INFORMATION ARCHITECTURE ANALYSIS AND WEBOMETRIC EVALUATION OF CENTRAL GOVERNMENT MINISTRIES' AND DEPARTMENTAL WEBSITES OF INDIA

A Synopsis

Submitted towards the requirement for the award of degree of

Doctor of Philosophy

In

Library and Information Science

Under the faculty of Arts

By

Shampa Mahato

Research Scholar

Registration No.- A0LIS0100319

Under the Supervision of

Dr. Sunil Kumar Chatterjee

Professor, Department of Library and Information Science

Jadavpur University, Kolkata

Department of Library and Information Science

Jadavpur University

Kolkata – 700032

2025

1. Introduction

There has been a trend towards increasing government transparency, developing online public services and providing individuals and businesses with e-participation tools for decision-making around the world. In this context, it is imperative to provide significant methods for assessing the progress in this field. Governments of all countries around the world provide citizens with access to data via a variety of channels in order to emphasize transparency, encourage accountability and highlight their achievements for the benefit of the general public. Natives use this information to make decisions on the degree of certainty and success of governments. Additionally, this data helps the citizens to make decisions while keeping them aware of the progress done in different areas. Natives depend on government information, such as policies, plans and tactics. As the World Wide Web continues to advance, governments can use its broad capabilities to connect with citizens (Chand, & Ramesha, 2017).

India has consistently been at the forefront of administrative innovation. Since its inception, the National Informatics Centre has provided residents with data and administration through a variety of offices and services. Central and state governments are actively involved in providing inhabitants with structured e-administration phases. From time to time, the Indian legislature has also approved a number of initiatives to promote e-administration. An important tactic described is the Information Technology Act 2000, which marks a significant advancement in India's IT strategy. In recent times, the advanced India initiative focuses on making information and services available to citizens across the country, not merely by providing them via an e-administration platform (Chand, & Ramesha, 2017).

In the Government of India directory (goidirectory.nic.in) there are listing of 52 ministries, 52 departments, 192 Attached/Subordinated Offices, 2 Independent Departments, 567 Statutory/Autonomous bodies, 41 Commissions/Committees. These are the websites through which Government of India facilitates the dissemination of information to citizens with many of these websites exists since long. Studying these websites will allow us to understand how the information dissemination is being facilitated.

In an increasingly complex digital environment, organization of resources becomes a critical issue. So, information architecture is necessary for organization of information content in a website. It is the structural design of shared information environments; combination of organization, labeling, search and navigation systems within web sites and intranets. In other

words it can be said that information architecture is the art and science of shaping information products and experiences to support usability and findability.

The term webometrics is derived from two words "web" and "metrics". The dictionary of science defines web as a hypermedia system that allows users to view and retrieve information from documents containing links. Metrics means Systems of measurement, particularly assessment of the usability and efficiency of electronic resources.

Webometrics is a quantitative investigation of web-related phenomena. The webometric study could be applied to web with commercial search engines providing the raw data. It is concerned with measuring aspects of the web: websites, web pages, parts of web pages, words in web pages, etc.

This study has examined 44 central government ministries and 38 departmental websites of India. This Investigated different components of information architecture (i.e. organization system, labeling system, navigation system and search system) of the existing government ministries' and departmental websites in India; also analyzed domain systems of the websites, the number of webpages and link pages and calculate the simple web impact factor, self-link web impact factor, external link web impact factor for central government websites' in India and rank the websites as per the scores under different WIFs.

Table 1: List of selected central government ministries of India with their website addresses

Sl. no.	**Central government ministries and their abbreviations**	**Website addresses**
1	Ministry of Ayush (MoA)	https://main.ayush.gov.in/
2	Ministry of Civil Aviation (MoCA)	https://www.civilaviation.gov.in/
3	Ministry of Coal (MoC)	https://coal.gov.in/
4	Ministry of Cooperation (MoCO)	http://cooperation.gov.in/Cooperation.aspx
5	Ministry of Corporate Affairs (MoCRA)	https://www.mca.gov.in/content/mca/global/en/home.html
6	Ministry of Culture (MoCL)	https://www.indiaculture.nic.in/
7	Ministry of Defence (MoD)	https://www.mod.gov.in/

