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Exploring the Websites of the Top Ten Leading Space Agencies in the World: A Webometric Analysis

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Abstract
This paper tries to examine the domain and link analysis, webpage ranking, web trafficking and engagement, audience demography and also WIFs through a webometric study of Top 10 space organizations in the world. Identify the domains of the website; analyze the number of webpages, inlinks, self-links and calculate the simple/external/self-link impact factor of the space organizations. A key method to webometric studies (WIFs) we trying to use the google search engine that allow to calculations to be made of the total number of web pages of the site
And total number of external backlinks of the site. The required data were collected in December 2022 using the google search engine for retrieving the number of web pages, Inlinks and Selflinks to the website.After analysis, we observed that NASA, ISRO, UKSA, and KARI is the most popular organization among them.

Keywords: Domain Analysis, Webpage Ranking, Link Analysis, Audience Demography, Traffic & Engagement, Web Impact Factors

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Introduction

A website is a collection of related material that contains text, and images, and may also include video, audio or other media. It is a collection of publicly accessible, interlinked Web pages that share a single domain name. It can be created and maintained by an individual, group, business or organization to serve a variety of purposes. The website is always at work to ensure that customers are always served with the information they need from the comfort of their homes.

Webometrics is the study of the quantitative aspects of the construction and use of information resources, structures and technologies on the Web, drawing on bibliometrics and informetric approaches. It covers research of all network-based communication using informetrics or other quantitative measures. Webometrics, in future, may become one of the most interesting research areas for the vast collection of electronic information available on the publicly indexable web.

A Space is the boundless three-dimensional extent to which objects and events have relative positions and directions. Space organisation is involved in science, engineering and technology to harvest the benefits of outer space for mankind. The website of the space organization is the core resource of information for Research and Development in space science and planetary exploration. Also, a website of a space organization provides information related to astrology, navigation, meteorology and space science for space Researchers and scholars. The website of a space organization plays a significant role to Promote and authorise private firms to play in the global Space market.

Webometrics and Web Impact Factor

Webometrics is the study of quantitative aspects of the construction and use of the information resources, structures and technologies on the web drawing on bibliometric and informetric approaches. It covers research of all network-based communication using informetric or other quantitative measures.(BJorneborn&Ingwersen, 1997)focused on the following four areas of webometrics study:

1. Web page content analysis;
2. Web link structure analysis (e.g. hyperlink, self-link and external link);
3. Web usage analysis (e.g. exploiting log files for users' searching and browsing behaviour);
4. Web technology analysis (including search engine performance).

A Web Impact Factor is a part of the methodology in webometrics studies. The Web Impact Factor (WIF) was developed by Ingwersen to measure the impact of websites by the number of links it receives. It provides quantitative tools for ranking, evaluating, categorizing, and comparing websites and top-level domains and sub-domains. A website with a higher impact factor may be considered to be more prestigious or of higher quality than those websites with a lower impact factor. (BJorneborn & Ingwersen, 2001)formulated three types of links and Web Impact Factor (WIF) which are in the following way:

1. The Simple WIF: The ratio of all links to the total number of Webpages.

2. The Internal WIF: The ratio of internal links within the site to the total number of Webpages.
3. External WIF: The ratio of links made from external sites to the target site, to the total number of WebPages at the site.

Significance of the study

The websites of space organizations are one of the main sources of information in academic and research activities of space science. In terms of research, educational institutions' websites can announce the existence and promote the achievements of individuals, research groups, institutions and departments. The present study is also an attempt to analyse the websites of space organizations around the world to show the current status of the website and rank them according to their audiences, social media trafficking, various links and WIFs.

Objectives of the study

This study is designed based on the following objectives:

- To identify the domain name of websites of the space organization.
- To find out the number of link pages, internal link pages, and external link pages, backlink pages of websites of the space organization.
- To identify the world Rank, google page rank and Alexa rank of websites of the space organization.
- To identify the traffic & engagement, core country traffic, and demographic audience of websites of the space organization Using Webometrics tools.
- To measure the web impact factors (WIFs) of the websites of the space organization.

Scope and Limitation of the study

The present study tries to examine the Webometric analysis of the top 10 space organization websites in the world, ranked by Government Space Expenditure in 2020 and 2021. The ranking of the website helps the follower to compare and identify the space organization websites worldwide.

