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The Situation of Top Research Centers' Websites in the Islamic World Countries: A Webometric Study

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Abstract

Research centers are among the most important institutes in a scientific society. Using the AltaVista search engine and webometric methods, this research tries to find the performance and impact of the top research centers of the Islamic World Countries. The results reveal that from 57 countries, 40 of them did not have any research centers scored in webometric ranking and the rest of them had not been scored well in the webometric ranking model. In this study, we rank research centers' websites based on some webometric indicators such as number of pages, linkages, WIF and Revised WIF. Findings show that the ranking of the websites based on the WIF and revised WIF is almost different and there is a strong correlation between the number of research centers in the Islamic countries that were scored in webometrics and their ranks based on countries' GDP.

Keywords: Islamic Countries, Webometrics, Web Impact Factor, GDP, Research Centers, Websites Evaluation.

Introduction

At present, the World Wide Web is the most important source to obtain information and it plays the most important role in research activities and scientific societies.

The web covers not only formal (e-journals, repositories) but also informal scholarly communications. Web publication is cheaper than printed publications, maintaining the high standards of quality of peer-review processes. It could also reach much larger potential audiences, offering access to scientific knowledge to researchers and institutions located in developing countries (Webomtrics, 2010). Therefore, studying the qualities and quantities of the web has made possible a new kind of analysis called " Webometrics" that is done through the web links analysis. Web Impact Factor (WIF) which is one of the important aspects in webometric study is defined as the number of pages linking to a web site divided by the number of pages in the website at a given point in time (Noruzi, 2005). Furthermore, links are used to promote online information retrieval systems and following particular links causes access to the proposed websites.

At present time most of the websites have high positions in information community but specialized and subjective websites have special positions so that identifying, ranking and evaluating these kinds of websites are significant for specialists of those subjects (Soheili & Osareh, 2008).

The original aim of ranking is to promote web publications. Ranking has often attracted a lot of attention to itself. "People have always liked to know for example what, who or which city/country has the highest or the lowest ranking from different aspects so that they can examine, compare and improve those aspects according to the result of ranking". (Jowkar & Rajabali Beglou, 2008)

Nowadays, many considerations have been paid to the ranking of higher education institutions in terms of their visibility on the web by webometric analysis. The Webometric Ranking Model has taken into account higher education institutions all over the world and definitely provides one with the relative position of institutions on a global standing (for more information on this ranking model see www.webometrics.info

The most significant institutes, after universities, are research centers. Research centers are the governmental or non-governmental organizations that aim to improve scientific researches and use their financial benefits from them. According to this definition, the importance of these organizations will become more obvious because the definition emphasizes aspects such as the science improvement and economic improvement. (Wikipedia, 2010)

The Organization of the Islamic Conference (OIC) is the second largest inter-governmental organization after the United Nations which has membership of 57 states spread over four continents. The Organization is the collective voice of the Islamic World and safeguards and protects the interests of the Islamic World in the spirit of promoting international peace and harmony among various people of the world (OIC, 2010).

Hence, the researches aimed at a webometric study on the research centers of the OIC member states.

Review of Literature

Although Webometrics is somehow a new field of study, many researchers are interested in this branch of metric studies hence the number of web based researches done in recent years. In some of these researches universities' websites, their ranking and Web Impact Factor (WIF) were analyzed by web based indicators but none of them has undertaken "research centers" websites.

Kousha and Horri (2004) did a webometric research on the Iranian universities websites and found that of the 440 links that they analyzed 63% were made for gratuitous or navigational reasons.

Noruzi (2005) in a research entitled "Web Impact Factors for Iranian Universities"

investigated the Web Impact Factors (WIFs) for Iranian universities. He founded that Iranian university websites have low in-links, WIF and also because of linguistic reasons Iranian websites may not attract the attention they deserve from the World Wide Web.

Hajzeinolabedini, Maktabifard and Osareh (2006) investigated National Library Websites (NLW) by using webometric methods. The in-links and co-links of national library websites were analyzed. Firstly, they studied the visibility of these National libraries on the web. Secondly, they studied the collaboration in national and international levels among the investigated national library websites. The results of the study also showed that there were 5 clusters in the studied national library websites. On the other hand, the multidimensional scaling map showed 7 major collaboration clusters.

