India's Contribution in the Scholarly Publications of Asiatic Region: A Comparison

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Abstract *- This write-up represents the fundamentals of SCImago Journal and Country Ranking in terms of its scope, role in scientometrics study, and the important elements of different types of scientometrics indicators. It attempts to achieve some fundamental objectives of scientometrics, like, i) ensure access to articles published in different R&D literature at national and global level, ii) reflect and represent true picture of scholarly contribution, research, scientific productivity at national and global level, iii) have an authentic tool/ground for effective, efficient and rigorous evaluation of scholarly works. The SJR2 indicator takes into account not only the prestige of the citing scientific journal but also its closeness to the cited journal using the cosine of the angle between the vectors of the two journals' co-citation. To eliminate the size effect, the accumulate prestige is divided by the fraction of the journal's citable documents, thus eliminating the decreasing tendency of this type of indicator and giving meaning to the scores.*

Keywords: Scopus, SCImago, Country ranking, Journal ranking, Compare countries, Academic Literature.

Introduction:

The SCImago Journal & Country Rank is a portal that includes the journals and country scientific indicators developed from the information contained in the Scopus database (Elsevier B.V.). These indicators can be used to assess and analyze scientific domains. This platform takes its name from the SCImago Journal Rank (SJR) indicator, developed by SCImago from the widely known algorithm Google PageRank. This indicator shows the visibility of the journals contained in the Scopus database from 1996.

As well as SJR Portal, SCImago has developed The Atlas of Science project, which proposes the creation of an information system whose major aim is to achieve a graphic representation of Ibero American Science Research. Such representation is conceived as a collection of interactive maps, allowing navigation functions throughout the semantic spaces formed by the maps.

Development:

This online platform SJR in SCImago lab, whichis a research group from the Consejo Superior de Investigaciones Científicas (CSIC), University of Granada, Extremadura, Carlos III (Madrid) and Alcalá de Henares, dedicated to information analysis, representation and retrieval by means of visualization techniques. SJR also provides The ***Shape of Science,*** **which** is a new graphical interface designed to access the bibliometric indicators database of the SCImago Journal & Country Rank portal, based on 2012 data

Coverage of database:

SJR provides full scientometrics profiles for more than 17000 journals of Scopus database from the year of 1996 to 2014, along with 233 countries from all over the world. Documents are classified by area and category. There are 295 Specific Subject Areas grouped into 26 Subject Areas. In addition, there is the General Subject Area containing multidisciplinary journals, such as Nature or Science. The Subject Areas are grouped into four categories on the Scopus "Basic Search" page. The four Scopus categories are –

- Life Sciences (3950 titles): Agricultural and Biological Sciences; Biochemistry, Genetics and Molecular Biology; Immunology and Microbiology; Neuroscience, Pharmacology, Toxicology and Pharmaceutics.
- Physical Sciences (6350 titles): Chemical Engineering; Chemistry; Computer Science; Earth and Planetary Science; Energy; Engineering; Environmental Science; Materials Science; Mathematics; a
- Social Sciences (5900 titles): Arts and Humanities; Business, Management and Accounting; Decision Sciences; Economics; Econometrics and Finance; Psychology; Social Sciences.
- Health Sciences (6200 titles; including 100% coverage of Medline titles): Medicine; Nursing; Veterinary; Dentistry; Health Professions.

Different types of indicator:

SJR has online tools for analyzing, comparing, and visualizing scientometric profiles of journals or countries. Its primary indicator is called 'SJR Indicator' that measures the scientific influence of the average article in a journal; it expresses how central to the global scientific discussion an average article of the journal is. There is a full list of SJR indicators available for journals and countries. Many indicators are common for both types, where some are distinct. SJR website provides following ranking and comparison – i) country rankings, ii) journal rankings, iii) compare countries and regions, iv) compare journals. SJR website is also useful to obtain – i) customized rankings of journals, ii) customized ranking of countries, iii) full scientometric profile of Scopus database, iv) journal evaluation, v) national-wide analysis, vi) map of science (country wise co-citation networks of subject areas or subject categorize for a period, or country wise bubble charts for indicators). Full list of SJR indicators available for journals and countries –