Sl. no.	Central government ministries and their abbreviations	Website addresses
8	Ministry of Development of North Eastern Region (MoDNER)	https://mdoner.gov.in/#
9	Ministry of Earth Sciences (MoES)	https://moes.gov.in/
10	Ministry of Education (MoE)	https://www.education.gov.in/en
11	Ministry of Electronics & Information Technology (MoEIT)	http://meity.gov.in/
12	Ministry of Environment, Forest and Climate Change (MoEFCC)	https://moef.gov.in/en/
13	Ministry of External Affairs (MoEA)	https://mea.gov.in/
14	Ministry of Finance (MoF)	https://www.finmin.nic.in/
15	Ministry of Food Processing Industries (MoFPI)	https://www.mofpi.gov.in/
16	Ministry of Health and Family Welfare (MoHFW)	https://main.mohfw.gov.in/
17	Ministry of Heavy Industries (MoHI)	https://heavyindustries.gov.in/
18	Ministry of Home Affairs (MoHA)	https://www.mha.gov.in/
19	Ministry of Housing and Urban Affairs (MoHUA)	https://mohua.gov.in/
20	Ministry of Information and Broadcasting (MoIB)	https://mib.gov.in/
21	Ministry of Jal Shakti (MoJS)	https://jalshakti.gov.in/
22	Ministry of Labour and Employment (MoLE)	https://labour.gov.in/
23	Ministry of Law and Justice (MoLJ)	https://lawmin.gov.in/
24	Ministry of Micro Small and Medium Enterprises (MoMSME)	https://www.msme.gov.in/
25	Ministry of Mines (MoM)	https://mines.gov.in/
26	Ministry of Minority Affairs (MoMA)	https://minorityaffairs.gov.in/
27	Ministry of New and Renewable Energy (MoNRE)	https://mnre.gov.in/

Sl. no.	Central government ministries and their abbreviations	Website addresses
28	Ministry of Panchayati Raj (MoPR)	https://panchayat.gov.in/
29	Ministry of Parliamentary Affairs (MoPA)	https://mpa.gov.in/
30	Ministry of Personnel, Public Grievances & Pensions (MoPPGP)	https://persmin.gov.in/
31	Ministry of Petroleum and Natural Gas (MoPNG)	https://mopng.gov.in/en
32	Ministry of Ports Shipping and Waterways (MoPSW)	https://shipmin.gov.in/
33	Ministry of Power (MoP)	https://powermin.gov.in/
34	Ministry of Road Transport and Highways (MoRTH)	https://morth.gov.in/
35	Ministry of Railways (MoR)	https://indianrailways.gov.in/
36	Ministry of Rural Development (MoRD)	https://rural.nic.in/
37	Ministry of Skill Development and Entrepreneurship (MoSDE)	https://www.msde.gov.in/
38	Ministry of Statistics and Programme Implementation (MoSPI)	https://mospi.gov.in/
39	Ministry of Steel (MoS)	https://steel.gov.in/
40	Ministry of Textiles (MoTT)	http://ministryoftextiles.gov.in/
41	Ministry of Tourism (MoT)	https://tourism.gov.in/
42	Ministry of Tribal Affairs (MoTA)	https://tribal.gov.in/
43	Ministry of Women & Child Development (MoWCD)	https://wcd.nic.in/
44	Ministry of Youth Affairs and Sports (MoYAS)	https://yas.gov.in/

Table 2: List of ministries' departments with their website addresses

Sr. no.	Central government ministries' departments and their abbreviations	Website addresses
1	Department of Administrative Reforms & Public Grievances (DoARPG)	https://darpg.gov.in/en
2	Department of Agriculture & Farmers Welfare (DoAFW)	https://agricoop.nic.in/en
3	Department of Agricultural Research and Education (DoARE)	https://dare.gov.in/
4	Department of Animal Husbandry and Dairying (DoAHD)	https://dahd.nic.in/
5	Department of Biotechnology (DoB)	https://dbtindia.gov.in/
6	Department of Chemicals and Petrochemicals (DoCPC)	https://chemicals.gov.in/
7	Department of Commerce (DoC)	https://commerce.gov.in/
8	Department of Consumer Affairs (DoCA)	https://consumeraffairs.nic.in/
9	Department of Defence Production (DoDP)	https://www.ddpmod.gov.in/
10	Department of Drinking Water and Sanitation (DoDWS)	https://jalshakti-ddws.gov.in/en
11	Department of Economic Affairs (DoEA)	https://dea.gov.in/
12	Department of Empowerment of Persons with Disabilities (DoEPD)	https://disabilityaffairs.gov.in//content/
13	Department of Expenditure (DoE)	https://doe.gov.in/
14	Department of Ex-servicemen Welfare (DoEW)	https://www.desw.gov.in/
15	Department of Fertilizers (DoFz)	https://www.fert.nic.in/
16	Department of Financial Services (DoFS)	https://financialservices.gov.in/
17	Department of Fisheries (DoF)	https://dof.gov.in/
18	Department of Food & Public Distribution (DoFPD)	https://dfpd.gov.in/index.htm
19	Department of Health Research (DoHR)	https://dhr.gov.in/