Onyancha and Ocholla (2007) compared Kenyan and South African university websites. They counted the number of pages and in-links and also out-links and Web Impact Factors (WIFs). Their findings showed that Kenyan universities' websites were at the beginning of the way and on the other hand, South African universities were in the way of progress.

Haidari, Zareh and Osareh (2007) in their research analyzed the links of the websites of the associations and national and international institutes of Library and Information Science by webometric methods. They recognized that websites with higher visibility have higher impact factors.

Danesh, Soheili and Shafiei (2008) surveyed the websites of the Iranian governmental and private banks. These researchers founded that these websites have a low visibility and impact factor.

Soheili and Danesh (2009) in their study investigated the visibility, web impact factor and the collaboration of the websites of the Iranian ministries. Findings indicated that the Ministry of Cooperatives (MOC) website in- links, Ministry of Science, Research & technology (MSRT) and Ministry of Industry & Mines (MIM) in-link were the most visited sites. Co-link analysis indicated that websites had collaborated in 3 clusters. Multidimensional scale also illustrated the collaboration of these websites in 3 clusters.

The results of Aminpour, Kabiri, Otroj & Keshtkar (2009) on Iranian universities of Medical Sciences showed that the website of Tehran University of Medical Sciences with 49,300 web pages and 9860 in-links was ranked first for the size and number of in-links, while its impact factor was ranked 38th. Rafsanjan UMS with 15 web pages and 211 links had the highest rank for the web impact factor among Iranian Universities of Medical Sciences.

Ghane (2010) investigated universities' and research institutes' websites affiliated to the Ministry of Science, Research and Technology, Ministry of Health and Medical Education and Islamic Azad university based on some parameters including traffic rank, reach, visibility, page view, size and website design.

Vaughan and You (2010) used a new webometric concept that is based on words rather

than in-links on web pages in their research. Results show that co-word data could potentially supplement or replace co-link data. Google Blog seems to be a better source than Google for co-word data collection. An added advantage of blog data is that all blogs have explicit date and time stamps, making data collection for a specific time period possible and reliable, a very important feature that in-link data do not have received.

Holmberg (2010) studied the use of co-inlinks to local government websites, assessed whether co-inlinking follows geographic patterns and investigated reasons for creating the co-inlinks. Co-inlinking to municipal websites was shown to follow geographic patterns, and co-inlinking was strongest within the (geographically-organized) functional regions suggesting that the main trend was for geo-political linking. Also, the majority of co-inlinkings to municipalities were to municipalities in the same functional region and the municipalities in the functional regions were very well connected to each other.

Aguillo, Bar-Ilan, Levene and Ortega (2010) in a research compared the university rankings using a set of similarity measures. The findings show that there are reasonable similarities between the rankings, even though each employs a different methodology. The biggest differences are between the rankings provided by the QS-Times Higher Education Supplement and the Ranking Web of the CSIC Cybermetrics Lab. The highest similarities were observed between the Taiwanese and the Leiden rankings from European universities. Overall, the similarities are increased when the comparison is limited to the European universities.

Review of the literatures show that there is a relation between websites' visibility and their impact factor. The managers of the websites must pay more attention to the improvement of their websites' quality in order to reach higher positions in the webometric ranking.

Research Objectives and Questions

The aim of this study is to survey the performance and impact of the top research centers of the Islamic World Countries by using webometric methods. Also, we aim to compare the performance of these research centers with their own rank in the world using a ranking model namely webometrics. We try to answer the following research questions:

1. How many web pages does a site contain and how is the ranking of websites based on this parameter?
2. How is the websites' conditions based on linkages (Total Links, In-links, Self-links)?
3. How is the ranking of research centers' websites based on WIF?
4. Is there any correlation between research centers' world rank and their ranks based on WIF?
5. How the performance of websites is after omitting self-links toward impact factor?
6. Is there any correlation between the number of research centers of each Islamic country that scored in webometrics and their ranks based on countries' GDP[1]?