SJR uses different types of scientometrics indicators. Such as –

- SJR (SCImago Journal Rank) indicator: It expresses the average number of weighted citations received in the selected year by the documents published in the selected journal in the three previous years, --i.e. weighted citations received in year X to documents published in the journal in years X-1, X-2 and X-3.
- h index: The h index expresses the journal's number of articles (*h*) that have received at least h citations. It quantifies both journal scientific productivity and scientific impact and it is also applicable to scientists, countries, etc.
- Total documents: Output of the selected period. All types of documents are considered, including citable and non-citable documents.
- Total Documents. (3years): Published documents in the three previous years (selected year documents are excluded), i.e. when the year X is selected, then X-1, X-2 and X-3 published documents are retrieved. All types of documents are considered, including citable and non-citable documents.

- Total References: It includes all the bibliographical references in a journal in the selected period.
- Total Cites (3years): Number of citations received in the seleted year by a journal to the documents published in the three previous years, --i.e. citations received in year X to documents published in years X-1, X-2 and X-3. All types of documents are considered.
- Cites per Documents (3 years): Average citations per document in a 3 year period. It is computed considering the number of citations received by a journal in the current year to the documents published in the three previous years, --i.e. citations received in year X to documents published in years X-1, X-2 and X-3.
- Cites per Documents (4 years): Average citations per document in a 4 year period. It is computed considering the number of citations received by a journal in the current year to the documents published in the four previous years, --i.e. citations received in year X to documents published in years X-1, X-2, X-3 and X-4.
- Reference per documents: Average number of references per document in the selected year.
- Self dites: Number of journal's self-citations in the seleted year to its own documents published in the three previous years, --i.e. self-citations in year X to documents published in years X-1, X-2 and X-3. All types of documents are considered.
- Non-citable documents: Non-citable documents ratio in the period being considered.
- Cited duocuments: Number of documents cited at least once in the three previous years, i.e. years X-1, X-2 and X-3.
- Uncited documents: Number of uncited documents in the three previous years, i.e. years X-1, X-2 and X-3.
- Percentage (%) international collaboration: Document ratio whose affiliation includes more than one country address.

For journals	For countries
SJR rank	H index
H index	Total documents (in a year or range)
Citation per document (2 years)	Total citations
Citation vs. self-citation	Citation per document
Citation per document vs. external cites per document (excluding self-citation)	Citable vs. non-citable documents
Citation per document in 2, 3 and 4 years windows)	Cited vs. uncited documents
International collaboration (percentage of docs with more than one country)	Citation vs. self-citation
Journal's citable vs. uncited documents	Citation per document vs. external cites per document (excluding self-citation)
References per document	Documents by subject areas (27 areas)
Total documents in a particular year	International collaboration (percentage of docs with more than one country)
Total documents in 3 years	Relative production (percentage of the region vs. percentage of the world)
Total citations in 3 years	

Scope of this study:

- The entire database covers a huge area and almost all countries. For my study I choose the four top most developing as well as super-power countries of Asia (i.e. China, Japan, India and South Korea).

- Also the entire database covers almost all subjects. For my study I choose one of the most powerful ongoing research areas of life science (i.e. Biochemistry, Genetics and Molecular biology).

Country search (India): First, collected data about the position of India, as an individual country, the positionof scholarly and scientific communication from the year of 1996 to the year of 2014 in the world. The subject area is Biochemistry, Genetics and Molecular biology

Different types of indicators uses by SciMagoJournal Ranking

Table 1

Indicator	1996– 2014
h Index	212
Documents	126059
Citable Documents	122425
Citations	1323471
Self-Citations	451371
Citations per Document	10.5

