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A comparison of bibliometric indicators for evaluating the top 100 Open Access Journals

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Abstract

A comparative study was performed based on scientific metrics for the year 2019 for the top 100 open access journals (OAJ) extracted from the web of science. The considered bibliometric indicators are Journal Impact Factor (JIF), Eugene Factor Score (ES), Scimago Journal Ranking (SJR), Source Normalized Impact per Paper (SNIP), Cite Score (CS), Google Scholar (GS), and H5 index. This study shows that journals have different ranks compared with their metrics of the various scientific indicators. Correlations were explained by applying Pearson's and spearman's statistical correlation using SPSS software 21.0 packages. Spearman's Pearson's (r) statistical correlation was found between JIF and CS (r=0.898).

Regarding spearman's (ρ) statistical correlations, the highest correlations were established between JIF and CS (ρ=0.690). It concludes that researchers and institutions cannot rely on a single indicator to measure the impact. It showed a direct linear co-relationship between the indicators, which concludes that performance measurement will be more reliable and accurate when more indicators are used for this purpose.

Keywords Open Access Journals, Bibliometric Analysis, H-index; SJR, Quartiles, Scientific Indicators, Journal Impact Factor, Cite Score, SNIP, and ES.

Introduction

Open access journal (OAJ) defined by Jacobs (2006)"as a means through which a reader of a scientific publication to read, print and distribute it further without any charge or limitations over the Internet for non-commercial purposes." Ismail (2017) argues that open access (OAJ) journals and publications are designed to remove barriers and allow the researchers to access them free of charge. It gives more visibility, readership, and citations to authors and their works, thereby impacting scholarly work by online social networks such as Facebook, Twitter, and YouTube (Valerio-Ureña & Herrera-Murillo, 2017). Ahmad et al. (2020) illustrated the existence and impact of vacant approaches in open access journals of the Indian science

journal-based literature published in JCR year 2018. Journal Impact Factor (JIF), Eigen Factor Score (ES), SCImago Journal Rank Indicator (SJR), Cite Score rank, and Google Scholar were primarily bibliometric measures of the excellence of the scientific journal. All the selected journals were indexed in the web of science, Scopus, and Google Scholar. The study revealed that JIFs ranged between 3.03 and 0.551 in ES 0.00642 and 0.00049 as JSR graded between 0.816 and 0.236, CS value shifted between 2.04 and 0.45 GS value fell between 37 and 12. Barbaro et al. (2015) has assessed to what degree open access journals of high quality in various STEM (Science, Technology, Engineering, and Medicine) disciplines are available as outlets for publication by evaluating their distribution and relative ranking by impact factor and article processing charge (APC). The research data have been retrieved from the directory of open access journals. JCR edition 2013 from the web of science Barik and Jena (2018) conducted a bibliometric analysis of selected open access journals of library and information science from 2001-2015. The study considered ten open access journals with 5208 papers. The study revealed that single authorship was dominant in open access LIS journals. Eighty-three countries contributed open access to LIS journals, and the United States was the top country producing 54.19% of authors, the value of collaborative index (0.73), degree of collaboration (0.72).

Basson et al. (2020) have investigated if OAJ published in the journals mentioned in the directory of open access journals (DOAJ) have a citation advantage compared to subscription journal articles, especially those for which there are no self-archived copies available. The investigator has analyzed the bibliometric data of the articles published between 2013-2015. The study revealed that OAJ has a citation advantage. The citation advantage found in most of these subject areas only on a single citation advantage measure. Björk et al. (2020) have discussed how often papers are cited in predatory open access journals and studied citations of randomly selected 250 Google Scholar articles during 2014. The study revealed that 2.6

average citations per article, 56% of the papers contained no quotations at all. A random sample of papers published in the approximately 25,000 peer-reviewed journals included in the Scopus index, for example, an average citation of 18, 1 during the same duration, with only 9% earning no citations. Cortegiani et al. (2019) have assessed the features and practice of predatory journals' critical care medicine (CCM). The revealed that 86 CCM journals from 48 publishers. The published address of most journals was in the United States (52%). The address was 43 % unreliable. In 72 % of instances, the English form was meager. It indexed three journals from PubMed. The study also revealed several journals falsely reported in the committee on publishing ethics (COPE), an international committee of medical journal editors (ICMJE), directory of open access journals (DOAJ). Median APCs were USD 909.50 for the journal article. The median lapse-acceptance time for published papers was 32 days. Domnina (2018) discussed the current status of Russian periodicals indexed in the directory of open access journals by considering their topics, language, publisher, and licenses. Journal scores evaluated based on commonly accepted international scientific metric metrics used in the Russian Science Citation Index Scopus and Web of Science both databases. Periodicals are ranked according to the different bibliometric indicators. Erfanmanesh (2019) have conducted a quantitive analysis of open access mega-journals (OAMJs). The study considered eight reputed journal titles using bibliometric methods during 2012-2016 based on the web of science database**.** The study results showed that eight studied OAMJs were responsible for 1.87% of the total number of publications from 2012-2016 indexed in Web of Science. The study revealed that PLOS was the most contributed journal, 88% of articles published in eight OAMJ cited at least once. The study results showed that Biochemistry & Molecular Biology, Multidisciplinary Sciences, Neurosciences, Oncology, and Immunology were the most assigned subject categories. The National Natural Science Foundation of China was the leading funding agency. The United States and China were the most productive countries in eight

OAMJ. Holmberg et al. (2019) investigated whether publications in open access journals have altimetric operations more often than articles in journals based on subscription? An examination of the research performance of universities in Finland. The findings indicate significant disciplinary and network variations in the OA benefit, with articles in OA journals attracting more citations and coverage on social media sites, such as veterinary sciences, social and economic geography, and psychology. Simultaneously, the reverse observed for articles in OA journals in medicine and health sciences. Renjith (2018b) evaluated 110 online open access journals in the field of geology. The research data have been retrieved from the directory of open access journals. The study focused on different bibliometric parameters, including language, country, and publisher wise, introductory geology subject keywords in geology. Miguel et al. (2011) regard visibility as an indirect means of appraising a variety of publications. These open access journals are accessed through free access journal portals or open access platforms (Renjith, 2018a). Zhang et al. (2019) conducted a bibliometric assessment of remote sensing open access journals from 2009-2018. The research paper 5,588 downloaded MDPI during the ten years. Oermann et al. (2016) have studied open-access predatory journals in nursing and explained their features, editorial standards, peer reviewers process, and editors affiliated with these journals. The study found that 140 predatory journals by 75 publishers in the field of nursing. The significant finding was that many journals published just one or two volumes and then either stopped the publishing or published fewer issues and papers after the first volume, a total of 4,238 articles published in the predatory journals during the study period. The study also revealed that most of the article processing charge was USD 100 (19 journals). Ma and Lee (2017) have described the bibliometric analysis of journal articles in the social science citation index (SSCI) during 1993-2016. The collected data have evaluated the five selected research questions, including publications pattern during 1993-2016, prolific authors, relevant journals, and citation frequencies of articles. Two hundred

fifteen authors produced a total of 115 open-access journal articles during 1993-2016. The study found that 115 articles received 842 citations in 57 journals. Valerio-Ureña and Herrera-Murillo (2017) illustrated the role of social networks (SN) to promote open access journals. The study examines the degree to which open access journals use SNs as communication channels. A total of 3,448 open access Scopus indexed journal data have been used for quantitative analysis. It was found that 14.4% of journals have at least one SNs profile. There was a substantial gap between the proportion of individual SNs profiles of first-quartile journals and the number of social network followers relative to the rest of the journal quartiles. Jokić et al. (2017) have analyzed European countries' scientific ability, as calculated by their involvement in publishing peer-review and open access journals (OAJs). A total of 1,201 open access journals have been downloaded from Scopus and GS by using different bibliometric indicators: quartile ranking, Scimago journal ranking, and H-index. The analysis revealed that life sciences and health sciences had the largest share of OAJs. The largest share of OAJs in physical sciences is in Q3, while the combined shares of Q2 and Q3 are above 50% and Just 10% of all European social science OAJs are in Q1. Wang et al. (2019) have conducted a study to determine the reasons for retractions of papers in biomedical science from open access journals (OAJs). For classify retracted publications in OAJs, the Medline database was scanned by PubMed. Open access journals were identified through OAJ directory. Each retracted article has extracted data including the period from publication to retraction, journal impact factor, country of origin. The study included data from 621 retracted studies. Since 2010, the amount and the rate of retractions have risen. The analysis found that the most common reasons for retraction were errors (148), plagiarism (142), duplicate publication (101), fraud/suspected (98) and invalid peer review (93). The study also revealed the main reason for the retraction was wrongdoing. The majority of retracted papers were written by scholars from India, Iran, China, India, Iran and the United States.

This present study is used bibliometric indicators, namely Journal Impact Factor (JIF), Eigenfactor Score (ES), CiteScore (CS), Source Normalized Impact per Paper (SNIP), SCImago Journal Rank (SJR), and H-index from Google Scholar. Here, it is explained one by one for readers to understand it clearly.