Sr. no.	Central government ministries' departments and their abbreviations	Website addresses
20	Department of Investment and Public Asset Management (DoIPAM)	https://dipam.gov.in/
21	Department of Justice (DoJ)	https://doj.gov.in/
22	Department of Land Resources (DoLR)	https://dolr.gov.in/
23	Department of Legal Affairs (DoLA)	https://legalaffairs.gov.in/
24	Department of Official Language (DoOL)	https://rajbhasha.gov.in/
25	Department of Pension & Pensioners' Welfare (DoPPW)	https://doppw.gov.in/en
26	Department of Personnel & Training (DoPT)	https://dopt.gov.in/#
27	Department of Pharmaceuticals (DoPh)	https://pharmaceuticals.gov.in/
28	Department of Posts (DoP)	https://www.indiapost.gov.in/vas/Pages/IndiaPostHome.aspx
29	Department for Promotion of Industry and Internal Trade (DPIIT)	https://dpiit.gov.in/
30	Department of Public Enterprises (DoPE)	https://dpe.gov.in/
31	Department of Revenue (DoR)	https://dor.gov.in/
32	Department of School Education & Literacy (DoSEL)	https://dsel.education.gov.in/
33	Department of Science & Technology (DoST)	https://dst.gov.in/
34	Department of Scientific and Industrial Research (DoSIR)	http://www.dsir.gov.in/
35	Department of Social Justice & Empowerment (DoSJE)	https://socialjustice.gov.in/
36	Department of Telecommunications (DoT)	https://dot.gov.in/
37	Department of water Resources, River Development & Ganga Rejuvenation (DoWRRDGR)	http://jalshakti-dowr.gov.in/
38	Legislative Department (LD)	https://legislative.gov.in/

2. Review of Related Literature

In today's information decade 'information overload' is a term used to describe the problems resulting from the incredible amount of information. Kirsh (2000) shows us that the problem of information overload is not simply caused by the increase of information amount but by other factors like the increased number of decisions of knowledge workers, the need of multi-tasking, the increased frequency of interruptions, the need of time efficiency and the lack of adequate work environments.

The main intention of information architecture is to reduce the time-wasting chaos that can arise from navigating through vast quantities of information globally. The central features of information architecture are likely to be overall design of a shared/common information environment, organizing and structuring information resources (web sites etc.) through formalization and manipulation of metadata, creating efficient methods of linking resources, designing structures for future generations so that anticipated needs can be met (Prytherch, c 2005).

An information modeler attempts to address the issue of psychological over-burden by including sufficient structures, labels and browsing aids to websites and programming applications so as to improve ease of use. In fact an adequate information architecture may optimize the digital work environment which is the information space. Users ought to handily discover the information they mentioned, without being over-burden with an excessive amount of information. They should work in the data space in an instinctive way and ought to have the option to recuperate their work after an interference (Zimmermann, 2005).

Rosenfeld and Morville (1998) advocated the idea of information architecture by utilizing it to characterize a blueprint for information organisation and access for sites. Their blueprint determines the classificatory structure, labeling of ideas inside that structure, navigation and searching systems.

Stover and Zink (1996) evaluated forty randomly selected university and college library web sites in Canada and the Unites States on the suspicion that librarians would provide excellent models of well-organized sites. They utilized ten criteria that included the number of links on a home page, the number of typographical errors present on a page and the purpose of the site.