Methodology

In the present study, the author follow the method of observation for research and decided to choose google search engines. The relevant data were collected from Webometrics tools like similar web, SEO checker and Google page ranking. The calculation of WIF is as follows:

WIFS= D/A
WIFR= B/A,
WIF Self-link = C/A
Where,
A = Total number of web pages of a given site
B = Total number of external backlinks to a given site
C = Total number of self-links to a given site

D = the Total number of links to a given site.

Data Collection Strategy

The required data were collected in December 2022 using the google search engine for retrieving the number of web pages, Inlinks and Selflinks to the website. For retrieving data specific search keywords along with search syntax have been presented in the following table.

Search Syntax			
Result	Search engine	Search queries	Interpretation
A	Google	domain:isro.gov.in	Total number of webpages of the site http://www.isro.gov.in
B	Google	linkdomain:isro.gov.in-domain: isro.gov.in	Total number of Inlinks or backlinks of the site http://www.isro.gov.in
C	Google	linkdomain:isro.gov.in domain: isro.gov.in	Total number of self link of the site http://www.isro.gov.in
D	Google	linkdomain:isro.gov.in	Total number of links of the site http://www.isro.gov.in

Review of Literature

(Ingwersen &Björneborn, 2004) explain the meaning, methodology and problematic issues of the central webometric analysis types, i.e., Web engine and crawler coverage, quality and sampling issues. It discusses briefly Web Impact Factor and other link analyses.(Aminpour, Kabiri, Otroj, &Keshtkar, 2009) analyzed the websites of Iranian universities of medical sciences according to the webometric indicators. Method and materials in a cross-sectional study, the number of web pages, in links, and external inlinks and also the overall and absolute web impact factors for Iranian universities of medical sciences with active exclusive websites were calculated and compared using the AltaVista search engine. (Jalal, Biswas &Mukhopadhyay, 2010) worked on the web presence and visibility of websites of Asian countries. They try to highlight the web presence using some webometric indicators like Internet access, web pages, number of Internet users, and link counts. The study analyzes the web presence using popular search engines like Altavista, Google, Yahoo and MSN. An attempt has also been made to find out the web Impact factor (WIF) for selected Asian countries. (Babu, Jeyshankar& Rao, 2010) examines 40 central university websites in India. Investigates domain systems of the websites, analyse the number of webpages and link pages and calculate 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 rank the websites as per the WIF. (Ratha, Joshi & Naidu, 2012) analysis of the design and structure of the library websites of IITs. It found significant differences according to some important points of view such as the user supporting services, number of hyperlinks on home pages and whole websites, number of images, location of images, In-active links and web pages, etc. (Thelwall, 2012) believe that webometrics quickly became established through the Web Impact Factor, the key metric for measuring and analyzing website hyperlinks. Link analysis

became more focused on link impact analysis and link network analysis, taking the number of links as a reflection of research productivity or prestige. (Ahmad, Batcha, Rashid & Hafiz, 2018) explores the web impact factor through a webometric study of the present 12 University Websites of Jammu and Kashmir. Identifies the domain systems of the websites; analyzes the number of web pages and link pages, and calculates the External Link WIF or simple web impact factor (WIF) and external web impact factor of all the University websites. (Sesen, 2021) told that it is important to check where the studies that are important for the results of scientific research are published and indexed as well as what is described in their content and whether their quality meets measurable criteria. (Kulczycki, Huang, Zuccala, Engels, Ferrara, Guns, & Zhang, 2022) they investigates different uses of the Journal Impact Factor (JIF) in national journal rankings and discusses the merits of supplementing metrics with expert assessment. Their focus is national journal rankings used as evidence to support decisions about the distribution of institutional funding or career advancement. They trying to examine seven countries under comparison are China, Denmark, Finland, Italy, Norway, Poland, and Turkey—and the region of Flanders in Belgium.(Taskın, Taskın, Dogan, &Kulczycki, 2022) Their study trying to reveal the factors affecting the publication speed of journals and show that publication time is significantly shorter when an editorial board member or a productive author of a given journal is one of the authors, in compare with the articles submitted by other authors.