Journal Impact Factor (JIF): JIF is a quantitative tool for ranking, evaluating, categorizing, and comparing journals. It is a measure of the frequency with which the "average article" in a journal has been cited in a particular year or period. It reflects the citation activity for journal articles one to three years after their initial publication (Barbaro et al., 2015), (McVeigh, 2004).

Eigenfactor Score (ES): ES practices the same algorithm like page rank of google (Rahaman et al., 2020). The Eigenfactor Score gauges the number of times articles from the journal published in the previous five years have been cited in the Journal Citation Reports (JCR) year. Like the Impact Factor, the Eigenfactor Score is a proportion of citations to the total number of articles (Bergstrom, 2007).

Cite Score (CS): Cite Score is the average citations per document that a title receives over three years (View et al., 2019). Thus, it calculates the average number of citations received in a calendar year by all items published in that journal in the preceding three years (Moed, 2017).

Source Normalized Impact per Paper (SNIP): Moed (2017) developed source normalized impact per publication at Centre for technology and technology studies, Netherland. It is defined as the ratio of the journal's citation count per paper and the citation potential in its specific subject fields and calculated as the number of citations received in the current year to publications in the past three years, by the total number of publications during the last three years (Moed, 2017).

SJR (SCImago Journal Ranking): is considered an appropriate indicator. Data for this indicator may be taken from SCImago journal, and the country rank portal and its source for the relevant bibliometric indicators is the Scopus database (Jokić et al., 2017). SJR is calculated as the ratio of the number of citations received by the prestigious journals in the current year and the total number of papers published in the last three years. The use of the SJR indicator allows for the estimation of a journal's impact, reducing the effect of self-citations (González-Pereira et al., 2010).

H-index: H-index indicates a journal's visibility in the relevant academic community considering many articles and several citations in a certain period. Journal has index h if h of its papers has at least h citations (Jokić et al., 2017). It quantifies both journal scientific productivity and scientific impact, and it is also applicable to scientists, countries, etc. (Renjith, 2018a).

Ahmad et al. (2020) evaluated the quality of library and information science journals. The study applied bibliometrics indices including Journal Impact Factor (JIF), Eigenfactor Score (ES), Cite Score (CS), Source Normalized Impact per Paper (SNIP), and SCImago Journal Rank (SJR). The study revealed a high correlation between JIF and ES rank (rho=0.843) for library and information science journals. A general Journal Quality Index is proposed to use the probability of all various indices utilized for estimating journal quality.

Ansari et al. (2020) conducted a similar study to measure the quality of behavior science journals. The study considered indices including Journal Impact Factor (JIF), Eigenfactor Score (ES), Cite Score (CS), Source Normalized Impact per Paper (SNIP), SCImago journal rank (SJR), and H-index. The study found high Pearson's (r) between JIF and SNIP (r=0.928) and high spearman's coefficient between (rho=0.822). The study opinioned that the compatibility of indicator reflects that the specialists, academician from the field of behavior science, and

researchers can counsel JIF, ES, CS, SJR, SNIP, and Google Scholar as an option in contrast to one another for the appraisal of the journals.

Methodology

The data was extracted from the web of science core collection (indicators JIF and Eigenfactor Score), Scopus database (indicator SNIP, Citescore & SJR), and the Google Scholar Metrics (H5-index). Journal Data filtered: By Selecting JCR Year: 2019 Selected Editions: SSCI Selected top 100 open access journals Selected Category Scheme: WoS Selected Open Access. Top 100 open access journals have been retrieved using the strategy mentioned above and analyzed using different indicators and parameters as discussed above. The ranks and values of all 100 journals have statistically compared with their indicators. JIF is considered the primary indicator compared to the other indicators (ES CS, SNIP, SJR, and H5-Index). Evaluate the indices' compatibility and determine whether these meters can be used as an alternative to each other for the valuation of top 100 open access journals. The correlation coefficient Pearson's (r) and spearman's (ρ) calculated by IBM SPSS (version 21.0). For data visualization and a graphical representation, Microsoft Excel (2016) and Microsoft Access (2016) used. Online open access journals available for search and retrieval of scholarly articles are tremendous and easy to access for publications.

Objectives:

The study aims to examine the quality and visibility of the top 100 open access journals indexed in the web of science and listed in the Journal Citation Report (JCR) for the year 2019 and to assess the excellence of open access journals by employing bibliometric indicators such as JIF, ES, CS, SNP, SJR, and h5-index. The study's objective is to compare these bibliometric indicators to check the compatibility of using one indicator as an alternative.

Results and discussions:

A total of 100 open access journals shown in Table 1 were identified in the block of the top 100 open access journals. This result agrees with Valerio-Ureña and Herrera-Murillo (2017) that the explanation for a higher rate of individual profiles online belonging to first-quartile journals is probably in response to the higher professionalization of these journals.

Table 1: Top 100 Open Access Journals Web of Science Ranked Journals for the year 2019.

Journal Rank Block (Open Access)	Number of Journals (the Year 2019) n=100
Q1 Ranked Journals	55
Q2 Ranked Journals	45

Table 2: Country-wise distribution of Open Access Journals:

Rank	Country	Number of journals	Percentage
1	England	42	42%
2	USA	16	16%
3	Spain	8	08%
4	Switzerland	6	06%
5	Netherland	4	04%
6	Canada	3	03%
7	Czech Republic	2	02%
7	Germany	2	02%
7	Lithuania	2	02%
10	Australia	1	01%

10	Brazil	1	01%
10	China	1	01%
10	Croatia	1	01%
10	France	1	01%
10	Hungary	1	01%
10	Iran	1	01%
10	Israel	1	01%
10	Japan	1	01%
10	New Zeeland	1	01%
10	Poland	1	01%
21	Portugal	1	01%
22	Romania	1	01%
23	Scotland	1	01%
24	South Korea	1	01%
	Total	100	100%

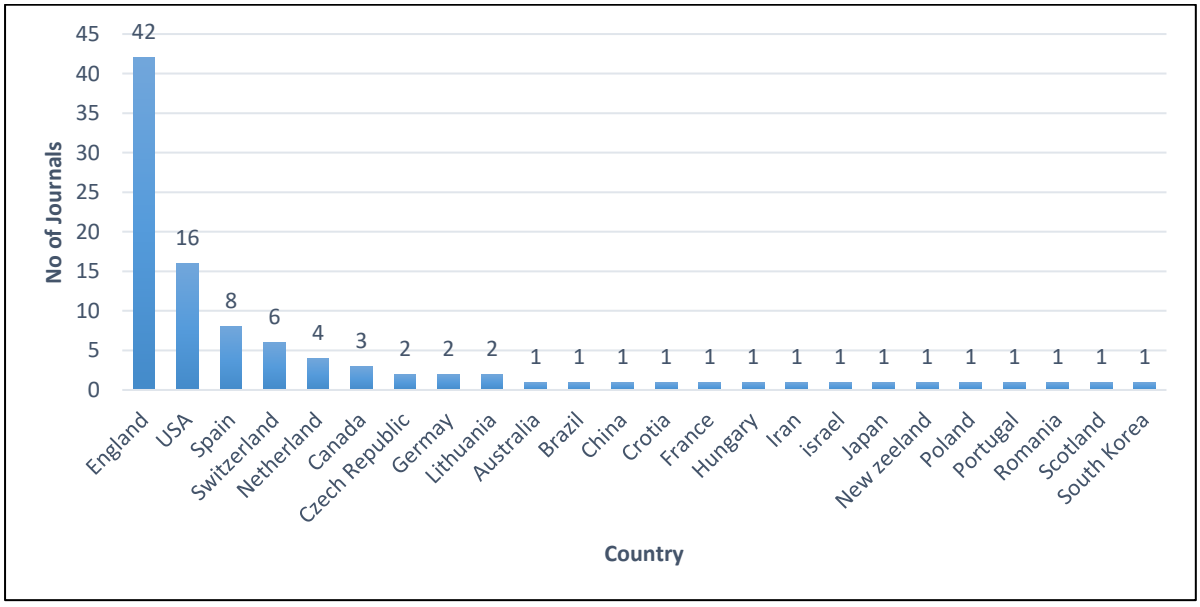

Figure 1: Country-wise Journal Production

Table 2 shows the country-wise top 100 open-access journal production. The table revealed that England was the leading producer of open access journals (42), followed by the United States (16 journals). Spain ranked 3rd in contributed eight (08) open access journals, followed by Switzerland six (06). Canada produces three open access journals, while the Czech Republic, Germany, and Lithuania contributed two open access journals. Australia, Brazil, China, Croatia, France, Hungary, Iran, Israel, Japan, New Zeeland, Poland, Portugal, Romania, Scotland, and South Korea added only one (01) open-access journal.

Top ten most cited Open Access Journals:

Table (2) shows the top ten most-cited open-access journals are: Sustainability (TC=35,095), Frontiers in psychology (TC=34,910), International Journal of environmental research, public health (TC=31,935), Personality and social psychology bulletin (TC=17,417), Ecology and society (TC=11,994), Implementation science (TC=10,777), Lancet global health (TC=9,165), health and quality of life outcomes (TC=8,924), Social cognitive and affective neuroscience (TC=7,347) and Comprehensive psychiatry (TC=6,735). The Journal Collabra-psychology recorded the lowest total citation (TC=149).