Table 2

Year	Documents	Citable Documents	Cites	Self Cites	Cites per Doc.	Self Cites per Doc.	Cited Docs.	Uncited Docs.	% International Collaboration	% Region	% World
2014	15547	14623	6266	2675	0.4	0.17	3419	12128	18.02	14.05	4.74
2013	14270	13871	30425	11768	2.13	0.82	8279	5991	18.28	13.93	4.51
2012	13270	12891	58355	20980	4.4	1.58	9502	3768	17.89	14.47	4.42
2011	11445	11117	73454	26086	6.42	2.28	8790	2655	17.3	14.34	4.15
2010	9584	9344	86547	29545	9.03	3.08	7747	1837	17.44	13.4	3.72
2009	8046	7839	92598	31610	11.51	3.93	6694	1352	18.17	11.76	3.17
2008	7150	6948	94017	30891	13.15	4.32	6029	1121	17.87	11.61	3
2007	6276	6087	101735	34067	16.21	5.43	5546	730	17.48	11.33	2.74
2006	5684	5519	105386	35207	18.54	6.19	5131	553	17.86	11.82	2.64
2005	5194	5079	102822	34680	19.8	6.68	4687	507	19.25	12.06	2.55
2004	4364	4263	91589	29921	20.99	6.86	3999	365	19.23	11.03	2.23
2003	3956	3866	86702	28944	21.92	7.32	3624	332	20.12	10.9	2.12
2002	3526	3469	76594	26281	21.72	7.45	3262	264	15.8	11.05	1.97
2001	3133	3071	62900	21546	20.08	6.88	2847	286	14.43	10.23	1.79
2000	2843	2792	60122	19349	21.15	6.81	2629	214	16.92	9.28	1.63
1999	3085	3042	53772	18413	17.43	5.97	2790	295	19.32	10.37	1.83
1998	2926	2885	51783	17999	17.7	6.15	2680	246	18.46	10.14	1.7
1997	2934	2914	45650	1560	15.56	5.64	2538	396	16.56	10.5	1.7
1996	2826	2805	42754	1849	15.13	5.25	2548	278	19.57	10.85	1.65

Country rankings: The rank is done on the basis of h index. The ranking parameters are as follows –

- Subject Area: **Biochemistry, Genetics and Molecular Biology**.
- Subject Category: **Biochemistry, Genetics and Molecular Biology (miscellaneous).**
- Region: **Asiatic Region.**
- Period: **1996 – 2014.**

Table-3

Rank	Country	Total pub. docs.	Citable documents	Citation	Self-citation	Citation per docs.	h index
1	Japan	27555	27141	577989	123821	27.2	278
2	China	40680	40252	252186	105415	10.65	137
3	South Korea	6950	6803	85162	12995	27.32	111
4	Singapore	2516	2476	49232	4193	42.91	95
5	**India**	**17581**	**16688**	**101725**	**37723**	**10.11**	**91**
6	Taiwan	5712	5624	50008	9129	19.84	84
7	Hong Kong	1852	1813	29702	3925	25.32	69
8	Thailand	2133	2071	13373	2321	14.25	46
9	Malaysia	3163	3147	12228	2321	9.12	38
10	Viet Nam	377	374	4149	470	16.42	28
11	Indonesia	483	477	2946	473	12.68	27
12	Pakistan	1352	1343	4695	1377	11.63	27
13	Philippines	288	288	2955	247	16.2	24
14	Bangladesh	580	574	2764	1029	8.83	22
15	Cambodia	110	109	1098	114	24.81	18
16	Sri Lanka	200	192	1312	189	12.1	18
17	Nepal	158	154	1169	151	13.6	17
18	Macao	132	130	806	365	9.08	15
19	Kazakhstan	724	720	546	160	5.59	12
20	Laos	52	52	538	37	17.9	11
21	Mongolia	53	53	694	22	46.95	11
22	Myanmar	28	28	340	49	15.39	10
23	North Korea	8	8	183	0	20.81	8
24	Uzbekistan	68	67	320	18	8.19	7
25	Brunei Darussalam	18	18	135	10	10.74	6
26	Afghanistan	8	7	43	2	8.03	3
27	Bhutan	9	8	20	4	2.67	3
28	Kyrgyzstan	16	16	7	0	0.27	1
29	Maldives	2	2	4	0	2	1
30	Northern Mariana Islands	1	1	6	2	6	1
31	Tajikistan	30	30	2	0	0.29	1
32	Timor-Leste	1	1	2	0	2	1
33	Turkmenistan	3	3	0	0	0	0

Comparative analysis: This comparison is done on the basis of following countries, subject area, subject category and parameters –