Data Collection and Analysis

Figure 1: According to Statistica Top Ten Leading Space Agencies Worldwide in 2020 and 2021 by Government Space Expenditure

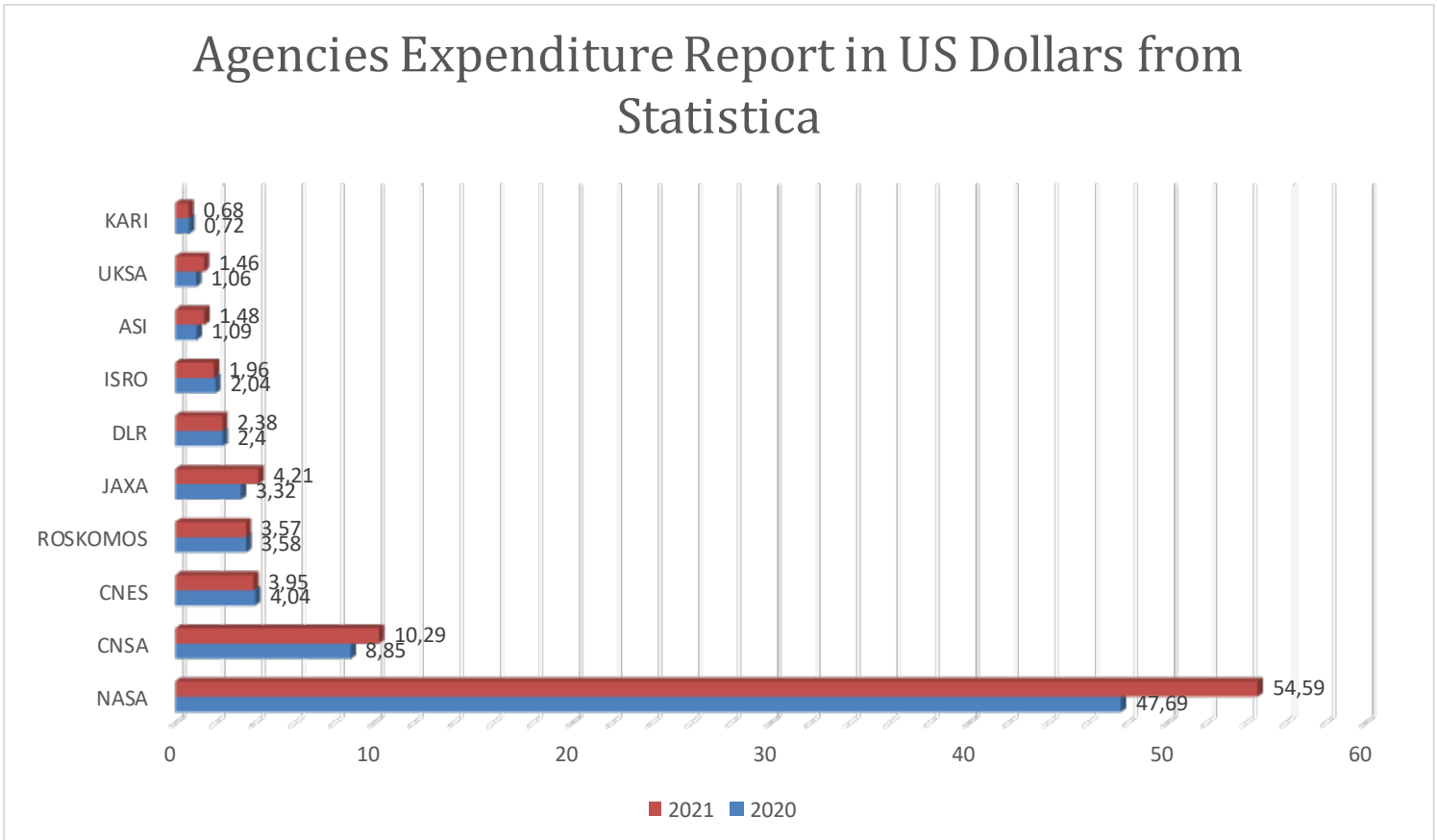

Table 1: Space Agencieswith their Symbol, Countries, Total Visitors, Websites and Domain Name.