Assessment of top five journals for JIF, ES, CS, SNIP, SJR, and H5:

As shown in table (3), the Journal Impact Factor's values (JIF) ranged between 21.597 and 1.543. The top five ranked journals were The Lancet Global Health (JIF=21.597), The Lancet Public Health (JIF=16.292), Journal of innovation & knowledge (JIF=6.027), Implementation science (JIF=5.531), and Journal of sport and health science (JIF=5.2). Health economics review recorded the least JIF of 1.543.

Values of Eugene Factor Score (ES) oscillated between 0.10267 and 0.00012. The top fine journals were Frontiers in Psychology (ES=0.10267), International journal of environmental research and public health (ES=0.06155), The Lancet Global Health (ES=0.00012 0.04479), Sustainability (ES=0.04111), and Implementation science (ES=0.02019), while the Journal Oeconomia Copernican (ES=0.00012) has the lowest ES.

In the case of cites core (CS), values of ranging between 23.1 to 0. The top five ranked journals were Lancet global health (CS=23.1), Lancet public health (CS=16.8), Big data & society (CS=10.2), Implementation science (CS=8.8), and Developmental cognitive neuroscience (CS=8). The Oeconomia Copernican, Reproductive health, and journal of legal analysis were not included in their CS in the Scopus, hence considered the least zero cites core.

Values of SNIP varied between 7.743 to 0. The top five recorded ranked journals were Lancet global health (SNIP=7.743), Lancet public health (SNIP=5.96), Big data & society (SNIP=4.07), Cultural anthropology (SNIP=3.43), and International Journal of educational technology in higher education (SNIP=2.895). Journal of competitiveness, Land Basel, Oeconomia Copernican, and Aera open have not to SNIP in the Scopus database, and considered minimum SNIP (ES=0).

Values of Scimago Journal Ranking (SJR) fluctuated between 7.367 and zero. The top five journals were reported to be Lancet global health (SJR=8.055), Lancet public health (SJR=6.886), Theoretical economics (SJR=5.672), Big data & society (SJR=3.249), and Implementation science (SJR=2.921). Journal of competitiveness and Land Basel recorded as least SJR value (SJR=0).

The values of Google Scholar (GS) varied between 98 and zero. The top five journals with this indicator are Frontiers in Frontiers in psychology (GS=98), International journal of environmental research and public health (GS=85), Lancet global health (GS=83),

Sustainability (GS=78), and Implementation science (GS=65). Social media+ society, journal of legal analysis, and European research on management and business economics recorded a zero GS value.

Table (3): Comparative ranking and values of JIF, ES, CS, SNIP, SJR, and H5 for top 100 Open Access Journals.

Full journal title	Country	Quartile	TC	TCR	JIF	JIFR	ES	ESR	CS	CSR	SNIP	SNIPR	SJR	SJRR	H-5	H-5R
Lancet global health	England	Q1	9,165	7	21.597	1	0.04479	3	23.1	1	7.743	1	8.055	1	83	3
Lancet public health	England	Q1	1,826	35	16.292	2	0.00962	20	16.8	2	5.96	2	6.886	2	43	20
Journal of innovation & knowledge	Spain	Q1	349	91	6.027	3	0.00039	93	7.1	8	2.826	6	1.059	47	25	74

Implementation science	England	Q1	10,777	6	5.531	4	0.02019	5	8.8	4	2.665	7	2.921	5	6 5	5
Journal of sport and health science	China	Q1	1,562	39	5.2	5	0.00361	39	6.3	13	1.88	28	1.136	40	39	26
Journal of behavioral addictions	Hungary	Q1	2,184	30	5.143	6	0.00597	24	6.8	10	1.441	48	1.767	16	47	14
Developmental cognitive neuroscience	England	Q1	3,177	21	4.966	7	0.01018	16	8	5	1.821	31	2.52	7	50	10
European Journal of psychology applied to legal context	Spain	Q1	267	96	4.905	8	0.00042	92	6.7	11	1.757	33	1.192	36	18	90

Climate risk management	Netherland	Q1	774	70	4.904	9	0.00236	51	7.4	7	2.225	14	1.483	20	29	53
Big data & society	USA	Q1	1,246	51	4.577	10	0.00513	26	10.2	3	4.07	3	3.249	4	45	18
BMJ global health	England	Q1	2,157	32	4.28	11	0.01023	15	4.1	41	1.6	41	1.8388	14	36	29
International Journal of clinical and health psychology	Spain	Q1	1,247	50	4.25	12	0.00183	62	6	14	1.942	25	1.494	19	34	33
Psychosocial intervention	Spain	Q1	714	71	4.026	13	0.00086	84	4.8	29	1.661	37	1.101	43	23	81

Ecology and society	Canada	Q1	11,994	5	3.89	14	0.01429	9	7.5	6	1.592	43	1.679	17	59	6
International Journal of health policy and management	Iran	Q1	1,463	44	3.821	15	0.00486	31	3.5	60	1.141	80	0.76	75	24	77
Harm reduction journal	England	Q1	1,512	42	3.818	16	0.00354	40	4.3	36	1.282	61	1.347	26	28	59
Journal of competitiveness	Czech Republic	Q1	565	81	3.649	17	0.00024	96	0	97	0	96	0	98	27	65
International Journal of qualitative methods	Canada	Q1	2,664	23	3.576	18	0.00215	54	2.7	89	2.485	9	0.872	63	34	33

Social cognitive and affective neuroscience	England	Q1	7,347	9	3.571	19	0.01957	6	7	9	1.218	71	2.095	9	57	7
Cultural anthropology	USA	Q1	2,546	25	3.554	20	0.00348	41	5.1	26	3.43	4	1.839	13	30	46
Internet interventions-the application of information technology in mental and behavioral health	Netherland	Q1	996	62	3.513	21	0.00272	47	5.4	19	1.76	32	1.078	45	34	33

European Journal of psychotraumatology	England	Q1	1,987	33	3.478	22	0.00494	29	4.3	36	1.556	44	1.311	27	43	20
Comunicar	Spain	Q1	1,432	45	3.375	23	0.00074	86	5.6	17	2.533	8	1.092	44	39	26
Population health metrics	England	Q1	1,481	43	3.328	24	0.00337	42	5.9	15	1.991	22	1.394	22	30	46
European research on management and business economics	Spain	Q1	182	98	3.317	25	0.00016	98	4.8	29	1.909	26	0.641	84	0	97
International Journal of health	England	Q1	2,531	26	3.239	26	0.00277	45	5.3	22	1.342	56	0.961	55	28	59

geographics																
Addiction science & clinical practice	England	Q1	646	75	3.088	27	0.0016 9	65	3.7	55	1.249	65	1.193	34	21	87
International Journal of educational technology in higher education	England	Q1	371	89	3.08	28	0.0004 5	91	5.6	17	2.895	5	1.066	46	33	37
BMC geriatrics	England	Q1	6,492	12	3.077	29	0.0158 3	8	4.4	33	1.755	34	1.367	24	50	10
Policy and society	England	Q1	807	67	3.05	30	0.0013 9	73	4.1	41	2.161	15	1.194	33	26	68

Health expectations	England	Q1	3,600	17	3.008	31	0.00823	21	5.4	19	1.746	35	1.354	25	50	10
Personality and social psychology bulletin	USA		17,417	4	2.997	32	0.00140 3	10	5.2	24	1.829	30	2.082	10	50	10
Financial innovation	England	Q1	430	88	2.964	33	0	100	5.4	19	2.082	18	0.847	64	23	81
Human resources for health	England	Q1	2,594	24	2.929	34	0.00488	30	4.1	41	1.881	27	1.208	32	42	24
Journal of global health	Scotland	Q1	1,418	46	2.899	35	0.00517	25	3.7	55	1.451	47	1.473	21	31	43
EPJ data science	Germany	Q1	629	76	2.873	36	0.00197	60	6.5	12	1.982	23	0.903	59	30	46
Frontiers in psychiatry	Switzerland		6,685	11	2.849	37	0.01742	7	3.2	69	1.137	81	1.229	29	52	8

International Journal of environmental research and public health	Switzerland	Q1	31,935	3	2.849	37	0.06155	2	3	77	1.248	66	0.739	78	85	2
Journal of eating disorders	England		795	69	2.828	39	0.00219	52	4	47	1.323	58	0.979	52	29	53
Social media+ society	England	Q1	1,156	56	2.807	40	0.00442	33	5	27	1.949	24	1.993	12	0	97
International Journal of integrated care	Netherland	Q1	1,245	52	2.753	41	0.00175	63	2.9	81	1.158	78	0.846	66	25	74
Environmental health and	Japan	Q1	1,591	38	2.71	42	0.00198	58	3.2	69	1.172	76	0.703	80	23	81

preventive medicine																
Psicothema	Spain	Q1	3,426	19	2.632	43	0.0025	49	3.5	60	1.3466	55	0.9233	57	33	37
International Journal for Equity in health	England	Q1	4,063	15	2.595	44	0.0098	18	4.2	39	1.6	41	1.3933	23	43	20
Sustainability	Switzerland	Q2	35,095	1	2.576	45	0.04111	4	3.2	69	1.165	77	0.581	90	78	4
Comprehensive psychiatry	USA	Q2	6,735	10	2.567	46	0.01004	17	4.9	28	1.1	85	1.161	38	39	26
Globalization and health	England	Q1	2,168	31	2.525	47	0.006	23	3.8	52	1.3244	57	1.272	28	34	33
Sociological science	USA	Q1	569	80	2.516	48	0.00367	37	4.4	33	1.8444	29	2.118	8	28	59