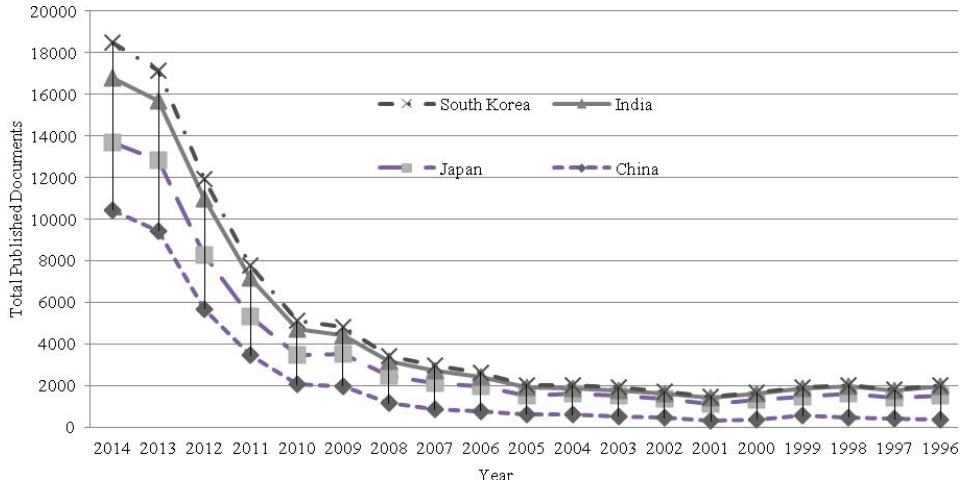
- Countries: China, Japan, India and South Korea
- Subject area:Biochemistry, Genetics and Molecular Biology**.**
- Subject category:Biochemistry, Genetics and Molecular Biology (miscellaneous)**.**
- Region:Asiatic Region.
- Period:1996 – 2014.

Table-4

Year	China					Japan				
	Tot. Pub. docs.	Self cites / docs.	% of citable docs.	Citable docs.	Cites/ doc.	Tot. Pub. Doc.	Self cites / doc.	% of citable doc.	Citable docs.	Cites/ doc.
2014	10450	0.222	23.722	10288	0.432	3215	0.418	26.034	3156	0.578
2013	9452	1.554	67.933	9352	2.896	3387	2.771	73.782	3356	3.666
2012	5698	3.906	84.152	5659	6.890	2595	6.407	86.898	2535	8.368
2011	3466	5.696	81.102	3432	9.823	1850	10.173	90.054	1824	13.157
2010	2052	6.657	78.460	2024	11.198	1444	11.902	87.258	1414	15.062
2009	1984	6.420	68.044	1959	10.091	1555	12.110	85.466	1521	15.656
2008	1164	10.818	86.082	1151	16.852	1304	16.006	89.264	1276	20.629
2007	859	11.692	86.380	850	18.714	1261	23.458	90.008	1229	29.658
2006	771	9.381	87.808	764	15.821	1,181	34.152	91.617	1159	41.264
2005	640	13.333	90.000	637	20.428	895	27.030	90.168	885	33.923
2004	615	9.491	87.805	612	16.473	988	25.887	90.283	973	32.686
2003	536	8.433	84.142	534	14.554	993	27.909	93.051	983	34.609
2002	457	4.455	90.153	454	10.048	915	30.508	91.148	901	38.456
2001	307	4.059	76.873	307	9.049	834	31.556	91.007	821	40.625
2000	389	5.720	76.864	389	10.807	954	31.349	92.977	943	40.343
1999	566	5.836	76.678	566	9.929	903	29.635	90.476	898	38.481
1998	480	4.096	78.958	480	7.388	1132	31.463	88.163	1,129	39.606
1997	406	2.362	82.020	406	5.638	993	30.716	86.908	990	39.770
1996	388	2.258	80.928	388	5.353	1156	23.089	86.332	1,148	30.176