S l no	Space Agency	Symbol	Country	Total Visitors	Websites	Domain Name
1	National Aeronautics and Space Administration (NASA)		United States	27.6M	www.nasa.gov	.gov
2	China National Space Administration (CNSA)		China	-	www.cnsa.gov.cn	.cn
3	Centre national d'étudesspatiales (CNES)		France	129.1K	www.cnes.fr	.fr
4	State Space Corporation "Roscosmos" (ROSCOSMOS)		Russia	143.2K	www.roscosmos.ru	.ru
5	Japan Aerospace Exploration Agency (JAXA)		Japan	1.0M	www.global.jaxa.jp/	.jp
6	DLR Space Administration (DLR)		Germany	834.3K	www.dlr.de	..de
7	Indian Space Research Organisation (ISRO)		India	684.7K	www.isro.gov.in	.in
8	Italian Space Agency (ASI)		Italy	98.2K	www.asi.it	.it
9	UK Space Agency (UKSA)		United Kingdom	127.3M	www.gov.uk/space-agency	.uk
10	Korea Aerospace Research Institute (KARI)		South Korea	68.2K	www.kari.re.kr	.kr

Table 1 shows, 10 Space Agencies in the world with their symbol, country, total visitors and websites. Among the agencies, everyone has a different domain name like '.gov', '.cn', '.fr', '.jp', '.de', '.in', '.it', '.uk', '.kr'. According to total visitors to the websites, UKSA has the first position with 127.3M followed by NASA second placed with 27.6M and KARI has the lowest with 68.2K. Also, wedon't have found any visitor results of CNSA.

Table 2: Space Agencies with their Domain Authority, Page Authority, Referring Domains,Government Domains, Educational Domains.

Sl.No.	Space Agency	Domain Authority (%)	Page Authority (%)	Referring Domains	Government Domains	Educational Domains
1.	**NASA**	94	74	268,761	745	3,457
2.	**CNSA**	80	48	7,937	289	57
3.	**CNES**	62	57	-	-	-
4.	**ROSKOMOS**	68	53	7,591	23	41
5.	**JAXA**	78	63	4,692	17	112
6.	**DLR**	75	56	19,418	41	292
7.	**ISRO**	71	55	8,393	97	141
8.	**ASI**	67	48	3,741	21	89
9.	**UKSA**	64	61	8,533	209	105
10.	**KARI**	52	40	1,510	3	51

Table 2 depicts the domain authority, page authority, referring domains, government domains, and educational domains of the websites of the space agencies in the world. As domain authority, NASA has the first position with a score of 94% followed by CNSA (80%), JAXA (78%), and KARI has the lowest domain authority with a score of 52%. As page authority, NASA has the first position with a score of 74% followed by JAXA (63%), UKSA (61%) and KARI has the lowest page authority with a score of 40%. In referring domains NASA has the highest number of referring domains (268761) followed by DLR (19,418), UKSA (8,533) and the lowest number of referring domains occupied by KARI (1,510). As government domains NASA has occupied the highest (745) followed by CNSA (289), UKSA (209) and KARI occupied the lowest domains (3). As educational domains NASA has occupied the highest (3457) followed by DLR (292), ISRO (141) and ROSKOMOS occupied the lowest (41).

Table 3: Country Rank, Google Page Rank, Global Rank, Alexa Reach Rank and Category Rank of the Space Agencies.

Sl.No.	Space Agency	Google Page Rank Score	Global Rank	Alexa Reach Rank	Country Rank	Category Rank
1.	NASA	8/10	912	888	987	4
2.	CNSA	6/10	147,280	145,731	-	-
3.	CNES	6/10	333,469	328,409	15,956	8
4.	ROSKOMOS	6/10	166,846	187,746	9586	673
5.	JAXA	7/10	92,389	84,326	4621	31
6.	DLR	7/10	51,887	56,278	3036	17
7.	ISRO	6/10	50,404	53,811	5588	370
8.	ASI	6/10	489,686	509,463	11124	5
9.	UKSA	6/10	966,264	784,437	2500	2
10.	KARI	5/10	205,676	253,121	10,342	2

Table 5 depicts the google page rank, global rank, alexa reach rank, country rank, and category rank of the websites of space agencies in the world and found that the google page rank out of (…./10) Ten NASA was ranked first position with 8/10, JAXA and DLR were ranked second position with 7/10, KARI was ranked last position with 5/10. According to global rank, NASA was ranked lowest with 912, ISRO belong in second with 50,404 and DLR in third with 51,887 and UKSA was ranked last position with 966,264. In alexa rank NASA was ranked lowest with 888, ISRO in second with 53811 and DLR in third position with ranked 56278 and UKSA was ranked last position with 784,437. According to the country rank, NASA was ranked first position with 987, UKSA was ranked second position with 2500, DLR was ranked third with 3036 and CNES was ranked last position with 15,956. In category rank, UKSA and KARI both were ranked first position with 2, followed by NASA with 4 and ROSKOMOS have ranked last position with 673.