7. What are the core websites?

Methodology and Procedures

We identified the top research centers of each Islamic country by using webometric ranking model (January 2010), then we considered each 57 of the Islamic countries. We understood that there were not any results for some countries, which means none of the research centers in these countries had been scored well in the parameters such as size, visibility, richness of files and scholar used by this ranking model. So, the number of top research centers reduced to 17 which are shown in Table 1.

Using Link Analysis, this study analyzed research centers' websites of Islamic countries based on several web-based scales some of which include the number of pages, number of total links, in-links, self-links, WIF and revised WIF. Following Noruzi (2005) and Asadi and Shekofteh (2008), we have used the following search strategy in AltaVista Advanced Search to obtain counts of different linkages to a specific site and calculate WIF and Revised WIF:

- Total Links: link: URL
- The number of pages in the website: domain: URL
- The number of in-links: (link domain: URL) NOT (host: URL)
- The number of self-links: (link domain: URL) AND (host: URL)
- The overall WIF: Total Links / The number of pages
- The in-link (revised) WIF: The number of in-links/The number of pages

Data was extracted during the end of January 2010.

Table 1

Surveyed Top Research Centers of Islamic World Countries

Row	Research Center	Country	URL
1	Centre de Recherche sur l'Information Scientifique et Technique	Algeria	http://www.cerist.dz/
2	Azerbaijan National Academy of Sciences	Azerbaijan	http://www.science.gov.az/az/index.php
3	Centre for Health and Population Research	Bangladesh	http://www.icddrb.org/
4	Africa Rice Center	Cote Ivoire	http://www.warda.org/
5	Indonesian Institute of Sciences	Indonesia	http://www.lipi.go.id/
6	Geological Survey of Iran	Iran	http://www.gsi.ir/
7	Forest Research Institute Malaysia	Malaysia	http://www.frim.gov.my/
8	Institut Marocain de L'Information Scientifique et Technique	Morocco	http://www.imist.ma/
9	International Institute of Tropical Agriculture	Nigeria	http://www.iita.org/
10	Palestinian Academic Society for the	Palestine	http://www.passia.org/

Row	Research Center	Country	URL
	Study of International Affairs		
11	King Faisal Specialist Hospital & Research Centre	Saudi Arabia	http://bportal.kfshrc.edu.sa/wps/portal/bportal
12	Council for the Development of Social Science Research in Africa	Senegal	http://www.codesria.org/
13	International Center for Agricultural Research in Dry Areas	Syria	http://www.icarda.org/
14	Réseau National Universitaire	Tunisia	http://www.rnu.tn/
15	Tubitak Scientific and Technical Research Council of Turkey	Turkey	http://www.tubitak.gov.tr/
16	Research Center of U Arab Emirates	U Arab Emirates	http://www.grc.ae/
17	Scientific and Educational Network of Uzbekistan	Uzbekistan	http://www.uzsci.net/

Question 1: How many web pages does a site contain and how is the ranking of websites based on this parameter?

Table 2 shows the top research centers based on number of pages in descending order. Indonesian Institute of Sciences (Indonesia) producing 37,500 pages has the first rank and Geological Survey of Iran (Iran) and Tubitak Scientific and Technical Research Council of Turkey (Turkey) with 32, 600 and 22, 200 pages have come second and third.

Table 2

Top Research Centers of Islamic World Countries Ranked By Number of Page

Rank	Research Center	Number of Web
1	Indonesia	37500
2	Iran	32600
3	Turkey	22200
4	Morocco	16900
5	Senegal	8610
6	Syria	8210
7	Bangladesh	6870
8	Palestine	6450
9	Nigeria	6360
10	U Arab Emirates	4290
11	Cote Ivoire	2670
12	Azerbaijan	1820
13	Malaysia	1630
14	Saudi Arabia	1060
15	Algeria	886
16	Uzbekistan	238
17	Tunisia	81

Question 2: How is the websites' conditions based on linkages (Total Links, In-links, Self-links)?

