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Visualization of journal ranking using a scimago: an analytical tool

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Visualization of Journal ranking using Scimago: An Analytical tool

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Abstract:

In the field of research various bibliometric indicators exist and the efficient use of such indicators has given rise to the publication of in-depth studies on the advantages and disadvantages of each of these indicators. However to evaluate the impact of scholarly journals number of metrics have been developed based on citation counts. These metrics represent scientific impact as a function not of just the quality of citations received but of a combination of the quality and the quantity. For example, the Scimago Journal Rank (SJR) indicator, is a size-independent, web-based metric aimed at measuring the current "average prestige per paper" of journals.

Keywords: Scimago, Journal Ranking, Web Metrics, Open Access

Introduction

Nowadays, research is influenced by factors such as its strong relationship with society, the ultra-specialization of areas and disciplines of knowledge, the competitiveness exercised by increasing practitioners, groups and research institutions, or the dynamism resulting from new trends and fashions. All this gives rise to a considerable growth of literature, as well as a constant restructuring and redefinition of the areas and disciplines of scientific knowledge, which ultimately interferes with our ability to design and implement classification systems that represent scientific knowledge **Gomez-Nunez, et al (2011).** The SJR is a publically available portal that includes the journal and country scientific indicators developed from the information contained in the Scopus database. The application of currently available sophisticated algorithms

of citation analysis allows for the incorporation of the “quality” of citations in the evaluation of scientific journals. The SJR indicator is computed in two phases. The SJR algorithm begins by assigning an identical amount of prestige to each journal. Next, this prestige is redistributed in an iterative process whereby journals transfer their attained prestige to each other through the previously described connections. The process ends when the differences between journal prestige values in consecutive iterations do not surpass a pre-established threshold **Gonzalez-Pereia, et al.** Production, visibility, impact and collaboration are among the major dimensions SJR considers in cross analyzing citations of scholarly writings by different individuals and institutions including higher education, government research agencies, health research institutions and private research companies. SJR also has a provision of analyses within a subject area **SCimago Research Group, n.d.** The main strength of SCImago is that it uses Scopus as the data source for the development of the SJR indicator. Scopus is said to be the world's largest scientific database with current coverage of data from more than 17,000 research publications embracing the full range of scholarly research. SCimago metrics also help to prevent excessive journal self-citation by limiting the number of references that a journal may direct to itself to a maximum 33% of its total references so that excessive self-citation will not involve artificially inflating a journal's value, but without eliminating the normal academic practice of self-citation.

Another advantage of SJR is that it introduces international collaboration in a bid to show the institution's output ratio that has been produced in collaboration with foreign institutions. The values are computed by analyzing the institution's output whose affiliation includes more than one country address over the whole period (**Godana & Dinku, 2011).** SJR not only ranks, analyzes and compares but also has a feature that generates visuals. So I also got the impression that the diagrammatic comparison of results might add a dimension of visual rhetoric to presenting quality of an academic impact as images present information and evidence that is relevant to an argument more accurately and concisely. Cognizant of the fact that contemporary society is filled with a variety of visual images designed to influence opinions, “rhetoricians working from a variety of disciplinary perspectives are beginning to pay a substantial amount of attention to issues of visual rhetoric.” Information visualization has emerged as a discipline of great interest at the crossroads of bibliometrics and scientometrics, providing multiple visual representations known as scientograms or science maps (Moya-Anegón et al., 2007). The SCImago Journal Rank indicator (denoted as SJRJ(Y)) of journal J in year Y is a variation on the

Google PageRank algorithm (Brin & Page, 1998), which is actually a variation on the Pinski-Narin (1976) weighted impact factor. For details of the mathematical calculations of these and similar indicators we refer the reader to (Langville & Meyer, 2006). According to the authors (SCImago, 2007) the SJR can be described as a journal prestige indicator. It is defined as a weighted sum of four terms. The first one is a kind of minimum prestige (the same for all journals, but depending on the total database); the second one depends on the number of published articles (a three year window is used); the third term is a term that depends on the prestige of the citing journals; finally the fourth term is a rest term in which a contribution of journals that are not connected to the citation network is taken into account. This last term depends on the number of published articles. The SCImago Journal Rank indicator is calculated using Elsevier's SCOPUS database. The SJR indicator is an open-access resource, while the journal IF requires paid subscription.

