The top business schools in the country such as IIMs and ISB are always making headlines with campus placement and salary offers. This clearly shows that importance of excellence in education and faculty of business schools. In beginning, the numbers of IIMs are very less but with the time many IIMs was established. Table-2 shows that the decade wise development of IIMs and from it clears that maximum IIMs was established during 2011-2016.

Table-1: List of Indian Institutes of Management (IIMs)*(Source:*

(https://en.wikipedia.org/wiki/Indian_Institutes_of_Management)

Sl.No	Name of Institution	Year of Established	Location
1	Indian Institute of Management Calcutta	1961	Kolkata, West Bengal
2	Indian Institute of Management Ahmedabad	1961	Ahmedabad, Gujarat
3	Indian Institute of Management Bangalore	1973	Bangalore, Karnataka
4	Indian Institute of Management Lucknow	1984	Lucknow,Uttar Pradesh
5	Indian Institute of Management Kozhikode	1996	Kozhikode,Kerala
6	Indian Institute of Management Indore	1996	Indore,Madhya Pradesh
7	Indian Institute of Management Shillong	2007	Shillong, Meghalaya
8	Indian Institute of Management Rohtak	2010	Rohtak, Haryana
9	Indian Institute of Management Ranchi	2010	Ranchi,Jharkhand
10	Indian Institute of Management Raipur	2010	Raipur,Chhattisgarh
11	Indian Institute of Management Trichy	2011	Trichy, Tamil Nadu
12	Indian Institute of Management Udaipur	2011	Udaipur,Rajasthan

13	Indian Institute of Management Kashipur	2011	Kashipur,Uttarakhand
14	Indian Institute of Management Nagpur	2015	Nagpur,Maharashtra
15	Indian Institute of Management Bodh Gaya	2015	Bodh Gaya,Bihar
16	Indian Institute of Management Visakhapatnam	2015	Visakhapatnam,Andhra Pradesh
17	Indian Institute of Management Amritsar	2015	Amritsar,Punjab
18	Indian Institute of Management, Sambalpur	2015	Sambalpur, Odisha
19	Indian Institute of Management, Sirmaur	2015	Sirmaur district, Himachal Pradesh

6. OBJECTIVES OF THE STUDY

The present study is undertaken to have an in-depth study of webometric study of Indian Institutes of Management (IIMs) website with following objectives to:

❖ Analyze URL of IIMs websites under study.

❖ Evaluate the search engine performance for Webometric studies.

❖ Find out the Domain Authority, Page Authority and Individual domains of IIMs website.

❖ Find out the Internal, External Link Pages and link equity of IIMs Websites.

❖ Calculate the web impact factor (WIF) of IIMs website and rank them as per WIF.

7. REVIEW OF LITERATURE

The scholars reviewed 60 articles from books and journals. The review of literature shows that there are a number of studies on Webometrics which have been conducted in India as well as over the globe to analyze institute websites as mention in above review of literature but no detail study has been conducted to analyze the websites of apex management institutions of India. Therefore, this study is an attempt to fulfill the gap of research.

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- ❖ Calculate the web impact factor (WIF) of IIMs website and rank them as per WIF.

9. RESEARCH METHODOLOGY

The present study is on Webometrics analysis of the IIMs websites by calculating web impact factor of respective websites and evaluates the performance of search engine through webometrics study. The primary data will be collected from selected institutes' website by survey and observation methods by the respective institute website(as mention in table-3). There are established criteria for Webometrics analysis of websites i.e. how to collect URLs, data collection tools through search engine and calculation of web impact factors (WIF).

While undertaking WIF study, it is necessary to select a suitable search engine that would count the number of pages in website and number of pages linking to the websites. Open site explorer is an optimization tool and search engine for links analysis. It makes gathering, sorting and exporting link data easier than ever. It provides a tremendous amount of information about the links to any page or site.