Tables 3, 4 and 5 rank the research Centers according to the number of total links, in-links and self-links to the websites, respectively. Based on number of total links, the top ranked research centers are Indonesian Institute of Sciences (Indonesia), Tubitak Scientific and Technical Research Council of Turkey (Turkey) and the Palestinian Academic Society for the Study of International Affairs (Palestine). Based on number of in-links, research center of U Arab Emirates comes first followed by the Council for the Development of Social Science Research in Africa (Senegal) and the International Institute of Tropical Agriculture (Nigeria). Also, in a number of self-links Research Center of U Arab Emirates, International Institute of Tropical Agriculture (Nigeria) and Council for the Development of Social Science Research in Africa (Senegal) have ranked first to third.

Totally, Research Center of U Arab Emirates almost ranks well in the linkages, while some research centers like Réseau National Universitaire (Tunisia) and Azerbaijan National Academy of Sciences (Azerbaijan) have functioned weakly.

Table 3

Ranking of Top Research Centers of Islamic World Countries By the Number of Total Links

Rank	Research Center	Total Links
1	Indonesia	52200
2	Turkey	43300
3	Palestine	20900
4	U Arab Emirates	17200
5	Iran	7180
6	Nigeria	7040
7	Senegal	4920
8	Uzbekistan	4580
9	Malaysia	4010
10	Syria	3680
11	Morocco	2440
12	Cote Ivoire	2220
13	Algeria	1740
14	Bangladesh	1470
15	Saudi Arabia	1010
16	Tunisia	824
17	Azerbaijan	603

Table 4

Ranking of Top Research Centers of Islamic World Countries by the Number of In-Links

Rank	Research Center	In-links
1	Arab Emirates U	4390
2	Senegal	269
3	Nigeria	251
4	Palestine	226
5	Syria	171
6	Cote Ivoire	123
7	Bangladesh	93
8	Turkey	90
9	Indonesia	84
10	Iran	45
11	Malaysia	36
12	Algeria	17
13	Uzbekistan	8
14	Saudi Arabia	7
15	Tunisia	1
16	Morocco	0
17	Azerbaijan	0

Table 5

Ranking of Top Research Centers of Islamic World by the Number of Self-Links

Rank	Research Center	Self-links
1	Arab Emirates U	4570
2	Nigeria	337
3	Senegal	287
4	Palestine	246
5	Indonesia	223
6	Syria	211
7	Iran	169
8	Cote Ivoire	151
9	Bangladesh	141
10	Turkey	104
11	Malaysia	57
12	Algeria	45
13	Saudi Arabia	24
14	Uzbekistan	23
15	Morocco	3
16	Tunisia	2
17	Azerbaijan	0

Question 3: How is the ranking of research centers' websites based on WIF?

Web Impact Factor was calculated by dividing total links by the number of pages. As shown in Table 6, Scientific and Educational Network of Uzbekistan (Uzbekistan) has come first based on this criterion and Réseau National Universitaire (Tunisia) and Research Center of U Arab Emirates are in second and third places.

Table 6
Ranking Research Centers Based on WIF

Rank	Research Center	WIF
1	Uzbekistan	19.24
2	Tunisia	10.17
3	U Arab Emirates	4.01
4	Palestine	3.24
5	Malaysia	2.46
6	Algeria	1.96
7	Turkey	1.95
8	Indonesia	1.39
9	Nigeria	1.11
10	Saudi Arabia	0.95
11	Cote Ivoire	0.83
12	Senegal	0.57
13	Syria	0.45
14	Azerbaijan	0.33
15	Iran	0.22
16	Bangladesh	0.21
17	Morocco	0.14

Question 4: Is there any correlation between research centers' world rank and their ranks based on WIF?

World rank of each research center was extracted from Webometrics site. As shown in Table 7, Technical Research Council of Turkey (Turkey) has the highest rank among others followed by Indonesian Institute of Sciences (Indonesia) and King Faisal Specialist Hospital & Research Centre (Saudi Arabia). Geological Survey of Iran (Iran) has ranked the 5th in the Islamic world. In order to answer the research question, we calculated the correlation between world rank of research centers and their ranks based on WIF. The result showed that there was not any significant correlation between research centers' world rank and their ranks based on WIF.