The SJR indicator (based on Scopus data) lists considerably more journal titles published in a wider variety of countries and languages, the SJR indicator attributes different weight to citations depending on the "prestige" of the citing journal without the influence of journal self-citations; prestige is estimated with the application of the PageRank algorithm in the network of journals. In addition, the SJR indicator includes the total number of documents of a journal in the denominator of the relevant calculation The evaluation of the quality of research is important for various professional societies, individual scientists, scholarly institutions, and funding organizations. The quality of a scientific contribution is primarily estimated from the long-term impact that it has in science. The latter can be inferred from the citations in scientific articles that a contribution receives. These principles have been applied in the evaluation of scientific journals. Three SJR journal-journal networks containing direct citation, co-citation and bibliographic coupling links are built. The three networks were then combined into a new one by summing up their values, which were later normalized through geo-normalization measure. Finally, the VOS clustering algorithm was executed and the journal clusters obtained were labeled using original SJR category tags and significant words from journal titles **(Antonio J. Gomez-Nunez, et al, 2016).**

Problem

Problems related to the classification of scientific knowledge have been widely discussed by scholars and researchers from different disciplines throughout history. Citation analyses play an

essential role in research evaluation systems. The essential idea underlying the application of these arguments to the evaluation of scholarly journals is to assign weights to bibliographic citations based on the importance of the journals that issued them, so that citations issued by more important journals will be more valuable than those issued by less important ones. The SJR indicator is a size-independent metric aimed at measuring the current "average prestige per paper" of journals for use in research evaluation processes. The present study has been carried out to identify journal ranking and institutional ranking by using Scimago tool in the field of “Health Profession”.

Objectives

1. To enhance visualization of the structure of scientific knowledge harbored included in the SCImago Journal & Country Rank (SJR)

2. To analyze the citation of the journals in the subject category “Health Profession”.

3. To explore the status of journals in south Asian regions.

Scope

The scope of study is confined towards analyzing journal ranking of top 14 countries confining the subject to “Health Profession”.

Methodology

Scimago tool was used to collect data from the field of Health Profession to check the journal and institutional ranking. SCImago Journal & Country Rank database was used for analysis of journal ranking and H-index for the Health Profession journals, as they are presented in the Scopus database.

Literature Review

This section provides the related literature pertaining to various aspects of journal ranking where various metrics have been used in number of studies to check the journal ranking.

The SJR is a bibliometric indicator that measures the prestige or influence of a scientific journal article, calculated with the largest and most nearly complete bibliographic database. The

systematic use of bibliometric indicators in the evaluation of research has given rise to the publication of in-depth studies on the advantages and disadvantages of each of these indicators **(García-Pachón & Arencibia-Jorgeb, 2014). Borja González-Pereiraa, Vicente P. Guerrero-Boteb and Félix Moya-Anegón , n.d** reveal that the SRJ indicator establishes different values for citations according to the scientific influence of the journals that generate them and SJR indicator reducing the rank of journals whose citedness is greater than would correspond to their scientific influence. While evaluating the quality of academic journals **John Mingers and Liying Yang** define that the quality of journals is becoming increasing important within the context of research performance evaluation. However, several new indicators have been developed, such as the h-index, SJR, SNIP and the Eigenfactor which take into account different factors and therefore have their own particular biases. The primary driver of an evaluation is an assessment of the quality of an individual research output, generally a journal paper. The evaluation can be done by peer review, as in the REF, or citations can be used as a proxy for quality – although they are really indicators of impact. The focus on quality of research has led to a focus on the quality of the publishing journal itself. According to **Leydesdorff (2009)** Scimago Journal Rank turns out to be an equivalent of the Impact Factor for the Scopus domain. **Lisa Colledge, et al (2010)** highlight that a citation from a widely-read, multidisciplinary journal counts as strongly as one from a more focused or local-interest source. SJR is a prestige metric inspired by Google's PageRank™, whereby a journal's subject field, quality and reputation have a direct effect upon the value of the citations it gives to other journals.SJR makes a distinction between journal *popularity* and journal *prestige*. SJR also aims to limit excessive benefits derived from journal self-citation. JIF, ES and SJR indicators of journals are important for librarians, researchers, academicians, authors, writers, inventors and environmental engineers alike when targeting quality journals for publishing their work **Shakil Ahmad, et al (2017)**. Impact Factor is the main index used by researchers for ranking the anatomy and morphology journals, but several shortcomings should be taken into account when they are using this index alone. The citation rate of an article determines the journal impact, but not vice versa. SJR and ES can be more accurate quality indexes in certain conditions. It is recommended considering all these indices when judging quality of the anatomy and morphology journals **Cantin, Munoz, & Roa (2015). (Sudhi K. Vijayan1 and V.R. Renjith**, **2017)** compare the journal impact rankings of the open access and subscription based SCImago