In a study, Gullikson, et al. (1999) assessed the impact of the information architecture of an academic web site; how information is categorised, labelled and presented, and how navigation and access are facilitated. They addressd how the information architecture influenced clients' ability to negotiate the site.

Al-Omari, H. (2006) in his study, 'E-Government Architecture in Jordan: A Comparative Analysis' proposed architecture for Jordan e-government portal which consisted of different services like communication services, economic services, education and training services, health services, labor services etc.

Webometrics covers research of all network-based communications using metric and other quantitative measures (Jeyshankar R, Sujitha, Maria and Valarmathi, 2012). The World Wide Web (WWW) has now become one of the main sources of information on academic and research activities, and therefore is an excellent platform to test new methods of evaluating webometric activities (Beerappa & Sheshadri, 2016).

The webometric analysis is based on the data collected from the Web using Google search engine. In each search engine, there are some specific search keywords that are designed to retrieve information from the Web (Beerappa & Sheshadri, 2016).

Six broad key parameters for the study of Indian Government Websites have been suggested by Chand and Ramesha; these are - identifier, information, usability, security, participation and services. Identifier is the concept which confirms the authenticity of websites and certifies the credibility which is very important from the user point of view to determine the accuracy and dependability. Information or content is the second major parameter which actually defines the key information that is being disseminated (Chand & Ramesha, 2017).

Abdulbasit Abdullah Mohammed Darem (2013) performed experiments to measure the effectiveness, efficiency and user satisfaction of e-government websites. His research process included usability testing through major usability evaluation criteria, constructing a web-based usability evaluation questionnaire and using a new framework to evaluate the e-government based on four constructs: sections, elements accessibility and speed. Finally he tried to find out how the website design influenced the effectiveness, efficiency and satisfaction of e-government websites.

Wang, Bretschneider & Gant (2005) stated that, despite the importance of the evaluation of Web-based e-government services, especially the performance of government Web sites in

facilitating public-government interaction, little research has been generated, with most web-based service evaluation focusing on the private sector. Web diagnostic tools have become a method of evaluation for general websites and e-Government websites (Brooks & Persaud, 2015).

Bhattacharya, Debjani (2014) worked on Service Quality of Government Websites in India and has remarked that user perceived service quality in the context of e-government, can be defined as the effectiveness of the web portals of government organizations. Usefulness and usability features of government portals can help citizens to participate in various public activities making the public administration effective, efficient, and transparent.

By searching the related literature of the concerned study, it has been observed that investigators examined usability of academic and government websites through usability testing by participation of user groups; none of the criteria (used by Stover and Zink,1996) specifically addressed information architecture; many authors have analyzed government webpages through the evaluation of web-based e-government services, especially the performance of government web sites in facilitating public-government interaction. At this juncture, information architecture analysis and webometric evaluation of central government ministries and departmental websites of India is an unexplored area of webometric research which has been chosen to conduct research study. Findings of this study may open the door to further studies of other new areas of the concerned field.

3. Statement of the problem

The problems of the proposed research may be stated as:

1. Analysis of information architecture of central government ministries and departmental websites through considering different information architectural components and
2. Evaluation of central government ministries and departmental websites with the help of webometric indicators.

The problems stated above along with some necessary and relevant research questions emerging therefrom will be resolved in course of the investigation :-

i) In what way the information are categorized, organized and labeled in the respective websites? What are the kinds of IA components followed by the websites for information organization and labeling?
ii) What are the specific organization structure followed by the selected websites?
iii) How information are linked with each other? What are the particular navigation structure? Is there any discrepancy found in information navigation system?
iv) Are the concerned websites characterized by an active searching system?
v) What are the total number of webpages and links (simple, external and self) carried by each of the selected websites?
vi) How the websites perform in the search engine result page?
vii) How the respective websites are linked together for information sharing?

4. Objectives of the study

The purpose of this research is to find out information organization strategy, presentation style, links, etc. (which are displayed through websites of different ministries and departments of central government of India) and analyse those strategies in a systematic way using information architectural components, webometric tools and techniques. In order to achieve the goal the study will precisely attempt:

1) to analyze the organization and content of various information presented on the websites;
2) to find out and analyze the exact labeling system followed by the websites;
3) to identify and analyze the navigation structure of the concerned websites;
4) to examine an active searching system;
5) to rank the respective websites according to their scores obtained under different IA components;
6) to find the number of web pages, number of link pages, number of self-link pages, external link pages and calculate WIFs (Simple, External and Self) with rank of the concerned websites under study.
7) to find out visibility and performance of Indian government ministries and departmental websites;
8) to observe how the different pages of the site relate to one another;

9) to identify and classify the domain of central government websites (ministries and departments) of India.