Computational linguistics	USA	Q1	2,426	29	2.51	49	0.0127	78	4.8	29	2.353	11	0.521	92	26	68
Frontiers in public health	Switzerland	Q2	3,696	16	2.483	50	0.01256	11	2	94	0.916	92	0.672	83	46	15
Moravian geographical reports	Czech Republic	Q2	342	92	2.479	51	0.00052	90	3.9	49	1.076	86	0.693	81	16	95
Language learning & technology	USA	Q1	1,344	47	2.473	52	0.00215	54	5.3	22	2.089	17	2.011	11	35	31
BMC medical ethics	England	Q1	1,795	36	2.451	53	0.00501	28	4.1	41	1.705	36	1.15	39	33	37
Land Basel	Switzerland	Q2	807	67	2.429	54	0.00147	72	2.8	85	0	96	0	98	24	77

Risk management and healthcare policy	New Zealand	Q2	549	82	2.429	54	0.00153	68	3.3	68	1.636	39	0.968	53	20	89
Health research policy and systems	England	Q2	1,948	34	2.365	56	0.00512	27	3.8	52	1.224	69	0.987	51	33	37
Journal of maps	England	Q2	1,545	40	2.365	56	0.00281	44	4.3	36	0.926	91	0.754	76	27	65
Global health-science and practice	USA	Q2	923	66	2.352	58	0.032	43	3.6	58	1.275	63	1.192	36	26	68
Health and quality of life outcomes	England	Q2	8,924	8	2.344	59	0.01098	12	3.9	49	1.402	53	0.999	50	45	18

International review of social psychology	England	Q2	1611	99	2.326	60	0.0006065	88	5.2	24	2.013	20	1.103	42	16	95
International review of research in open and distance learning	Canada	Q1	2,443	28	2.297	61	0.0020203	57	4.2	39	1.638	38	1.118	41	51	9
Journal of law and the biosciences	USA	Q1	3330	93	2.275	62	0.0013515	74	4.5	32	0.79	94	0.6099	89	21	87
Educacion xx1	Spain	Q1	539	83	2.261	63	0.0021	97	2.7	89	1.207	72	0.631	86	30	46

Economic research-ekonomska istrazivanja	Croatia	Q1	1,168	54	2.229	64	0.0013	76	2.3	92	1.226	68	0.49	93	31	43
JASSS-the journal of artificial societies and social simulation	England	Q1	1,256	49	2.222	65	0.00165	66	4.1	41	1.28	62	0.77	73	26	68
Journal of epidemiology and global health	France	Q2	538	84	2.2	66	0.00123	80	3.1	74	1.129	82	0.631	86	24	77
The technological and economic developm	Lithuania	Q2	1,519	41	2.194	67	0.00127	78	5.7	16	1.196	74	0.622	88	30	46

ent of the economy																
International Journal of mental health systems	England	Q2	1,185	53	2.193	68	0.00256	48	3.4	65	1.402	53	0.965	54	28	59
Reproductive health	England	Q2	3,163	22	2.177	69	0.0097	19	0	97	1.407	50	1.223	30	46	15
Judgment and decision making	USA	Q2	2,465	27	2.163	70	0.00412	35	3.8	52	1.439	49	1.499	18	0	97
Global health action	England	Q2	3,376	20	2.162	71	0.0103	14	4.1	41	1.296	59	1.193	34	43	20
Annals of general psychiatry	England	Q2	996	62	2.157	72	0.0015	71	3.7	55	0.964	89	0.813	68	23	81

Borsa Istanbul review	Netherland	Q2	287	94	2.13	73	0.0038	94	3.5	60	2.253	13	0.684	82	26	68
Oeconomia copernicana	Poland	Q2	273	95	2.128	74	0.0012	99	0	97	0	96	0	98	17	94
Australian and New Zealand Journal of public health	Australia	Q2	3,449	18	2.079	75	0.0449	32	3.9	49	1.259	64	0.885	61	33	37
Frontiers in psychology	Switzerland	Q2	34,910	2	2.067	76	0.10267	1	3.2	69	1.2	73	0.914	58	98	1
Child and adolescent psychiatry and mental health	England	Q2	1,266	48	2.061	77	0.00217	53	3.2	69	1.193	75	0.77	73	27	65

College & research libraries	USA	Q2	1,162	55	2.052	78	0.00128	77	3.5	60	2.095	16	1.776	15	30	46
Journal of the medical library association	USA	Q2	1,129	57	2.042	79	0.00154	67	2.8	85	1.623	40	0.894	60	25	74
Psychology research and behavior management	England	Q2	682	73	2.03	80	0.00134	75	2.7	89	1.222	70	0.638	85	29	53
BMC palliative care	England	Q2	1,610	37	2.015	81	0.00395	36	4	47	1.407	50	1.056	48	33	37
Conflict and health	England	Q2	694	72	2	82	0.00198	58	2.9	81	1.114	84	1.036	49	28	59

Medical education online	England	Q2	1,011	60	1.97	83	0.00248	50	3.1	74	1.403	52	0.806	69	28	59
Safety and health at work	South Korea	Q2	983	64	1.945	84	0.00152	69	3.6	58	1.996	21	0.529	91	31	43
Aera open	USA	Q2	491	86	1.892	85	0.00273	46	3	77	0	96	2.913	6	29	53
BMC international health and human rights	England	Q2	970	65	1.861	86	0.00191	61	3	77	1.288	60	0.881	62	23	81
International Journal of stem education	Germany	Q2	368	90	1.85	87	0.00091	83	3	77	2.058	19	0.847	64	26	68
BMC nursing	England	Q1	1,103	58	1.846	88	0.00214	56	3.1	74	1.537	45	0.802	70	36	29

BMC medical education	England	Q2	5,284	13	1.831	89	0.0105 6	13	2.8	85	1.526	46	0.831	67	46	15
Physical review physics education research	USA	Q2	583	79	1.811	90	0.0010 9	81	4.4	33	2.272	12	0.771	72	30	46
Archives of public health	England	Q2	1,074	59	1.774	91	0.0036 3	38	2.9	81	1.124	83	0.791	71	29	53
Collabra-psychology	USA	Q2	149	100	1.761	92	0.0007 2	87	2	94	1.016	87	0.486	94	18	90
Revista de saude publica	Brazil	Q2	4,571	14	1.748	93	0.0041 5	34	2.8	85	0.945	90	0.744	77	41	25
Israel Journal of health policy research	Israel	Q2	477	87	1.741	94	0.0009 4	82	2.1	93	0.915	93	0.475	95	18	90

Journal of legal analysis	England	Q1	240	97	1.727	95	0.0006	89	0	97	0	96	1.209	31	0	97
Journal of business economics and management	Lithuania	Q2	999	61	1.64	96	0.0075	85	3.5	60	0.989	88	0.458	96	29	53
Theoretical economics	USA	Q2	680	74	1.631	97	0.0797	22	3.4	65	2.444	10	5.672	3	35	31
Anfiteatro economic	Romania	Q2	591	77	1.625	98	0.0025	95	1.8	96	0.532	95	0.276	97	18	90
Politics and governance	Portugal	Q2	584	78	1.6	99	0.0173	64	3.4	65	1.229	67	0.936	56	24	77
Health economics review	England	Q2	530	85	1.543	100	0.0151	70	2.9	81	1.142	79	0.724	79	22	86

Table 4: Bivariate Correlation between JIF with ES, CS, SJR, SNIP, and H5 for top 100 Open Access Journals

Correlation statistic	**Coefficient Values**	**Significant.**
Pearson's r between JIF and ES values	0.244	0.000
Pearson's r between JIF and CS values	0.898	0.000
Pearson's r between JIF and SJR values	0.784	0.000
Pearson's r between JIF and SNIP values	0.810	0.000
Pearson's r between JIF and H5 Values	0.340	0.000
Spearman's rho between JIF and ES rankings	0.268	0.000
Spearman's rho between JIF and CS rankings	0.690	0.000
Spearman's rho between JIF and SJR rankings	0.485	0.000
Spearman's rho between JIF and SNIP rankings	0.459	0.000
Spearman's rho between JIF and H5 rankings	0.300	0.000

** Correlation is significant at the 0.01 level (2-tailed).

In table 4, the Correlation coefficient is calculated for the top 100 open access journals as per the indicators of values and ranks. Pearson's (r) measured for values, and spearman's (ρ) considered for ranks. The table revealed that there is a supreme Pearson's (r) statistical correlation between JIF and CS (r=0.898) followed by JIF and SNIP (r=0.810), JIF and SJR (r=0.784), JIF and H5 (r=0.340). There is the lowest statistical correlation between JIF and ES (r=0.244).