Journal & Country Rank (SJR) database it was observed that while using references and citation analysis, different graphic models were developed to represent the relations established between a set of journals and the disciplines they pertained to.

Data Analysis and Interpretation

Table 1 H-Index of Journals in the field of Health Profession

Journal Name	Country	H-Index
Noise and Health	India	45
Indian Journal of Traditional Knowledge	India	31
Journal of Pharmaceutical Analysis	China	24
Healthcare Informatics Research	South Korea	24
Imaging Science in Dentistry	South Korea	19
Journal of Exercise Science and Fitness	Singapore	19
Journal of Medical Signals and Sensors	India	17
Hong Kong Physiotherapy Journal	China	14
Hong Kong Journal of Occupational Therapy	Singapore	12
Asia-Pacific Journal of Sports Health Profession,	Singapore	8
Journal of educational evaluation for health professions	South Korea	6
Rigakuryoho Kagaku	Japan	6
Indonesian Journal of Pharmacy	Indonesia	5
Audiology and Speech Research	South Korea	1

India leads with highest H-Index of 45 for the journal “Noise and Health” and H-index of 31 attained for journal “Indian Journal of Traditional Knowledge” followed by China with H-Index 24. While as lowest H-Index of 1 was attained by South Korea for the journal “Audiology and Speech Research” (Table 1).

Table 2 Coverage of Journals in the field of Health Profession

Journal Name	Country	Coverage
Hong Kong Physiotherapy Journal	China	2000-2020
Rigakuryoho Kagaku	Japan	1995-2014, 2017-2019
Hong Kong Journal of Occupational Therapy	Singapore	2002-2019
Noise and Health	India	2002-2019
Journal of Exercise Science and Fitness	Singapore	2005-2020
Indian Journal of Traditional Knowledge	India	2008-2020
Healthcare Informatics Research	South Korea	2010-2020
Journal of Medical Signals and Sensors	India	2011-2020
Journal of Pharmaceutical Analysis	China	2011-2020
Imaging Science in Dentistry	South Korea	2011-2019
Asia-Pacific Journal of Sports Health Profession, Arthroscopy, Rehabilitation and Technology	Singapore	2014-2020
Journal of educational evaluation for health professions	South Korea	2016-2020
Indonesian Journal of Pharmacy	Indonesia	2016-2019
Audiology and Speech Research	South Korea	2019-2020

Table 2 showcase the coverage of journals in the field of Health Profession where highest coverage is attained for journal “Hong Kong Physiotherapy Journal” which covers time period from 2000-2020 while as journal “Audiology and Speech Research” accomplished minimum coverage of only 1 year from 2019-2020.