5. Scope and limitation of the study

The study got restricted within the information architecture analysis and webometric evaluation of central government ministries (44) and their departmental websites (38) of India; out of 52 ministries only 44 have their own websites. Remaining 8 ministries are portrayed by means of sites of their departments. The departmental websites (38) with individual domain name have been taken for observation and analysis in this study. As a whole, this study covers the analysis and evaluation of websites of selected ministries and ministries' departments under central government of India. The websites of 192 Attached/Subordinated Offices, 2 Independent Departments, 567 Statutory/Autonomous bodies, 41 Commissions/Committees under the union government of India are kept beyond its scope (Integrated government online directory, n.d.).

6. Methodology of the Study

Alike the journal/article citation mechanism, Importance of web pages or websites can be judged with the help of links (especially text links), information organization and presentation style and their analyses. In this study, the required data have been collected applying web-based survey and observation methods from all 44 union government ministries' websites and 38 departmental websites of India. Collected data had subsequently been analyzed and tabulated by using different information architectural components, webometric tools and techniques.

7. Significance of the study

The findings of such study may help to diagnose the problem and lead us to find right direction for research in the field of information architecture analysis and webometric evaluation of central government ministries' and departmental websites of India. The study will show the visibility, performance and link quality of central government websites of India. It will help to analyze the organization and content of various information, navigation, search strategy, etc. presented on the concerned websites. The study will also help to rank the selected government websites (ministries and their departments) according to their web impact factors.

8. List of selected information architectural components for the analysis of websites:

Several information architectural components for analyzing websites have been elaborated in previous chapter. For doing analysis the significant IA components are selected from among those. The following is a list of chosen IA components.

8.1 Organization system
8.1.1 Organization scheme
8.1.1.1 Logical grouping of information & content
8.1.1.2 Exact scheme
8.1.1.2.1 Alphabetical
8.1.1.2.2 Chronological
8.1.1.1.3 Geographical
8.1.1.3 Ambiguous scheme
8.1.1.3.1 By topic
8.1.1.3.2 By task
8.1.1.3.3 By audience
8.1.1.3.4 By metaphor
8.1.2 Organization structure
8.1.2.1 Top-down
8.1.2.2 Hierarchical
8.1.2.3 Bottom-up
8.1.2.4 Hypertext model
8.2 Labeling system
8.2.1 Textual label
8.2.1.1 Hyperlinks
8.2.1.2 Headings
8.2.1.3 Navigation options
8.2.1.4 Index terms
8.2.1.5 Iconographic labels
8.3 Navigation system
8.3.1 Embedded navigation system
8.3.1.1 Global
8.3.1.2 Local
8.3.1.3 Contextual

8.3.2 Supplemental navigation system

8.3.2.1 Sitemap

8.3.2.2 Site-index

8.3.2.3 Guides (guided tours, tutorials, micro-portals)

8.4 Searching system

(Morville & Rosenfeld, 2006)

9. Findings of the study

9.1 Information architecture analysis of central government ministries' and departmental websites

Information architecture analysis of the selected central government ministries' and departmental websites is the first part of analysis in this study. In order to analyze data 44 central government ministries' websites and 38 departmental websites have been selected. The components of the information architecture have been taken from the book 'Information Architecture for the World Wide Web' by Peter Morville and Louis Rosenfeld. These components are used in this study for analyzing information architecture of the concerned websites under study.

9.1.1 Findings from the information architecture analysis of central government ministries' websites

The study reveals that –

- There is no error in the content organization or information display of only few of ministries' websites.
- 28 out of 44 ministries' websites have arranged their information alphabetically.
- The content on all ministries' websites is arranged in chronological order, particularly in the "What's New" or "Press Releases" sections.
- Geographical scheme has been adopted by only 3 websites.
- The website of MoDNER contains almost all sub-components of organization scheme, so this website resides in the finest position under this category.
- All of the ministries' websites have adopted topic-wise organizational structure.
- The websites of 37 ministries have a task specific layout where visitors can offer recommendation or feedback form.