Table 4: Most Traffic Countries

Sl.No.	Space Agency	**Home Countries (%)**	**Top-1 (%)**	**Top-2 (%)**	**Top-3 (%)**	**Top-4 (%)**	**Others (%)**
1.	**NASA**	U.S (44.84)	Canada (3.69)	Germany (3.29)	U.K (3.28)	India (3.12)	(40.99)
2.	**CNSA**	China (91.7)	-	-	-	-	-
3.	**CNES**	France (70.39)	Italy (3.62)	Angola (3.04)	China (2.10)	Sweden (2.09)	(18.75)
4.	**ROSKOMOS**	Russia	Israel	Canada	Spain	Bulgaria	(5.24)

		(91.34)	(1.07)	(0.90)	(0.77)	(0.68)	
5.	**JAXA**	Japan (83.16)	U.S (4.10)	Slovakia (1.32)	China (1.18)	Germany (1.11)	(9.12)
6.	**DLR**	Germany (70.21)	China (3.42)	Turkey (2.52)	U.S (2.36)	Netherlands (1.84)	(19.65)
7.	**ISRO**	India (89.82)	U.S (3.42)	Australia (0.77)	Brazil (0.65)	Canada (0.61)	(4.73)
8.	**ASI**	Italy (76.43)	Poland (5.43)	U.S (3.76)	France (2.18)	Russia (1.99)	(10.21)
9.	**UKSA**	U.K (86.39)	U.S (2.06)	India (0.79)	France(0.54)	Spain (0.45)	(9.78)
10.	**KARI**	Korea Republic (95.16)	U.S (0.90)	Mexico (0.69)	China (0.64)	Philippines (0.62)	(1.99)

{Note: The data for the table has been collected during December 8-11, 2022 using the google search engine and similar web tools.}

Table 4 depicts the most traffic countries of websites of space agencies in the world and we found that CNES, ROSKOMOS, and KARI have occupied most traffic in their home countries with 91.7%, 91.34%, and 95.16%. After that, we found U.S. is the top 1 country which can create traffic in other space agencies with JAXA/4.10%, ISRO/3.42%, UKSA/2.06%, and KARI/0.90%.

Table 5: Social Media Traffic Distribution

Space Agency	YouTube (%)	Twitter (%)	Facebook (%)	LinkedIn (%)	Reddit (%)	Research gate(%)	Others (%)
NASA	16.63	29.25	15.72	3.71	28.12	-	6.57
CNSA	-	-	-	-	-	-	-
CNES	48.06	4.41	20.60	9.88			17.05
ROSKOMOS	45.12	-	-	-	3.34	-	51.54
JAXA	14.93	69.07	14.7	-	-	0.62	0.68
DLR	14.86	3.36	0.73	79.76	-	0.82	0.47
ISRO	20.80	38.86	1.01	14.72	4.31	-	0.31
ASI	-	22.18	11.33	66.23	-	0.26	-
UKSA	28.81	16.43	21.21	7.25	16.50	-	9.80
KARI	66.07	-	-	-	-	-	33.93

{Note: The data for the table has been collected during December 8-11, 2022 using the google search engine and similar web tools.}

Table 5 depicts the social media traffic distribution of websites of space agencies around the world. In YouTube traffic, KARI occupied the first position with 66.07%, followed by CNES at 48.06% and DLR occupied the last position with 14.86%. As for Twitter traffic, JAXA has occupied the first position with 69.07% and CNES have occupied the last position with 4.41%. As for Facebook

traffic, UKSA has occupied the first position with 21.21% and DLR has occupied the last position with 0.73%. As LinkedIn traffic, DLR has occupied the first position with 79.76% and NASA has occupied the last position with 3.71%. As for Reddit traffic, NASA occupied the first position with 28.12% and ROSKOMOS occupied the last position with 3.34%. As Research gate traffic, DLR occupied the first position with 0.82% and ASI occupied the last position with 0.26%.