In respects to spearman's (ρ) statistical correlations, the highest correlations established between JIF and CS (ρ=0.690) followed by JIF and SJR (ρ=0.485), JIF and SNIP (ρ=0.459), JIF and H5 (ρ=0.300) and the lowest correlation happened between JIF and ES (ρ=0.268).

Assessment of top ten Open Access Journals by bump Chart:

For evaluating the quality of the top 100 open access journals, JIF considered the primary bibliometric meter and top ten impactful journals selected from it to compare with each other indicators with the help of a bump chart, which can be seen in Figures 2 to 6.

Figure 2 displays a bump chart of the top ten (JIF ranked) open access journals in distinction concerning ES ranking. It was cleared from the table that only two journals were included in the top ten open access journals in the ES indicator. The gigantic differences in the European Journal of Psychology ranking applied to legal context and journal of innovation & knowledge.

Figure 3 represents a bump chart for the top ten (JIF ranked) open access journals compared to CS ranks. The figure demonstrates that seven are also ranked in the top ten in the CS list. The bump chat shows that ranks have fluctuated for both the indices except three journals (Lancet global health, Lancet public health, and Implementation Science). There was a strong correlation with varying their rank with each other.

Figure 4 denotes a bump chart for the top ten (JIF ranked) open access journals concerning SNIP ranks. 50% of journals also appeared in the top ten open access journals in the SNIP list. The figure reveals that ranks fluctuated for both the indicators for open access journals. The journal of behavioral addictions has enormously declined.

Figure 5 describes the bump chart for the top ten (JIF ranked) open access journals compared to SJR ranks. The figure exposes that 50% of journals also included in the top ten in the SJR indicator list. Like SNIP, the ranks of both meters have fluctuated except for two journals (Lancet global health and Lancet public health) with the changing arrays of ranking for open access journals. There was a moderate correlation found between their fluctuated rank with each other. The journal' Journal of innovation & knowledge' and 'Journal of sport and health science 'have suffered enormously.

Figure 6 represents a bump chart for the top ten (JIF ranked open access journals in association with google scholar H5 index. Three journals of the open access journals secured top ten positions in the H5 index list. The ranks have fluctuated in both the indices and the lowest correlation was found in them. 'European Journal of psychology applied to legal context' and 'Journal of Innovation & Knowledge' have suffered from the highest differences.