- Out of 44 ministries, only 25 have tailored their informational content to the needs of their targeted audience.
- Metaphors are frequently used to help users grasp new or unfamiliar things by linking them to previously understood ones. The websites of the chosen ministries have not adopted the metaphor-driven concept.
- On the basis of organization scheme, the website of MoDNER received the highest score, i.e. 87.5%. The websites of MoD and MoP received 25%, the lowest score.
- 10 (out of 44) ministries' websites follow logical grouping of information and content.
- Alphabetical scheme has been occurred by 28 ministries' websites. All of the selected ministries' websites follow chronological scheme.
- 37 and 25 websites follow 'by task' and 'by audience' scheme respectively. 'By metaphor' scheme is not found in any of the selected websites.
- Top-down organization structure is used by all (44) of the chosen websites. 42 (out of 44) ministries' websites have a hierarchical structure.
- 35 (79.54%) ministry websites have used the bottom-up approach. These websites either display a staff directory or offer a data search option on a different page.
- All the websites (100%) follow top-down structure. Hierarchical and hypertext models have been maintained by 42 websites. 35 websites have bottom-up structure.
- Textual labels hyperlinks and headings, appear on the websites of each of the 44 ministries. The websites of 43 ministries have navigation options to arrange their information content.
- The information on the websites of 26 ministries (out of 44) is presented using various searchable index terms. It shows that, 35 ministries' websites have used iconic labels. The websites of all ministries are in a good and satisfactory situation under labeling system.
- Hyperlinks and headings are followed by all of the ministries' websites. All ministry websites (i.e. 44) have implemented the global navigation system. Each of the ministry's website uses local navigation system.
- The websites of 42 ministries present their content of information by using contextual navigation. The websites of 24 ministries (out of 44) present sitemap; only 2 ministries' websites have the typical site-index. 35 ministries' websites have guides, micro-portals etc. inside their content.

- Sitemap is followed by 24 websites and only 2 of ministries' websites contain site index. 35 websites contain guides, micro-portals etc. in their content.
- Under the component navigation system, the websites of MoEIT and MoEA have received the highest score, they carry all the sub-components of navigation system.
- Searching system has been appeared on the websites of 41 (out of 44) ministries. This system is not available on the websites of MoCO, MoJS and MoPPGP.
- According to the scores attained by the concerned websites under various components of information architecture, the website of MoDNER stands at first rank with the highest score 22 out of 24. Second rank has been taken by five websites (i.e. MoA, MoCL, MoEIT, MoEA and MoPNG) with score 21 out of 24.

9.1.2 Findings from the information architecture analysis of central government departmental websites

The study provides the following results –

- Under the component organization scheme, 50% score has been attained by most of the departmental websites (i.e. 19). The websites of six departments obtain the lowest score i.e. 3 out of 8.
- The exact organization scheme, 'chronological' and ambiguous scheme, 'by topic' appear in the web content of all departmental websites (i.e. 38). Metaphor driven scheme has not been followed by any of the websites under study.
- Only 5 websites follow logical grouping of information and content. 16 websites hold 'by audience' scheme.
- The website of DoC carries almost all sub-components of organization scheme that's why it secures the highest score under this category.
- Top-down, hierarchical and hypertext model have been followed by all the selected websites of central government departments. Bottom-up structure is not appeared in the web content of only 5 websites (out of 38).
- All of the websites present hyperlinks, headings and navigation options for structuring their content. Index terms and iconographic labels are being followed by 25 and 32 websites respectively.
- Global, local and contextual navigation system have been maintained by all (i.e. 38) selected websites. Site-index is found in the website content of DoSIR. Sitemap has

been followed by 32 websites (out of 38). There are 27 websites which contain guides or micro-portals in their web content for serving specific purpose.

- The website of DoSIR occupies the highest score under navigation system.
- All the selected websites (i.e. 38) follow searching system to serve the information demand of the targeted audience.
- The IA ranking table of the departments indicates that the website of DoC has taken 1st rank with the highest value 22 (out of 24). The second position has been occupied by the websites of DoP and DPIIT with score 21. The lowest rank i.e. 8 is obtained by two websites (i.e. DoARPG and DoDP) with score 15.