Table 6: Web Impact Factor (WIF)

Space Agency	Actual Data				WIFs		
	Webpages	Inlinks	Self-links	Total Links	Simple	External	Self-link
NASA	150,000,00	684,000,0	211,000	7051000	0.47	0.45	0.01
CNSA	118,000,00	371,000,0	110,500	3820500	0.33	0.40	0.00
CNES	299,000,0	670,000	80,900	750900	0.25	0.23	0.02
ROSKOMOS	530,200,0	270,000	35,900	305900	0.05	0.05	0.00
JAXA	180,000,0	327,000	22,200	349200	0.19	0.18	0.01
DLR	764,000,0	592,000	25,200	617200	0.08	0.07	0.00
ISRO	203,000,0	420,000	27,200	447200	0.22	0.20	0.01
ASI	394,000,0	376,000	17,100	393100	0.09	0.10	0.00
UKSA	686,000,00	260,000,0	82,000	2682000	0.03	0.04	0.00
KARI	302,000,0	473,000,0	25,400	4755400	1.58	1.56	0.00

{Note: The data for the table has been collected during December 8-11, 2022 using google.}

Table 6 exhibits the web impact factor of the websites of the space agencies in the world. The study analyses the Simple (overall) WIF, WIF external and WIF selflink. After calculating the WIF, it is observed that KARI with 1.58 SWIF scores highest, followed by NASA with 0.47SWIF which occupies the second place and CNSA with 0.33 SWIF occupies the third. Based on WIF external, it found that KARI with 1.56 scores the maximum number of WIF external,

followed by NASA with 0.45WIF external. Regarding the self-link of WIF, the result visualized that CNES with 0.02 WIF self-link occupies the top position, followed by NASA, JAXA, and ISRO with the same (0.01) WIF selflink.