Table 3 Scimago Journal Ranking in the field of Health Profession

Journal Name	Country	SJR
Journal of Pharmaceutical Analysis	China	0.829
Healthcare Informatics Research	South Korea	0.566
Imaging Science in Dentistry	South Korea	0.446
Journal of Exercise Science and Fitness	Singapore	0.435
Noise and Health	India	0.427
Asia-Pacific Journal of Sports Health Profession, Arthroscopy, Rehabilitation and Technology	Singapore	0.348
Journal of educational evaluation for health professions	South Korea	0.342
Hong Kong Physiotherapy Journal	China	0.327
Indian Journal of Traditional Knowledge	India	0.272
Journal of Medical Signals and Sensors	India	0.258
Hong Kong Journal of Occupational Therapy	Singapore	0.151
Indonesian Journal of Pharmacy	Indonesia	0.137
Rigakuryoho Kagaku	Japan	0.101
Audiology and Speech Research	South Korea	-

Table 3 present scimago journal ranking of journals in the field of Health Profession where it has been observed that China is leading as far as scimago ranking is taking into consideration with highest SJR of 0.829 for “Journal of Pharmaceutical Analysis” while as least SJR of 0.101 is attained by Japan for journal “Rigakuryoho Kagaku”.

Table 4 Country Ranking in the field of Health Profession

Country	Documents	Citable documents	Citations	Self Citations	Citations per document	H Index
China	2891	2804	1814	944	0.63	115
Japan	1687	1621	690	224	0.41	179
South Korea	1508	1462	778	209	0.52	122
India	927	868	606	251	0.65	83
Taiwan	456	423	230	47	0.50	109
Hong Kong	346	334	277	50	0.80	110
Singapore	302	274	224	38	0.74	90
Malaysia	250	240	175	92	0.70	53
Thailand	192	184	71	10	0.37	51
Pakistan	178	171	253	156	1.42	36
Indonesia	146	144	47	21	0.32	22
Vietnam	51	50	97	11	1.90	20
Kazakhstan	49	49	3	1	0.06	7
Philippines	31	27	12	0	0.39	22
Nepal	30	24	13	3	0.43	26
Bangladesh	28	28	21	5	0.75	20
Sri lanka	22	20	14	7	0.64	16
Macao	21	20	22	8	1.05	25
Kyrgyzstan	8	8	1	0	0.13	7
Mongolia	6	6	8	1	1.33	7
Uzbekistan	5	5	2	0	0.40	6
Laos	2	2	2	0	1.00	4
Bhutan	2	2	0	0	0.00	2
Brunei Darussalam	1	1	0	0	0.00	9
Afghanistan	1	1	0	0	0.00	7
Cambodia	1	1	0	0	0.00	7
Tajikistan	1	1	0	0	0.00	0
Turkmenistan	1	1	0	0	0.00	0
Northern Mariana Islands	1	1	1	0	1.00	1

Table 4 shows country wise status of journals where China is leading with 2891 documents and among which 2804 are citable documents and achieved highest citations of 1814 in comparison with other countries. As far as self citations are taken into consideration again China attains 944 self citations followed by Japan, South Korea and India. On the other hand lowest document availability has been seen from the country Northern Mariana Islands, Turkmenistan, Tajikistan, Cambodia, Afghanistan and Brunei Darussalam with only single document existence. Furthermore Country wise H-Index reveals that highest H-index has been seen for Japan with 179 H-index followed by South Korea (122) and China (115).

C**onclusion**

The SCImago journal rank indicator is a novel instrument for the evaluation of scientific journals that may challenge the established premiership of the journal IF in ranking scientific journals. It provides unrestricted (open) access, is based on a larger source journal database, and focuses on the quality of citations that a journal receives by other journals, rather than the absolute number. However, the sophisticated methodology used in the calculation of the SJR indicator needs to be adequately validated, and certain characteristics may need to be reconsidered before definitive conclusions for its applicability could be drawn. It appears, though, that the election of one index or the other would be mostly a matter of whether the popularity or the quality of a journal is considered as the primary criterion for the evaluation of scientific journals.

Improving and updating the categorization of Scopus database journals included in the SCImago Journal and Country Rank (SIR) website calls for some reallocation and delimitation of subject areas and categories in order to restructure the scientific knowledge encompassed by SJR journals. It is thus intended to represent a consistent and congruent new disciplinary structure founded upon a set of well defined subject categories. Once the new classification scheme is defined, it is necessary to re-categorize journals, assigning the subject categories considered under the new scheme. This process largely entails reference analysis.

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