9.2 Webometric Analysis of Central Government ministries' and departmental websites

The second part of analysis in this study is the webometric research, particularly the link structure analysis. For conducting this analysis, websites have been chosen from central government ministries and departments of India. WIF (Simple, External and Self) has been calculated for each website. According to the scores of different WIF the concerned websites have been ranked.

9.2.1 Findings from the webometric analysis of central government ministries' websites

In this section, the concerned study has revealed the following –

- According to domain name extension, 40 websites carry gov.in domain name, only 4 websites hold nic.in domain name.
- The website of MoCRA takes 1st rank under simple and self-link WIFs.
- MoEFCC occupies 1st rank with 1 webpage, 58 external linked web pages and 58 external link WIF. MoR holds 32 rank with the lowest score 0.00006, but this website holds the highest number of web pages i.e. 1240000.
- The topmost position has been taken by MoR with 71 domain authority, 59 page authority and page rank 7. It is followed by MoCRA with 59 domain authority, 59 page authority and page rank 6.
- Figure 124 illustrates that out of 44 ministries' websites, only 13 have made connection with each other. Rest of the websites are not linked with each other for sharing information or any other purposes.

9.2.2 Findings from the webometric analysis of Central Government departmental websites

The result of the current study shows that –

- ❖ Maximum number of websites (i.e. 34) follow gov.in domain and rest of the websites contain nic.in domain name.
- ❖ The website of DoFPD holds the highest position under simple, external and self-link WIFs.
- ❖ According to Domain Authority, the website of DoSEL has the highest score 60. In terms of Page Authority, the websites of DoAFW and DoP secured the maximum score 58. Google's Page Rank indicates that the websites of DoAFW, DoP, DoST and DoT have the highest ranking i.e. 6 out of 10.
- ❖ The study reveals that a significant number of departmental websites are connected to DoPE (https://dpe.gov.in). It is connected to the websites of DoC, LD, DoIPAM, DoE, DoEA and DoPT.
- ❖ Most of the websites are not linked with each other for information sharing through their websites.

10. Suggestions

- ➢ Data or material ought to be arranged rationally in any navigation link or menu label. A link must have its dedicated destination.
- ➢ An alphabetical arrangement strategy should be used to organize various items, such as different topics or subjects, department names etc. A chronological format should be maintained in the "News & Events" and "Notices" sections of the websites.
- ➢ Information content needs to be organized by relevant topic or theme. There should be many ways to provide comments, recommendations and the like. Information needs to be grouped according to the demand of various user groups.
- ➢ A top-down organizational structure is required to uphold hierarchy. A bottom-up structure will be implemented in the staff/report directory for the ease of searching.
- ➢ To link one theme or item to another, there ought to be hyperlinks. Relevant navigation options are also required. In order to make keyword searching easier, index terms are utilized as the heading of each unit of information. It is necessary to use pertinent iconographic labels in proper places.

- Every page of a website should have the home page link and the top navigation bar. Local navigation systems are required to represent local and significant content. There should be options for contextual navigation so that one can learn more about a topic.
- A sitemap aids in providing a visual depiction of a website's structure. Micro-portals are utilized for displaying specific functions or services provided by the respective ministry or department.
- A searching system with a shared search space is required for keyword searching.
- Basic search engine optimization (SEO) guidelines of major search engines should be followed in order to make the websites searchable
- The concerned websites should not have any broken link.
- The websites with fewer webpages need to increase the number of web pages indexed by search engines in order to facilitate users' access to the information provided by the respective ministries and ministries' departments.
- The web design and links between the pages require to be rectified so that search engines can easily access and index the most recent content added to the websites.

11. Future scope of the research

The method or techniques of this research could be employed to any website or group of websites where information is presented for the targeted audience. The users are an important part of research, but they are not involved in this current study. Users' experiences and opinions about using a particular website could be an important part of this research. Therefore, user involvement is an unexplored area of this research. A researcher must include this part in their research particularly on the analyses of website information architecture.