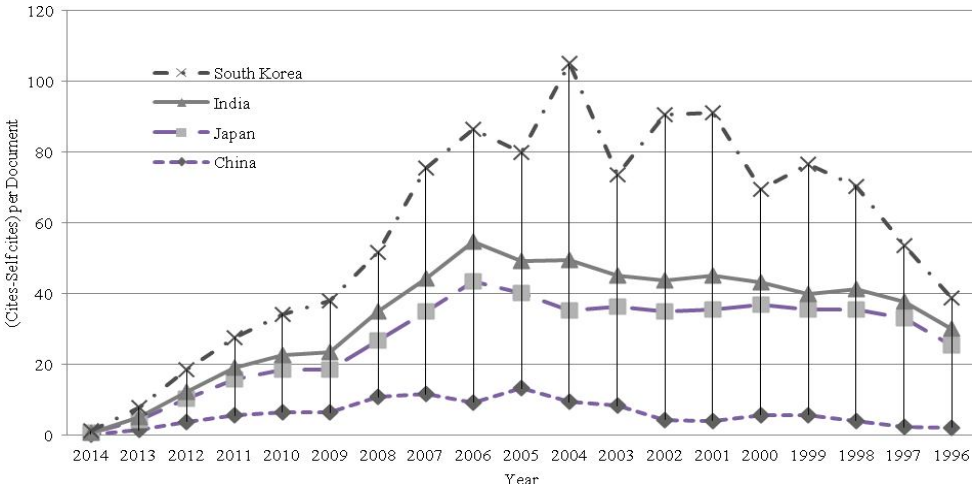
Year	India					South Korea				
	Tot. Pub. Doc.	Self cites/ doc.	% of citable doc.	Citable docs.	Cites / doc.	Tot. Pub. Doc.	Self cites/ doc.	% of citable doc.	Citable docs.	Cites / doc.
2014	3122	0.143	15.695	2967	0.255	1716	0.441	25.641	1672	0.551
2013	2836	0.934	47.250	2727	1.470	1451	2.712	68.436	1429	3.398
2012	2686	1.993	63.328	2594	3.240	933	6.251	85.209	904	7.833
2011	1836	3.338	69.499	1746	5.377	611	8.545	89.362	588	10.755
2010	1210	4.048	68.760	1138	6.255	395	11.658	89.114	380	14.587
2009	885	5.011	75.367	816	7.718	376	14.426	78.989	373	16.540
2008	717	8.264	77.824	639	12.365	224	16.728	82.589	224	19.313
2007	598	9.092	79.599	530	13.707	230	31.396	81.739	228	36.287
2006	474	11.099	84.599	420	16.422	201	31.990	93.532	198	37.139
2005	392	8.842	85.204	353	15.268	112	30.866	95.536	112	37.232
2004	275	14.251	84.727	240	21.153	127	55.528	94.488	125	62.465
2003	261	8.816	84.291	253	14.245	129	28.558	98.450	127	33.612
2002	258	8.833	87.597	251	14.926	90	46.989	95.556	89	53.611
2001	259	9.463	82.625	253	13.981	83	46.120	90.361	82	52.783
2000	259	6.290	84.556	257	10.803	61	26.197	95.082	61	29.672
1999	398	4.470	78.643	395	7.839	60	36.650	93.333	60	40.317
1998	343	5.770	85.714	340	10.195	67	29.134	85.075	67	31.687
1997	364	4.706	84.615	363	8.181	38	15.816	92.105	38	18.816
1996	408	4.792	87.990	406	8.708	46	8.609	82.609	46	12.565

Total published documents:



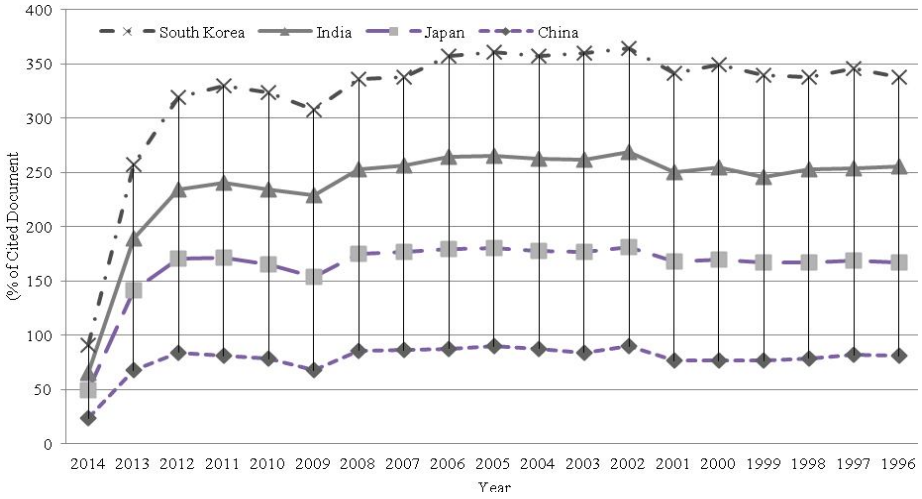
The above graph and table 4 shows, that at the beginning there was a slight difference of numbers of total published documents. But with the increasing of time the difference between numbers is also increased. For three countries the average increase rate of total published documents is almost same except China.