Table 7

Research Centers' World Rank against Their Rank in WIF

Research Center	World Rank	Ranking based on WIF
Turkey	102	7
Indonesia	201	8
Saudi Arabia	219	10
Tunisia	500	2
Iran	515	15
Azerbaijan	679	14
Uzbekistan	799	1
Bangladesh	888	16
Malaysia	936	5
Senegal	1017	12
Nigeria	1219	9
Palestine	1486	4
Algeria	1591	6
Syria	1769	13
Morocco	2026	17
U Arab Emirates	2342	3
Cote Ivoire	2355	11

Table 8

Spearman Correlation between Research Centers' World Rank and Their Rank in WIF

Correlations				
			Rank of WIF	Worldrank
Spearman's rho	Rank of WIF	Correlation Coefficient	1.000	.098
		Sig. (2-tailed)	.	.708
		N	17	17
	worldrank	Correlation Coefficient	.098	1.000
		Sig. (2-tailed)	.708	.
		N	17	17

Question 5: How the performance of websites is after omitting self-links toward impact factor?

Page self-links point from one section to another within the same page. Site self-links (also known as internal-links) are typically navigational pointers from one page to another within the same site (Thelwall, Vauguhan and Bjorneborn, 2005). As mentioned before, overall WIF is calculated by dividing number of in-links plus self-links by number of pages but RWIF is resulted from dividing number of in-links without self-links by number of pages (Ingwersen, 1998). The purpose of this question is to discover how research centers' rank would be different after omitting self-links. In order to find out this, performance of research centers' websites were calculated based on revised RWIF. As shown in Table 9, Scientific

and Educational Network of Uzbekistan has been ranked first in WIF but 6th in RWIF which means a negative performance after omitting self-links. Also, Réseau National Universitaire (Tunisia) has been ranked 2nd while came in 11th place in revised WIF. In general, 8 research centers had a negative performance after omitting self-links and the performance of 7 research centers was better based on RWIF. As shown in Table 9, Research Center of U Arab Emirates has ranked first in RWIF while it was ranked 3rd based on WIF and also Africa Rice Center (Cot Ivoire) has functioned very well based on RWIF and come 2nd. After removal of self–links, the rank of 47.05% of websites descended, 41.17% of websites ascended and the rank of 11.76% websites did not accept any changes.

Table 9

Ranking of Research Centers' Based on WIF and RWIF

Research Centers	WIF	Ranking based on WIF	Revised WIF	Ranking based on Revised WIF	Research Centers performance after omitting self-links
Uzbekistan	19.24	1	0.03	6	-5
Tunisia	10.17	2	0.01	11	-9
U Arab Emirates	4.01	3	1.02	1	2
Palestine	3.24	4	0.04	4	0
Malaysia	2.46	5	0.02	8	-3
Algeria	1.96	6	0.02	8	-2
Turkey	1.95	7	0	15	-8
Indonesia	1.39	8	0	15	-7
Nigeria	1.11	9	0.04	4	5
Saudi Arabia	0.95	10	0.01	11	-1
Cote Ivoire	0.83	11	0.05	2	9
Senegal	0.57	12	0.03	6	6
Syria	0.45	13	0.02	8	5
Azerbaijan	0.33	14	0	15	-1
Iran	0.22	15	0	15	0
Bangladesh	0.21	16	0.01	11	5
Morocco	0.14	17	0	15	2

Question 6: Is there any correlation between the number of research centers of each Islamic country that scored in webometrics and their ranks based on countries' GDP?

The number of research centers of each Islamic country was extracted from Webometrics site. Then countries were ranked by the number of their research centers and also by their GDP. Countries' rank based on GDP was extracted from the World Bank website. We calculated the correlation between rank of countries according to the number of research centers and their ranks based on GDP. The amount of correlation is 0.75 which is significant

at the 0.01 level that showed there was a strong correlation between them which means countries with high GDP have more research centers in Webometrics website.