10. FINDINGS

The major findings of the study based on the objectives are:

1. The 17 (89.47%) IIMs are using .ac .in URL and only 2 (10.52%) IIMs websites (IIM- Ahmedabad and IIM-Bangalore) used .ernet .in URL. The country code TLD (ccTLD) .in is used by all of the IIM's (i.e. 100%) websites.

2. IIMs websites supported many file formats. All the IIMs' websites are using HTML which is by- default web page designing language. The document file formats (.html, .pdf, .doc, .excel) and image file format (.jpg / .jpeg, .png) are used by IIM's website. IIM-Calcutta, have used maximum file formats (7) to represent the information content of website while IIM-Raipur, IIM-Trichy, IIM-Nagpur and IIM-Amritsar used minimum (3) file formats. It have been found that 12 IIM Library website i.,e 63.15 % are using a web-Opac in their websites.

3. In search engine performance evaluation it was found that search expression with gap having more number of hits in all IIMs websites comparison to search expression without gap in both site command and link command sites and huge variations in data was found. Although, conceptually search expression without gap is more logical.

4. The IIM-Ahmadabad and IIM-Bangalore have highest (73) domain authority among the IIMs websites followed by IIM-Calcutta (54) and IIM-Kozhikode (50) while IIM-Shillong and IIM-Rohtak have the lowest (01) domain authority.

5. IIM Indore have highest (56) page authority among all IIMs followed by IIM-Udaipur (50) and IIM-Calcutta (47) while IIM-Shillong, IIM-Rohtak and IIM-Sambalpur have the lowest page authority (01).

6. In Total 1070 internal linke, IIM-Indore lead first position with 770 total internal links followed by IIM-Trichy (188) and IIM-Kozhikode (45) while five IIMs (IIM-Banglore, ,Shillong, Rohtak, Raipur and Sambalpur) have zero (0) Internal Links.

7. In total 5538 External Links reported in all IIMs websites, again IIM Indore with 2054 External Links occupied the first place among IIMs websites, followed by IIM Udaipur (665) and IIM Ranchi (653) while three IIMs (IIM- Shillong, Rohtak and Sambalpur) have not a single external link till now.

8. In ranking of IIMs websites on the basis of Total Links (total internal links & total external links) analysis IIM-Indore leads with 2824 Total Links followed by IIM-Ranchi (664) with second place and IIM-Udaipur (657) with third rank.

9. Total 1082 Internal Equity Passing Links was reported from all IIMs websites. IIM-Indore has the highest number of Internal Equity-Passing Links (770), followed by IIM-Trichy (188) and IIM-Kozhikode (45).

10. Total 5337 External Equity Passing Links was reported from all IIMs websites in which IIM- Indore has the highest number of Internal Equity-Passing Links with 770, followed by IIM-Trichy (188) and IIM-Kozhikode (45), which occupies the second and third place respectively.

11. In ranking of IIMs websites on the basis of Total Equity-Passing Links (total internal & total external Equity-Passing Links), IIM-Indore leads with 2760 among the all IIMs websites, followed by IIM-Ranchi with 635 occupies the second position and IIM- Udaipur with 625 occupies the third position in ranking.

12. Till 3rd round of data collection, IIM-Lucknow have1^{st} rank on the basis of RWIF where as last two round (i.e. 4th& 5th) IIM-Rohtak have ranked 1st. In overall ranking of 19 IIM's website, IIM-Lucknow has the highest (7.2) average RWIF and ranked 1st, while IIM- Rohtak and IIM-Calcutta ranked second and third with RWIF 0.011491 and 0.010663 respectively.

11. CONCLUSION

The World Wide Web (WWW) is used to access huge quantity of information available through Internet and become main source of information for academic and research activities. To cope-up the growing demand of users for information exchange, the easiest and effective way is websites. In the recent years, websites plays a key role through which information is disseminated effectively and efficiently. A website is a collection of web pages, images, videos or other digital materials that are linked with a common Uniform Resource Locator (URL) and it is hosted on web server accessible via network such as Internet or local area network. The web services, rendered through websites have been gathering significant momentum in both academia and R &D institutions in the recent years. The Web is playing a main role in diverse application domains such as business, education, industry and entertainment. As a result, there are increasing concerns about the ways in which websites are developed and the degree of quality delivered. Developing a website should be passed through several design guidelines to ensure that the website can achieve the purposes and goals intended to be accomplished. Additionally, an academic organization's website is a gateway to its information, products and services. As such, it should ideally be a reflection of the needs of the clients it serves. Unfortunately, website design is often driven by technology, organizational structure or business objectives, rather than by users needs.