Figure 2: Audience Demographics

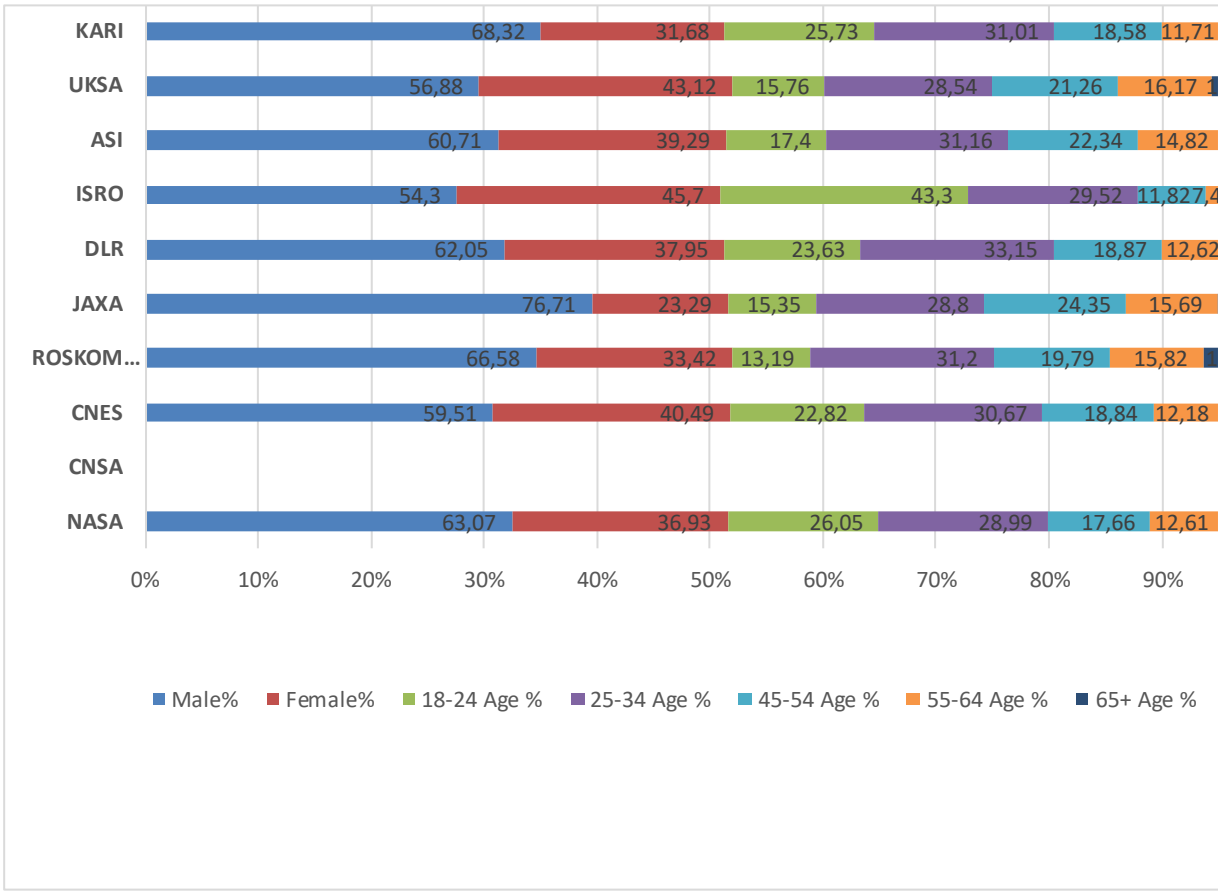

Figure 2 shows the audience demography of websites of the space agencies in the world and found that the highest male audience is occupied by KARI at

76.71% and the lowest male audience occupied by ISRO at 54.30%. As a female audience, ISRO has the highest with 45.70% and JAXA has the lowest with 23.29%. After that, we found the highest number of audiences between the ages 18-24 occupied by ISRO with 43.30% and the lowest occupied by ROSKOMOS with 13.19%. In the audiences between the ages of 25-34, DLR has the first position with 33.15% and UKSA have the last position with 28.54%. In the audiences between the ages of 35-44, JAXA has the first position with 24.35% and ISRO have the last position with 11.82%. In the audiences between the ages of 45-54, UKSA has the first position with 16.17% and ISRO have the last position with 7.42%. In the audiences between the ages of 55-64, UKSA has the first position with 10.57% and ISRO have the last position with 4.54%. In the audiences from the ages of 65+, ROSKOMOS have the first position with 7.74% and ISRO has the last position with 3.39%.

Figure 3: Website Engagement Analysis

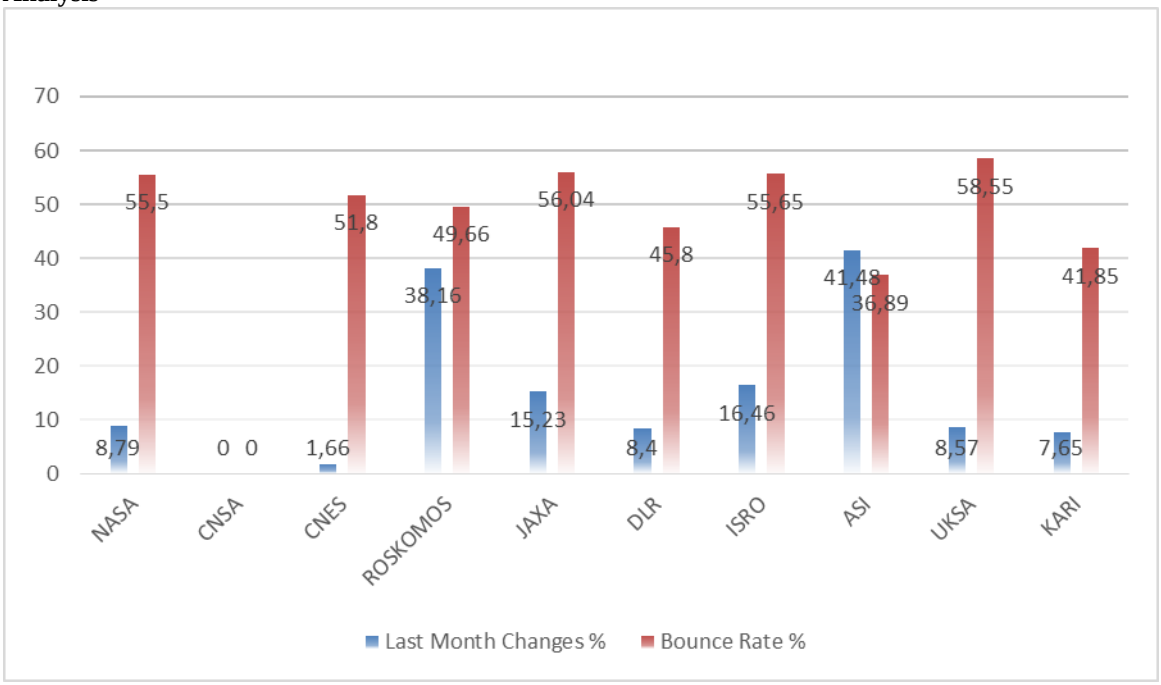

Figure 3 shows the website engagement analysis of websites of the space agencies in the world and found that the changes in engagement of the websites in the last month mostly by ASI with 41.48% and hardly by CNES with 1.66%. Last month's bounce rate was highest occupied by UKSA with 58.55% and lowest occupied by ASI with 36.89%.