(Cites-Self cites) per Document:



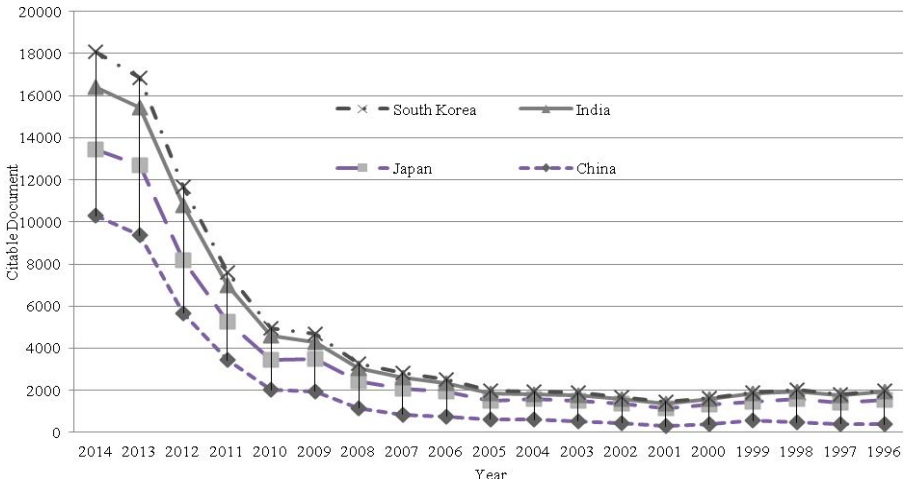
The above graph and table 4 shows, from the beginning South-Korea well performed consistently with the comparison of other three countries, but at the ending year South-Korea performs very despair. The graph is increased at the highest position of this country in 2004. Though, the line graph of South-Korea shown very fluctuation, whereas, other three countries stay on an average position consistently. India started from 3rd position, but the situation is well now.

Percentages of cited documents:



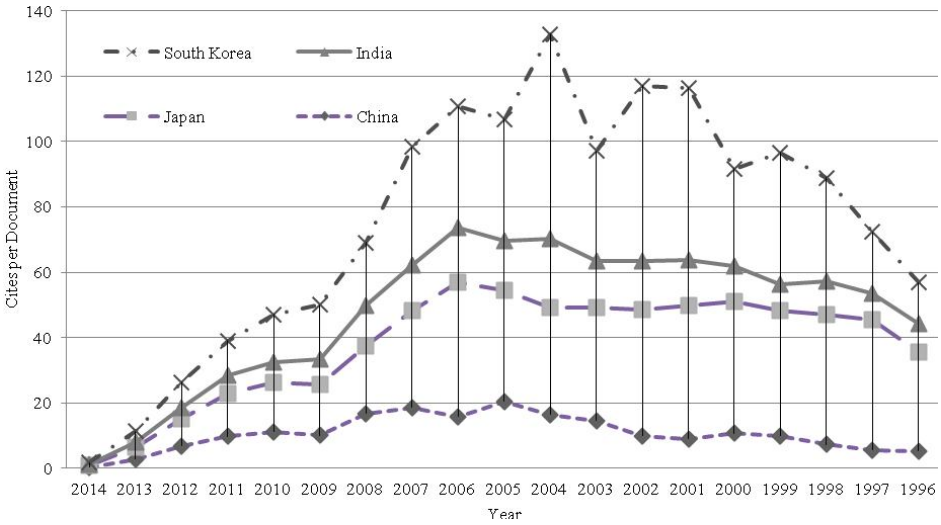
The picture is very disappointing for our country at this stage. The above graph and table 4 shows, at the beginning time India achieved the highest rank, but with the advent of time at the ending year India got 4th position. Though, the rate of percentage of other countries is also downwards.