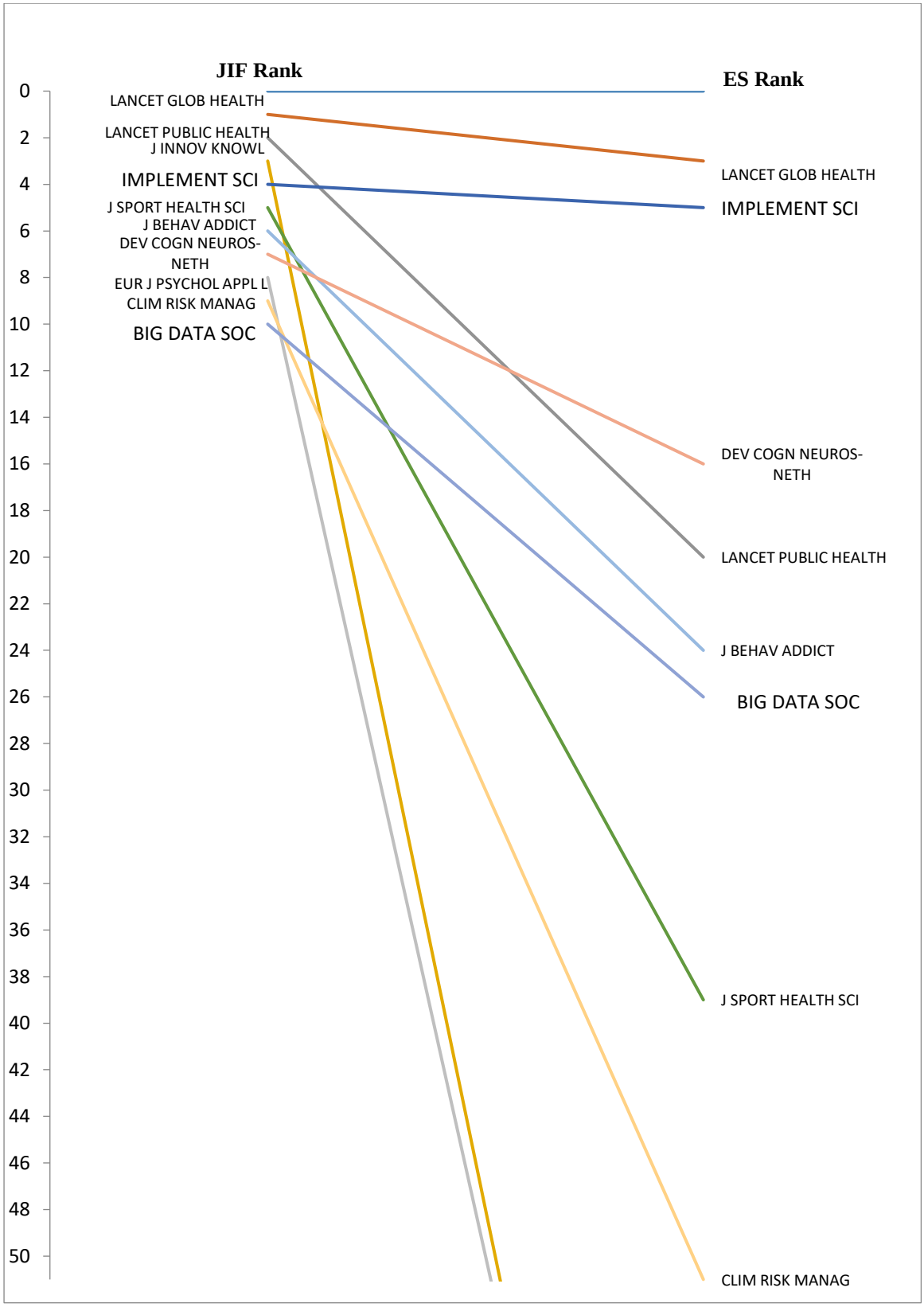

Figure 2: Bump Chart JIF and ES

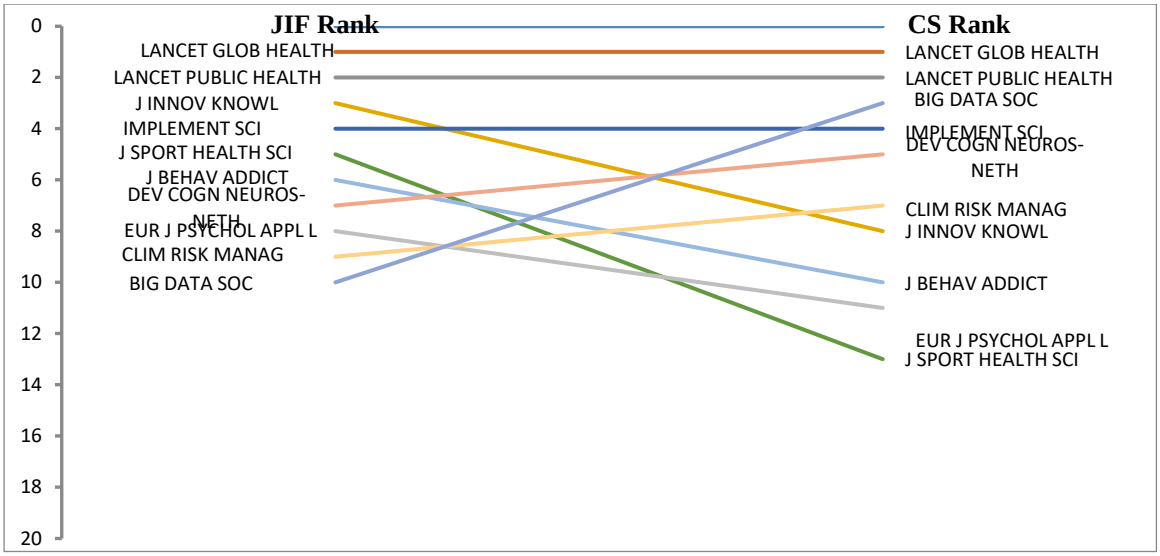

Figure 3: Bump Chart JIF and CS

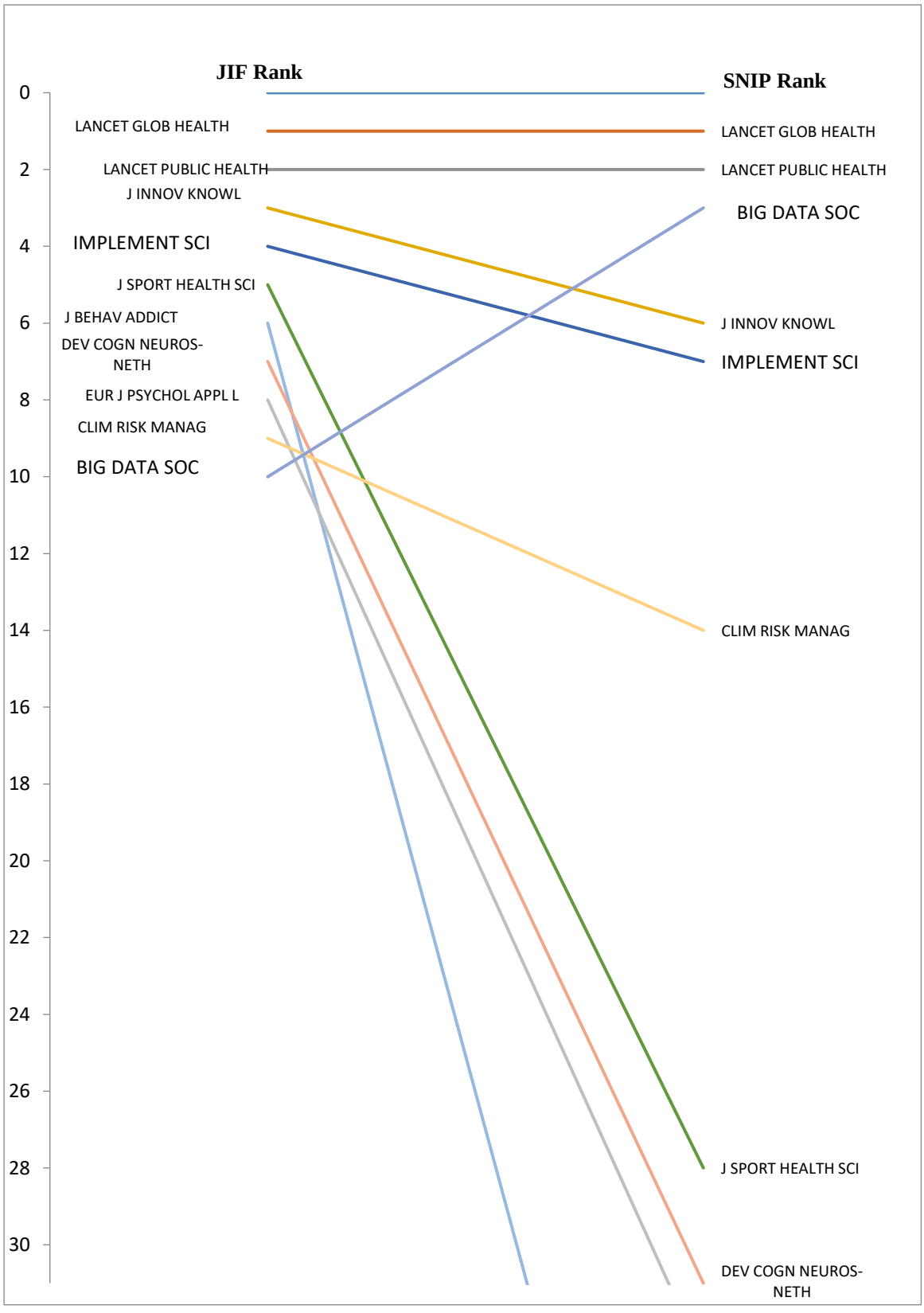

Figure 4: Bump Chart JIF and SNIP

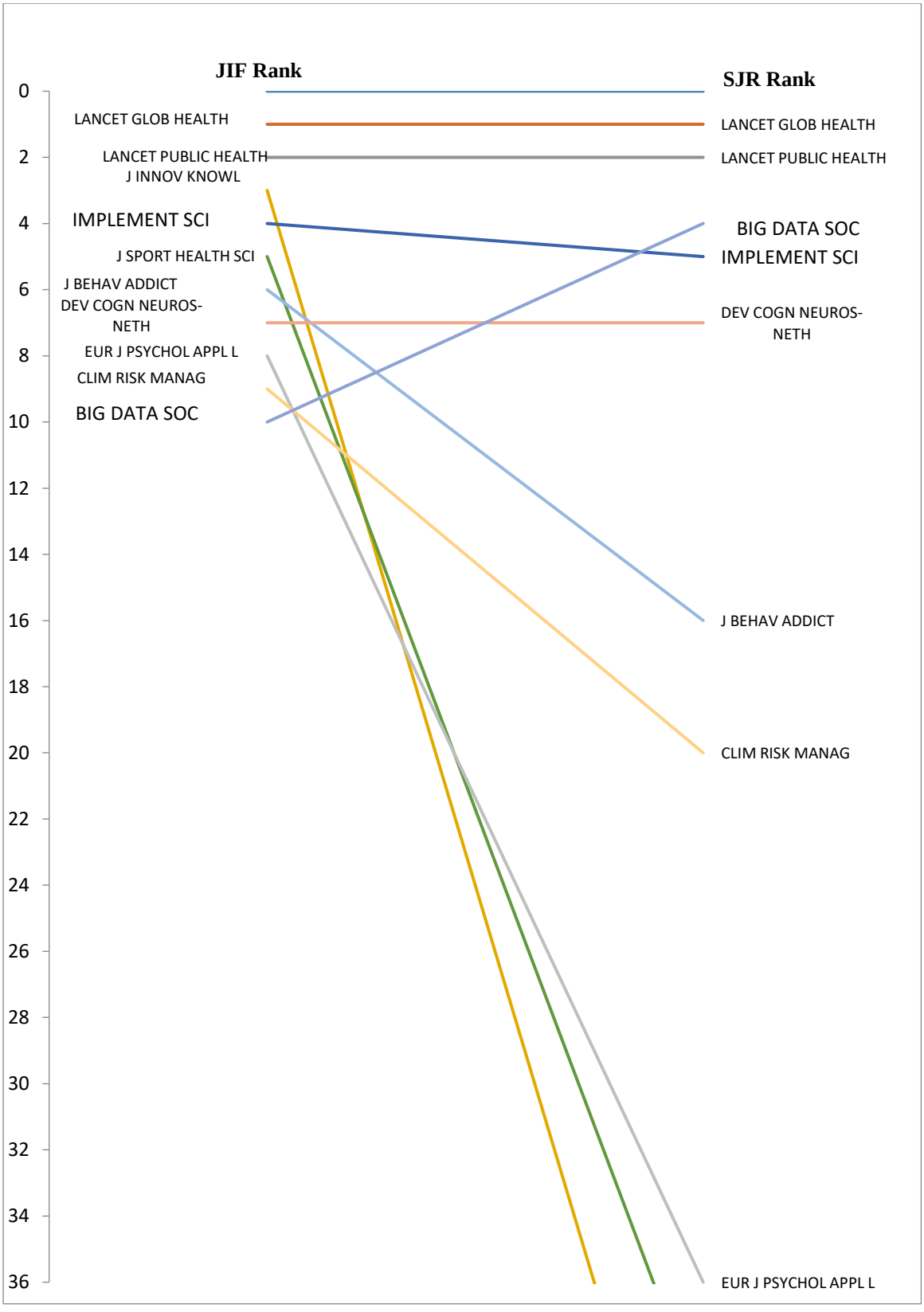

Figure 5: Bump Chart JIF and SJR