12. Conclusion

An information space, often known as digital workplace, could be advanced by a good information architecture. Users should be able to efficiently locate the information query they mentioned in this area without being overloaded with data. Among the various classification schemes found in literature, the scheme developed by Peter Morville and Louis Rosenfeld for their well-known book "Information Architecture for the World Wide Web" has been chosen because it provides the reader with a clear and thorough understanding of the fundamentals of website information architecture. The current study aims to give a clear-cut picture of website information architecture. It is therefore conceivable that this work of research will pave the

way for new approaches to the analyses of website information architecture and further improve the existing literature in this area.

Web Impact Factor (WIF) has been widely used as a webometric indicator in this study to evaluate the quality of websites. A website's WIF is unstable because some website administrators routinely remove outdated inlinks to a large number of sites, and some add newly created links to the site in continuous basis. The current study provides a fair assessment and data regarding Indian ministries' and departmental websites; additionally, the selected websites have been ranked based on the scores retrieved from the ranking tool Google's Page Rank. Therefore, the study illustrates the performance, visibility and link quality of the relevant websites. The outcome of this study will aid in the diagnosis of the issue and point future research in the direction of webometric website evaluation.

References

Abdulbasit Abdullah Mohammed Darem (2013). Evaluation of the usability of e government websites (Doctoral dissertation, Department of studies in Computer Science, University of Mysore, Mysore). Retrieved from http://hdl.handle.net/10603/62244

Al-Omari, H. (2006). E-government architecture in Jordan: a comparative analysis. *Journal of computer science*, 2(11), 846-852.

Beerappa, M., & Sheshadri, D. K. (2016). Web Link Analysis of Selected Documentation Centres in India: A Webometric Study. *International Research: Journal of Library & Information Science*, 6(2), 367-380. Retrieved from http://irjlis.com/wp-content/uploads/2016/08/15-IR-350-62.pdf

Bhattacharya, Debjani (2014). Service quality of government websites in India: A select study (Doctoral dissertation, University School of Management Studies, New Delhi). Retrieved from http://hdl.handle.net/10603/110081

Brooks, L., & Persaud, A. (2015). *Comparing local e-government websites in Canada and the UK*. In International Conference on Electronic Government (pp. 291-304). Springer, Cham. Retrieved from https://scholar.google.co.in/scholar?hl=en&as_sdt=0%2C5&q=Comparing+Locale-GovernmentWebsitesinCanadaand+the+UK&btnG=

Chand, B. B. & Ramesha (2017). Indian Government Websites: A Study. *DESIDOC Journal of Library & Information Technology*, 37(5), 346-352. Retrieved from DOI: 10.14429/djlit.37.10964

Gullikson, S., Blades, R., Bragdon, M., McKibbon, S., Sparling, M., & Toms, E. G. (1999). The impact of information architecture on academic web site usability. *The Electronic Library*, 17(5), 293-304.

Integrated government online directory. (n.d.). Retrieved from https://igod.gov.in/ug/categories

Jeyshankar, R. Sujitha, I. Maria and Valarmathi, A. (2012). Web Pages of ICMR Institutes Websites: A Webometric Analysis. *Global Advanced Research Journal of Library, Information and Archival Studies*, 1(1), 006-018. Retrieved from http://garj.org/garjlias/index.htm

Kirsh, D. (2000). A Few Thoughts on Cognitive Overload. *Intellectica*, 1(30), 19-51.

Morville, P. & Rosenfeld, L. (2006). *Information architecture for the world wide web* (3rd ed.). [e-book]. Retrieved from www.oreilly.com

Prytherch, R. (c 2005). *Harrod's librarians' glossary and reference book* (10th ed.). Aldershot, England: Ashgate pub.

Rosenfeld, L. & Morville, P. (1998). *Information architecture for the world wide web*. [e-book].

Stover, M. Zink, S.D. (1996). World Wide Web home page design: patterns and anomalies of higher education library home pages. *Reference Services Review*, 24(3), 7-20.

Wang, L., Bretschneider, S., Gant, J. (2005, January). *Evaluating web-based e-government services with a citizen-centric approach*. Proceedings of the 38th Annual Hawaii International Conference on System Sciences. IEEE.

Web. (c2016). In *The Science dictionary*. Retrieved from https://www.thesciencedictionary.com/results/?q=web#gsc.tab=0&gsc.q=web&gsc.page=1

Zimmermann, T. (2005). Information architecture. Retrieved from https://wwwmayr.in.tum.de/konferenzen/Jass05/courses/6/Papers/03.pdf