Citable Documents:



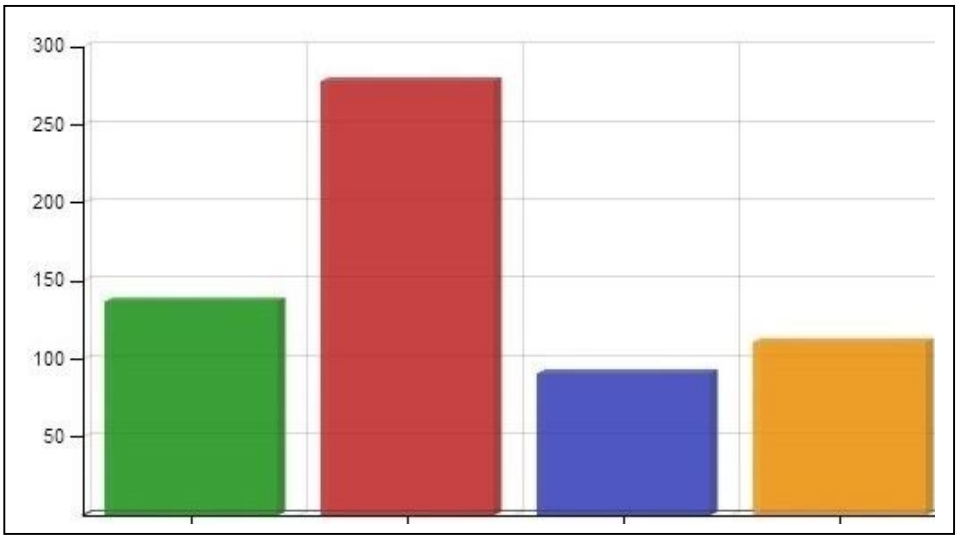
The above graph and table 4 shows, at this stage the situation of all countries is well. The rate of citable documents is going to upwards from the beginning. India started at 2nd position now position is 3rd at the end. On the other hand, China started at 3rd position, now achieved the 1st position in 2014

Cites per Document:



The below table-5 and graph shows, from the beginning Japan well performed with the comparison of other three countries, but at the ending year Japan performs very despair. The graph is increased at the highest position of this country in 2004. Though, the line graph of South-Korea shown very fluctuation, whereas, other three countries stay on an average position. At the particular stage the worst situation is of Japan. They started above 30, now they below 1. India's situation is not good also.

h index:



Picture: Position of four countries according to h-index (1996 – 2014)

Journal rankings: The rank is done on the basis of h index. The ranking parameters are as follows –

- Subject Area: Biochemistry, Genetics and Molecular Biology.
- Subject Category: Biochemistry, Genetics and Molecular Biology (miscellaneous)**.**
- Region: Asiatic Region**.**
- Period: Here 3 years means (from 2014 – 2012)**.**