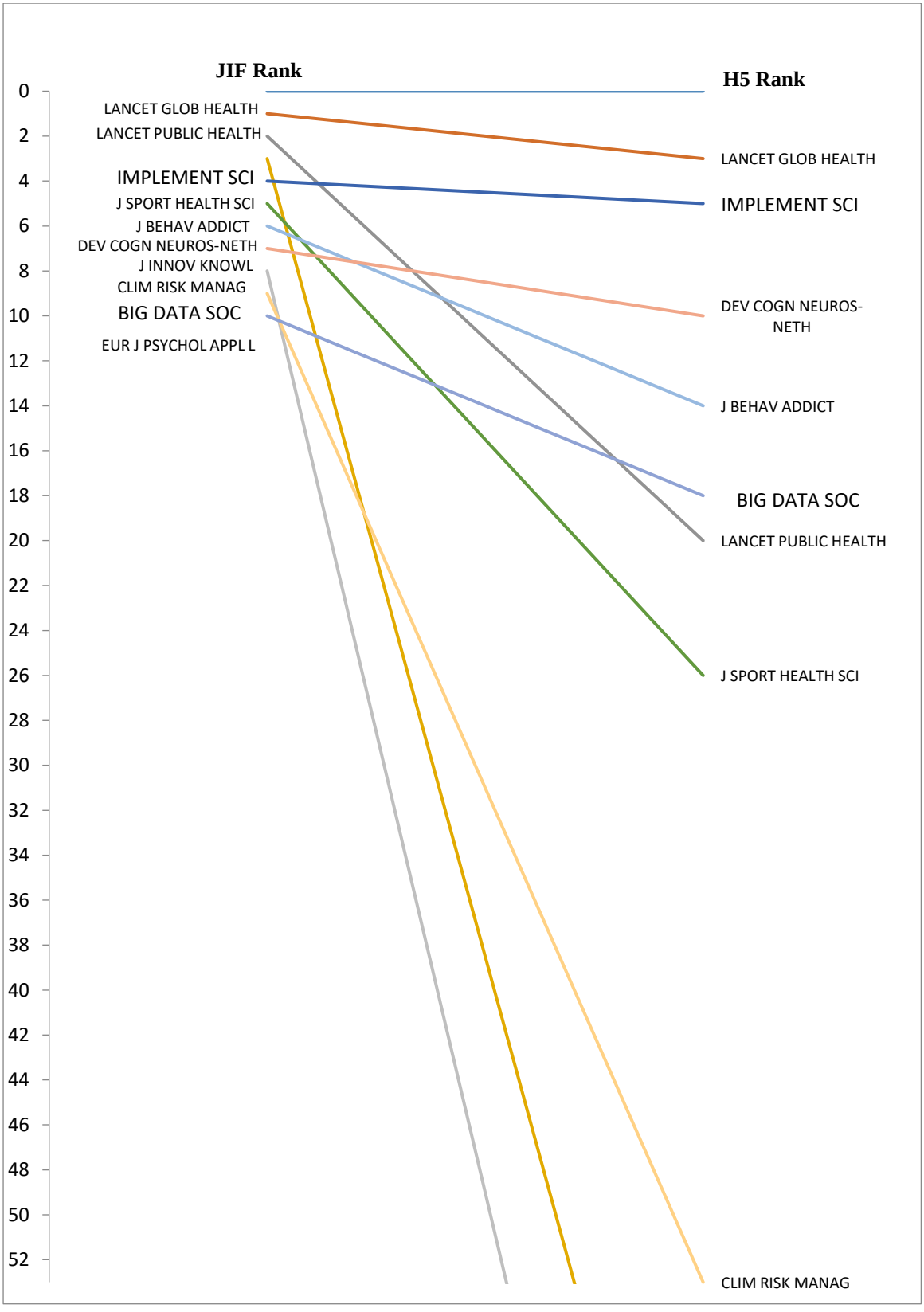

Figure 6: Bump Chart JIF and H5

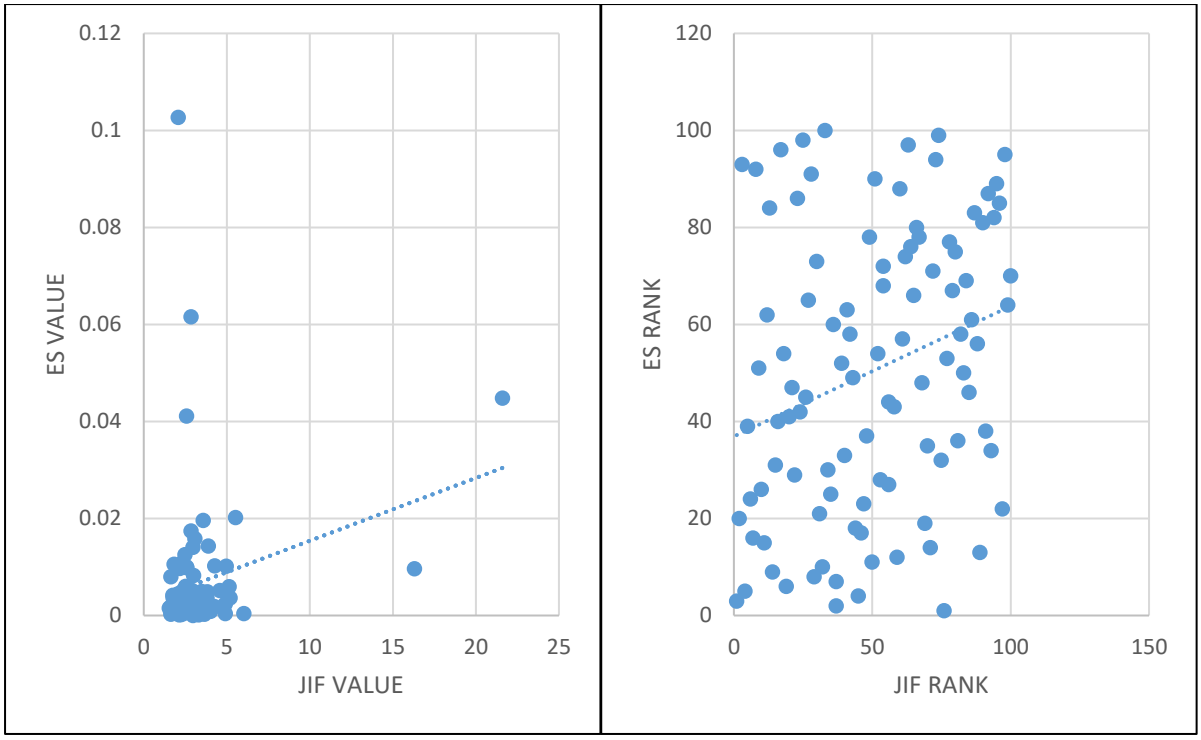

Figure 7: Correlation between JIF and ES (Values and ranks)

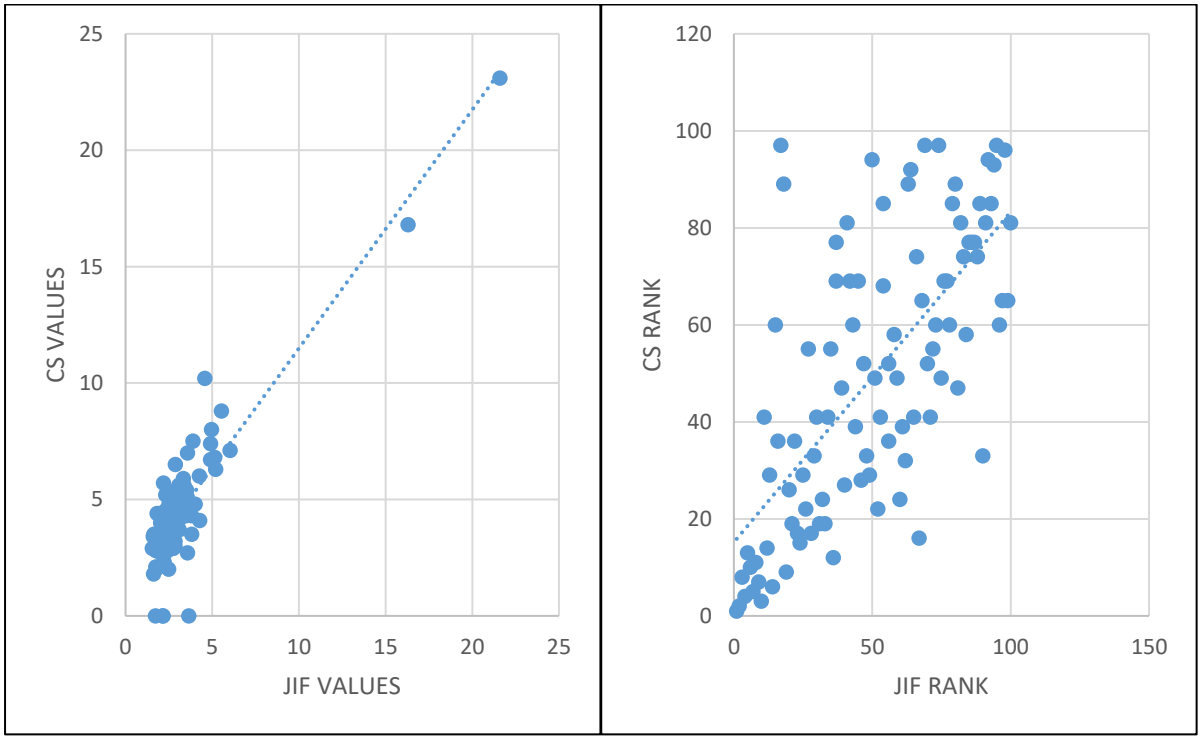

Figure 8: Correlation between JIF and CS (Values and ranks)