Table 10

Countries' Rank Based On Number of Research Centers against Their GDP

country	Number of research center	Ranking based on number of research center	Ranking based on GDP
Algeria	2	7	45
Azerbaijan	1	13	73
Bangladesh	1	13	61
Cote Ivoire	1	13	88
Indonesia	4	2	19
Iran	14	1	26
Malaysia	3	4	42
Morocco	2	7	59
Nigeria	1	13	39
Palestine	1	13	41
Saudi Arabia	3	4	23
Senegal	1	13	110
Syria	1	13	65
Tunisia	1	13	76
Turkey	3	4	17
U Arab Emirates	2	7	49
Uzbekistan	1	13	84

Table 11

Spearman Correlation between Number of Research Centers Of Each Country and Their GDP

Correlations				
			GDP	Number
Spearman's rho	GDP	Correlation Coefficient	1.000	.750**
		Sig. (2-tailed)	.	.001
		N	17	17
	Number	Correlation Coefficient	.750**	1.000
		Sig. (2-tailed)	.001	.
		N	17	17
**. Correlation is significant at the 0.01 level (2-tailed).				

8. What are the core websites?

In order to find answer to this question, we calculated all the in-links together and then divided the result to the number of websites. The websites that have a higher number are considered as core websites. The amount of this formula was 341.8235 that according to this number only one website (U Arab Emirates) is a core website.

Discussion and Conclusion

Ranking of institutions such as universities, research centers, business schools and repositories have become an important activity in every profession and higher education is no exception. Websites can better reflect the output of professors and researchers as they can provide a more complete picture of their activities. The web offers the possibility of not only formal (e-journals, repositories, etc.) but also informal scholarly communication for that purpose. Web publication is cheaper maintaining high standards of qualities of peer review processes.

With these rankings we intend to provide extra motivation for researchers world-wide to publish more and better scientific content on the web making it available to colleagues and people wherever they are. Hence in this study, using webometric indicators, we investigated the status of research centers' websites of the Islamic countries.

The findings of the research provide an evaluation of the status of the Islamic countries' research center websites in terms of their performance on the web. First of all, less than one third of Islamic countries have at least one research center that scored in the indexes used by webometric ranking model. Also, the world ranks of other research centers were not much considerable most of them ranked higher than 500 which shows their weak performance on the web. As shown in Table 7, Tubitak Scientific and Technical Research Council of Turkey (Turkey), Indonesian Institute of Sciences (Indonesia), King Faisal Specialist Hospital & Research Centre (Saudi Arabia) and Réseau National Universitaire (Tunisia) are the four top ones which have been ranked lower than 500. As deduced from the results, Research Center of U Arab Emirates has also functioned fairly well in most of parameters investigated in this study. This research center has ranked first based on the number of in-links and self-links, and ranked fourth based on total links. Also, this research center was allocated the third place by WIF, while some research centers like Réseau National Universitaire (Tunisia) and Azerbaijan National Academy of Sciences (Azerbaijan) have functioned weakly and did not rank well in the linkages. It is necessary to imply that the performance of Geological Survey of Iran (Iran) is not much noticeable. Although this research center has ranked well based on the webometric model, it is not well- functioned based on the indexes investigated in the present study.

In other section, this study aimed to investigate the correlation between research centers' world rank and WIF. The results of Spearman correlation disclosed that there is not any significant correlation between research centers' world rank and their ranks based on WIF. Also, in this study we investigated how research centers' rank in WIF will be different after omitting self-links. After removal of self-links 8 research centers had a negative function, the function of 7 research centers were better based on the RWIF and the function of two research centers did not accept any changes. Totally, after omitting self-links, the rank of 47.05% of

websites descended, 41.17% of websites ascended and the rank of 11.76% websites did not accept any changes.

In the last part of this study, we calculated the correlation between rank of countries by number of research centers and their ranks based on GDP. The results showed that there was a strong correlation between them which means countries with high GDP have more research centers in Webometrics website.

End Note

1. Gross Domestic Product (GDP)

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