Table-5

Rank	Journal title	SJR	h index	Total Docs. (3years)	Total Refs.	Total Cites (3years)	Citable Docs. (3years)	Cites per Doc. (2years)	Ref. per Doc.	Country
1	Indian Journal of Medical Research	0.701	55	919	7820	1345	662	1.65	24.14	India
2	Journal of Biosciences	0.635	50	313	4327	569	289	2.01	39.34	India
3	Tohoku Journal of Experimental Medicine	0.497	40	385	3456	562	379	1.38	30.86	Japan
4	Journal of Medical Investigation	0.384	33	114	1499	134	114	1.12	23.79	Japan
5	Experimental Animals	0.546	29	129	1789	144	116	1.03	35.08	Japan
6	Journal of Zhejiang University. Science. B.	0.429	28	384	4676	571	367	1.45	38.64	China
7	Science China Life Sciences	0.6	28	455	7009	651	425	1.65	37.08	China
8	Acta Medica Okayama	0.35	27	174	1307	180	173	0.85	24.66	Japan
9	Biomedical Research	0.517	25	137	1327	177	137	1.15	28.23	Japan
10	Biotechnology	0.217	17	137	1148	99	136	0.47	29.44	Pakistan
11	Journal of Ginseng Research	0.781	15	161	668	363	160	2.71	22.27	South Korea
12	BioScience Trends	0.579	14	135	1587	233	126	1.85	31.12	Japan
13	Artificial Life and Robotics	0.272	13	245	666	79	211	0.43	10.57	Japan
14	Indian Journal of Medical Research, Supplement	0.108	13	9	54	2	8	0.25	54	India
15	Biomedical Research	0.178	12	289	2708	127	288	0.39	23.55	India
16	Life Science Journal	0.161	12	5063	42160	844	5063	0.16	21.41	China
17	Journal of Pharmacy and Bioallied Sciences	0.371	11	334	2278	369	279	0.98	23.48	India
18	Biology and Medicine	0.275	10	111	1659	109	111	0.5	22.73	India
19	Chiang Mai Journal of Science	0.178	10	241	2684	92	231	0.35	30.85	Thailand
20	International Journal of Integrative Biology	0.118	10	44	454	6	44	0	32.43	India
21	Hokkaido Journal of Medical Science	0.113	9	29	0	5	29	0.22	0	Japan
22	Journal of Biomedical Research	0.531	8	189	1443	262	180	1.7	42.44	China
23	Journal of Natural Science, Biology and Medicine	0.341	8	197	2257	218	187	0.96	19.97	India
24	Journal of Pharmaceutical Analysis	0.36	8	179	1569	191	179	1	26.15	China
25	Proceedings of the Indian National Science Academy	0.129	8	210	4552	48	204	0.29	41.01	India
26	Research Journal of Pharmaceutical, Biological and Chemical Sciences	0.157	8	1704	27267	373	1704	0.18	21.67	India
27	Biomedicine	0.131	7	386	1736	13	353	0.04	16.69	India
28	Journal of Oral Biosciences	0.219	7	115	1286	68	113	0.64	36.74	Japan
29	Journal of the Korean Society for Applied Biological Chemistry	0.283	7	277	3437	199	268	0.68	28.64	South Korea
30	Plant Root	0.266	6	26	250	13	24	0.79	35.71	Japan
31	Mass Spectrometry Letters	0.121	4	67	452	14	19	0.56	22.60	South Korea
32	National Journal of Physiology, Pharmacy and Pharmacology	0.144	4	79	1091	20	70	0.29	17.32	India
33	Pakistan Journal of Life and Social Sciences	0.178	4	69	302	23	69	0.33	30.20	Pakistan
34	Tropical Life Sciences Research	0.159	4	48	593	19	48	0.25	37.06	Malaysia
35	Asia Life Sciences	0.109	3	37	0	7	36	0.27	0	Philippines
36	Genomic Medicine, Biomarkers, and Health Sciences	0.138	3	53	0	13	52	0.21	0	Taiwan
37	IPSJ Transactions on Bioinformatics	0.102	3	16	15	1	13	0	7.5	Japan
38	Journal of Shanghai Jiaotong University (Medical Science)	0.102	3	1086	6446	24	1085	0.02	17.19	China
39	Journal of Chemical and Pharmaceutical Sciences	0.121	2	117	128	10	117	0.09	9.85	India

Conclusion:

Using the cosine of the co-citation profiles is equivalent to assigning greater weight to citations to thematically close journals. For example, it increases the weight of citations to journals in the same Subject Area, and especially in the same Specific Subject Area. On the contrary, it decreases the weight of citations to scientific journals in other areas in which one must presume that the citing journal is of less authority. This leads to greatly equalizing the distribution by Subject Area, and especially by specific Subject Area, and makes scores from different areas more comparable, all without using any arbitrary classification of journals or weights to apply to the citations.

Beyond the metrics of the prestige of scientific journals which weight the Citation in terms of the prestige of the citing journal, the present SCImago Journal & Country Rank(SJR) indicator solves the problem of the tendency for prestige scores to decrease over time by the use of stochastic matrices. It endows the resulting scores with meaning, and uses the cosine between the co-citation profiles of the citing and cited journals to weight the thematic relationship between the two journals. We may conclude from this comparative case study some cases. These are as follows –

According to different types of indicators (viz. total published documents, self-cites per document, citable documents, percentage of citable documents and cites per documents), overall good situation is of China, followed by Japan. It's shown the state-of-the-art research in life science field is excellent of these two countries. The position of India is still not so good, in spite of we may say, the situation of our country is increasing slow but steady with a lot of limitations.

According to h index the rank of India as an individual country is 5^{th} in Asia for year 1996 – 2014 in specific subject area is Biochemistry, Genetics and Molecular Biology and specific subject category is Biochemistry, Genetics and Molecular Biology (miscellaneous)**.**

Two journals of India obtained the first and second rank according to h index; including also 11 journals ranked by SCImago Journal & Country Rank(SJR) indicator in out of 39 journals for same specific subject category and same time span.

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