The academic websites are the primary source of all the information to their hosting institutions or organizations. An university website is increasingly used for the variety of purposes like attracting new students, information regarding courses, syllabus, job vacancies, library catalogue, acts as centre place for news and announcements. The academic library websites has to serve diverse category of students and researchers who are looking for reliable, relevant and quality information. Students need information for studying, achieving academic purpose and doing assignments. Researchers need information for their research

and new information or knowledge. Since web portals are the integral part of the institutions, it also provides direct access to library and their digital resources.

Web resources are apple of information professional's eye due to its value added services to meet their current and diversified information needs. In the WWW, the web pages are the entities of information, with hyperlinks from them acting as citations. Quantitative analysis on the WWW is being carried out in the same way, as is tradition in citation databases. As information on web increases towards entropy, it is needed to apply some theory/ metrics (measurement) to develop new methods, modeling techniques and metaphors to examine this emerging complex network. Through webometric study one can observe that how users actually react and use specific web document. The web is beyond control in growth, which means opportunities exist where good system architecture and diligent analysis can be applied for everyone's benefit. The Webometrics is a very important segment in the field of library and information science through which analysis of websites has been conducted by many information professionals. In the present digital era, web became the master source of information and plays an important role in its dissemination because people became more webs centric to find their information.

After analyzing all the nineteen IIM's websites, it is found that the URL of the IIM's websites is in two domains which are: .ac, and .ernet. The TLD .ac .in is used by 17 IIMs websites i.e. 89.47 % of IIMs websites whereas only 2 IIM's websites i,e. 10.52 % have used .ernet .in. It is clear that different websites supported different file format which is used for accessing file in their websites. HTML file is used in all of IIMs websites for representing their content. Only few IIMs website mention updated date and time in their homepage .Majority of the IIMs websites have more numbers of hits when it search with gap in both link and site command while number of hits are very less when it search without command. IIMs which were established before 2009 have high number of domain authority and page authority which may be due to their year of establishment but some new IIMs also have good number of domain authority and page authority. There are less total internal links are found in comparison to total external link and same way internal passing link are very less in comparison to external passing links in IIMs website, its need to enhance the performance of IIMs website.

In analysis of five round of revised WIF it is found that some websites are not indexed thoroughly in Google search engine. IIM's websites which are having higher number of web pages but no links lead to lower WIF and RWIF. This may be due to structural problems in websites, instability of web servers, less indexing of websites etc. In overall ranking of IIM's

website, IIM-Lucknow has the highest (7.2) average RWIF and ranked 1st, while IIM-Rohtak and IIM-Calcutta ranked second and third with RWIF 0.011491 and 0.010663 respectively.

12. SUGGESTIONS

On the basis of observations during study and analysis of findings following suggestions suggested to improving IIM websites visibility and accessibility:

1. It was observed that majority of the websites have not mentioned the date of updating their websites. Thus every websites need to add the date of last update.
2. Web OPAC file format was used by 12 IIM website. This format should be used by all IIMs websites
3. The web designs and the links between pages need to be updated constantly so that the

   search engines can easily access and index the latest materials uploaded on the websites

   and users can easily find their relevant information in quickest possible time.
4. During study it was observed that some IIMs websites thoroughly linking with some others websites but not linked with all IIMs websites. Thus all the IIMs websites should be link with each other.
5. There is need to improve the search engine performance of many IIMs websites because their search hits number is very less.
6. The Internal Equity Passing link should be enhancing in IIMs website.