Findings

- Total visitors of the websites UKSA have a first position with 127.3M and KARI has a last position with 68.2K. Also, we don't have found any visitor results of CNSA.
- As domain authority, NASA has the first position with a score of 94% and KARI has the lowest domain authority with a score of 52%. As page authority, NASA has the first position with a score of 74% and KARI has the lowest page authority with a score of 40%. In referring domains NASA has the highest number of referring domains (268761) and the lowest number of referring domains occupied by KARI (1,510). As government domains, NASA has occupied the highest (745) and KARI has occupied the lowest domains (3). As educational domains, NASA has occupied the highest (3457) and ROSKOMOS has occupied the lowest (41).
- In Google page rank out of (…./10) Ten NASA was ranked first position with 8/10, JAXA and KARI were ranked last position with 5/10. According to global rank, NASA was ranked first with 912 and UKSA was ranked last position with 966,264. In ALEXA rank NASA was ranked first with 888 and UKSA was ranked last position with 784,437. According to country rank NASA was ranked first position with 987 and CNES was ranked last position with 15,956. In category rank, UKSA and KARI both were ranked first position with 2 and ROSKOMOS have ranked last position with 673.
- CNES, ROSKOMOS, and KARI have occupied most traffic in their home countries with 91.7%, 91.34%, and 95.16%. After that, we found U.S. is the top 1 country which can create traffic in other space agencies with JAXA/4.10%, ISRO/3.42%, UKSA/2.06%, and KARI/0.90%.
- In YouTube trafficking, KARI occupied the first position with 66.07 and DLR occupied the last position with 14.86%. As for Twitter trafficking, JAXA occupied the first position with 69.07% and CNES occupied the last position with 4.41%. As for Facebook trafficking, UKSA has occupied the first position with 21.21% and DLR has occupied the last position with 0.73%. As LinkedIn trafficking, DLR has occupied the first position with 79.76% and NASA has occupied the last position with 3.71%. As for Reddit trafficking, NASA occupied the first position with 28.12% and ROSKOMOS occupied the last position with 3.34%. As Research gate trafficking DLR occupied the first position with 0.82% and ASI occupied the last position with 0.26%.
- The WIFs observed that KARI with 1.58 SWIF scores highest, followed by NASA with 0.47 SWIF which occupies the second place and CNSA with 0.33 SWIF occupies the third. Based on WIF external, it found that KARI with 1.56 scores the maximum number of WIF external, followed by NASA with 0.45 WIF external. Regarding the self-link of WIF, the result visualized that CNES with 0.02 WIF self-

link occupies the top position, followed by NASA, JAXA, and ISRO with the same (0.01) WIF selflink.

- The highest male audience was occupied by KARI with 76.71% and the lowest male audience was occupied by ISRO with 54.30%. As a female audience, ISRO has the highest with 45.70% and JAXA has the lowest with 23.29%.
- Changes in the engagement of the websites in the last month mostly by ASI with 41.48% and hardly by CNES with 1.66%. Last month's bounce rate was highest occupied by UKSA with 58.55% and lowest occupied by ASI with 36.89%.

Conclusion

In present days, websites are one of the most crucial sources of scientific Information. The linking features as well as the presence of scientific Organizations, like RND Institutions, universities, and libraries on the Web are the popular Area for webometrics research. In this study, we hopefully provides a fair idea and information about the website of all the space agencies in the world. After the ranking, we know that NASA, UKSA, and ISRO is the most popular website for people. The findings of the current study indicated that CNSA and JAXA had a low number of web pages, UKSA had a low number of inlinks and ASI had a low number of self-links. KARI have the highest number of simple and external WIFs. The followings are the major findings of the present study:

- UKSA have the highest visitors in the site.
- NASA have the strong domain.
- CNES, ROSKOMOS, and KARI's most traffic in their own countries.
- NASA, KARI and CNSA score's good in WIFs.

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