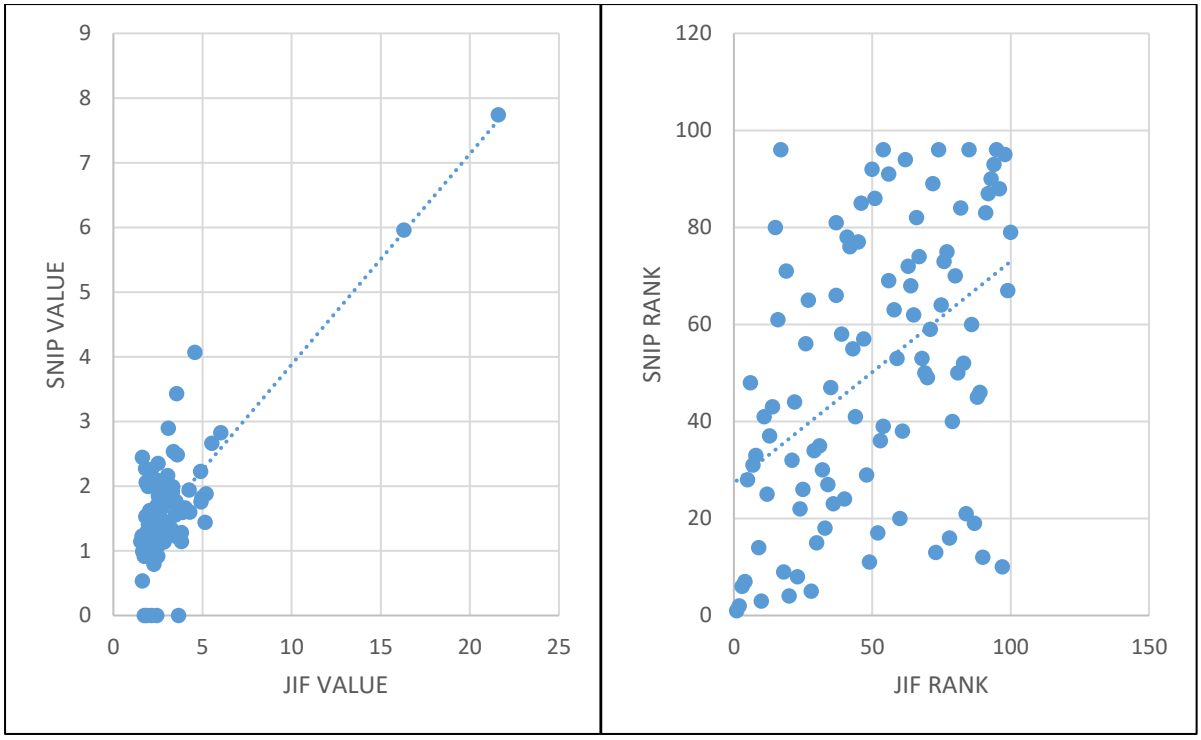

Figure 9: Correlation between JIF and SNIP (Values and ranks)

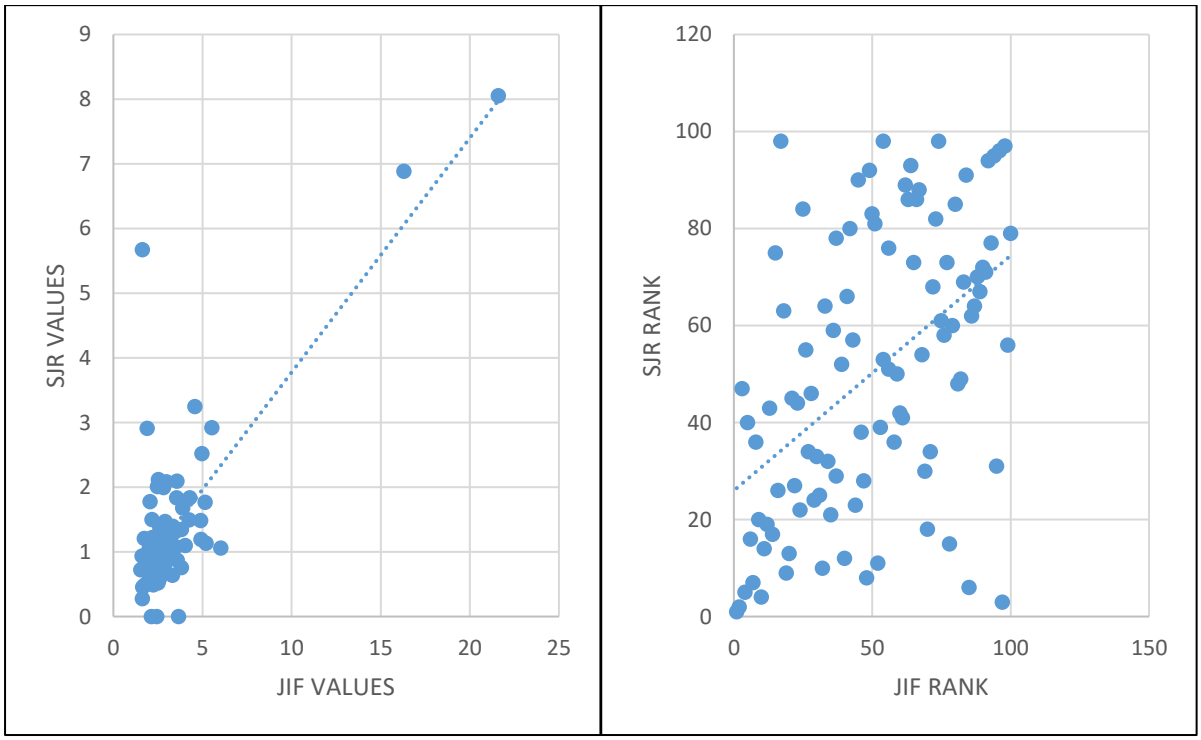

Figure 10: Correlation between JIF and SJR (Values and rank)

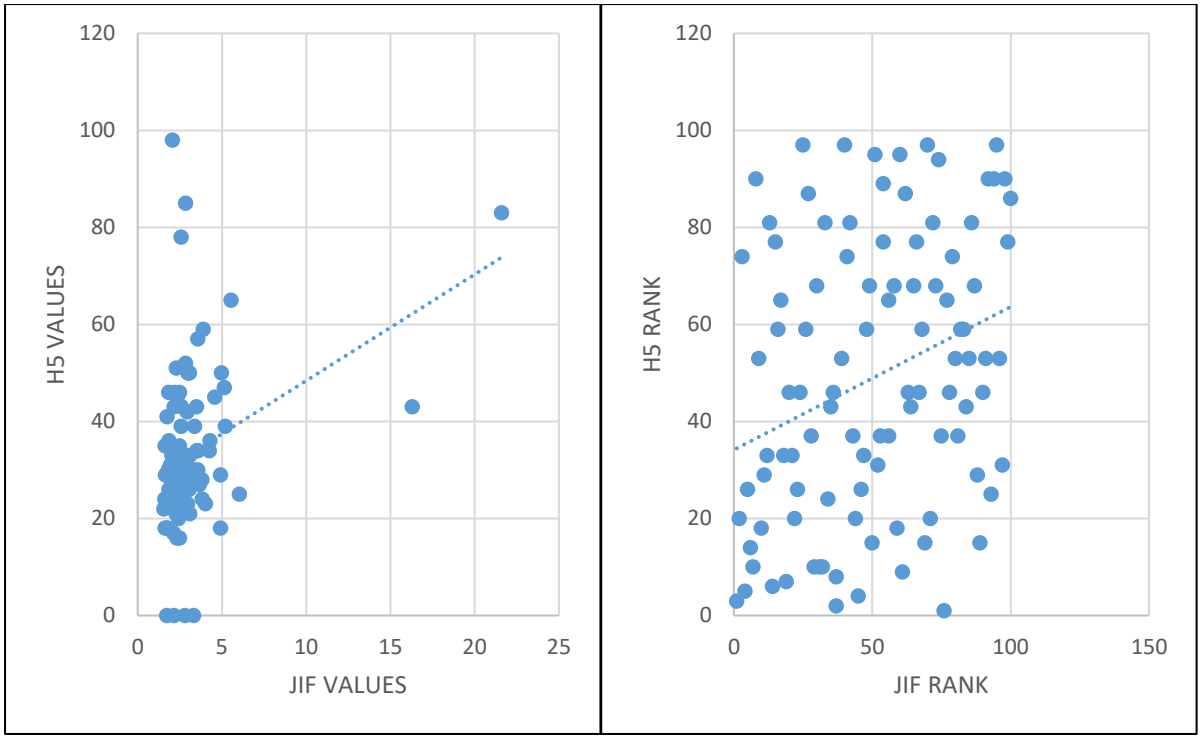

Figure 11: Correlation between JIF and H5 (Values and ranks)

Figure 7 shows the Scatter plots showing the correlation between JIF and ES (values and ranks) and their fit lines for the top 100 open access journals. The figure demonstrates a linear correlation between the values and ranks of JIF and ES indicators. This result is the agreement with (Abdel-Magid et al., 2020).

Figure 8 shows the scatter plots showing the correlation between JIF and CS (values and ranks) and their fit lines for the top 100 open access journals. The figure establishes a similar correlation between the values and ranks of JIF and CS indicators.

Figure 9 illustrates the scatter plots showing the correlation between JIF and SNIP (values and ranks) as well as their fit lines for the top 100 open access journals. The figure exhibits a steep correlation between the values and ranks of JIF and SNIP indicators.

Figure 10 displays the Scatter plots showing the correlation between JIF and SJR (values and ranks) and their fit lines for the top 100 open access journals. The figure reveals a strong linear correlation between the values and ranks of JIF and SJR indicators.

Figure 11 displays the scatter plots showing the correlation between JIF and H5 (values and ranks) and their fit lines for the top 100 open access journals. The figure establishes a linear correlation between the values and ranks of JIF and H5 indicators.

Conclusion:

This research has indicated that researchers in different disciplines and fields rely on journal articles to gather relevant and useful information. These researchers and staff use online open access journals and article databases, besides other sources. To facilitate their work and enhance accessibility, research centers, institutions, departments, and entities of higher education domains, universities, associations, societies, and related organizations of different countries should aid their progress and avail accessibility through open access to the various communities. This study shows that journals have different ranks than other journals when their performance is measured with multiple scientific indicators. Therefore, we conclude that researchers and institutions should not use a single indicator to measure the impact of their research output. This study also showed a linear co-relationship between the indicators, which leads us to conclude that performance measurement will be more reliable and accurate when more indicators are used for this purpose.

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