Journal benchmarking for strategic publication management and for improving journal positioning in the world ranking systems

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Abstract

Purpose – The purpose of this paper is to introduce and develop the methodology of journal benchmarking.

Design/methodology/approach – The journal benchmarking method is understood to be an analytic procedure of continuous monitoring and comparing of the advance of specific journal(s) against that of competing journals in the same subject area, together with the application of best practices defined in order to improve a journal's own advance and gain a position among leading scientific journals.

Findings – As a realization of this method, it is suggested to build up a journal scoreboard, which is a matrix of journal indicators, distributed for different journals. For the journal scoreboard on the subject of lasers and optics (36 journals, five indicators) a series of regression equations was built up that allow forecasts to be made for journals' impact factor levels, depending on the International Collaboration and Reference per Document indicators included in the SCIMAGO database.

Practical implications – The detailed journal scoreboard and prediction calculations allow elaborating strategies and policies for the promotion of journals in the Web of Science and Scopus databases.

Originality/value – The research presents the building up of a journal scoreboard in combination with prediction calculations that can be helpful for improving journal positioning in international Scientometric databases.

Keywords Web of science, Scopus, Journal rankings, Journal scoreboard, Publication management, Regression equations, SCIMAGO, Journal benchmarking

Paper type Research paper

Introduction

Elaborating policies and strategies for the promotion of scientific journals in the world ranking systems, e.g. Web of Sciences and Scopus, requires using a definite methodology and an available online platform that provides journal indicators. For this purpose, the methodology of benchmarking seems to be a convenient and appropriate one, and the SCIMAGO platform to be the most available free online platform which covers all scientific journals included in the Scopus analytical system.

The benchmarking methodology originally introduced by Rank Xerox in the 1980s was thoroughly described by R. Camp (1989). Benchmarking is understood as "the search for industry best practices that lead to superior performance." Following him,

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T.K.C. Chow (2012) offered to define benchmarking as a "strategic and structured approach whereby an organization compares aspects of its processes and/or outcomes to those of another organization or set of organizations in order to identify opportunities for improvement." Our operational definition of journal benchmarking is consistent with the broader ones of benchmarking, though it was narrowed to meet the specific needs of the scientific publishing industry. Thus journal benchmarking suggests setting one's scientific journal's advance and accomplishments against that of the best of the scientific publishing market for monitoring and comparative analysis of any group of journals functioning in the same subject area.

Analytic procedures of journal benchmarking are reported in more detail in "Methodology". In order to find out the degree of exploration of this problem and the amount of information available, the term "journal benchmarking" was used as an exact phrase query in an advanced search for the information retrieval systems of Scopus and Google Scholar in March 2012 and August 2013, and the search gave no responses. On the other hand, the query for the similar phrase "benchmarking of journal" used in an advanced search with that exact phrase in Google Scholar gave four results, and "benchmarking of journals" seven. Out of the 11 results, seven were repetitious, and the amount of pages relevant to our research (pages with most useful contents) was not over 50 percent. It conveys that no cluster of publications generated by the terms "journal benchmarking" or "benchmarking of journal(s)" has been accumulated to date, which implies that systematic studies on this subject are not performed.

At the same time, there were several results for queries with similar wordings, e.g. "benchmarking of journals" is mentioned in the work of Rieder *et al.* (2010), stating that impact factor (hereafter referred to as "IF") is still considered a generally accepted tool for journal benchmarking in spite all its disadvantages. In the work of Turk *et al.* (2002) the problem of developing the benchmarking methodology for scientific journals based on internet users' search queries was under discussion. Together with standard citation indicators, such characteristics as the time period between an article's submission to the journal and its publication, the article's accessibility, and readership are to be taken into account.

Journal benchmarking may be an integral part of scientific and institutional benchmarking; hence we used the Google Scholar search engine to test the following terms: "scientific benchmarking," "research benchmarking," "institutional benchmarking" and "institutions benchmarking." However, it did not receive any hits appropriate to our research targets.

There are also several relevant results from the following queries: "publication benchmarking" and "publishing benchmarking." For the former search query, Google Scholar retrieved several scientific works devoted to the comparative analysis of publication activity of 75 Accounting Research Institutions in the USA (Glover *et al.*, 2012) and of 18 Anglo-American Schools of Economy (Schaefer, 2006) that are mentioned. From the latter search query the results were the works, presenting publication benchmarking reviews and reports in the field of university technological transfer (Phan and Siegel, 2006), innovation activity (Pages and Toft, 2009), and bibliometric analysis of research in benchmarking (Metri, 2006).

Among all these issues, the work of Kurt C. Schaefer (2006) is rather interesting. He poses three problematic questions and gives concise answers as follows:

(1) What "counts" as scholarship in economics? Our gold standard is the peer-reviewed journal article.

(2) Who gets the credit for scholarship in cases of co-authorship? It is noted that the proportion of co-authored articles has risen in the last 30 years from around 20 percent to near 50 percent, and departments generally do not discount for co-authorship when making promotion and tenure decisions.

(3) How long are the pregnancies? Relative to other professions, there is a long "pipeline" period between submission to a journal and eventual publication, due to several factors. Masson *et al.* (1992) find a mean publication delay of 118 weeks; Ellison (2000) shows that this lag from submission to publication has grown in recent decades from about six months to over two years. In other disciplines, the lag is lower.

Kurt C. Schaefer (2006) gives the following general recommendations:

(1) do not try to re-invent the wheel. Read current working papers, and look for gaps in their analyses. Then fill those gaps with a project of your own;

(2) work with a co-author whenever possible;

(3) work with a nice person whenever possible; and

(4) scholarship is like taking vitamins. Think of research in the same way as you think of exercise or religious disciplines; a little bit every day is more effective than a lot once a year.

The recommendations suggested can be useful for developing the author's research and publication strategies.

The strategic approach to research career development and to a choice of journals for scientific research results publication for doctoral candidates is represented in the paper by Macauley and Green (2007). The authors offer to apply the strategic approach for publishing any research results, and they underline that the results of three-years-plus training in doctoral candidacy should be published carefully in accordance with the plan elaborated for the thesis/dissertation/research paper. Here, the time limitation for research is of major importance, which is why the publication cycle, mentioned in the observed works (Turk *et al.*, 2002; Schaefer, 2006), must be evaluated. The crucial moment of the strategic approach is a choice of appropriate publication sources. When planning journal publication, its high-impact pressure should be taken into consideration. In practice this means that doctoral candidates should publish their articles in indexed journals which are integral parts of most academic libraries. We refer to Web of Science, an online subscription-based scientific citation providing an overall citation search; its main characteristics are given in Journal Citation Reports, an annual publication by Thomson Reuters about academic journals including their IFs.

Kurt C. Schaefer (2006) offers an interesting way of applying benchmarking methodology for scholarly self-motivation; "it may be helpful to benchmark the standard to which we should hold ourselves accountable by studying the account of publishing that economists actually do." Schaefer emphasizes that much of his method is transferable to various subject matters other than economics. Based on the data from 18 institutions, he draws up a table with the following indicators:

(1) number of economists;

(2) number of EconLit (The American Economic Association's electronic bibliography; www.aeaweb.org/econlit/index.php) articles;

(3) number of articles by most prolific economist;

(4) number of Google Scholar citations; and

(5) alternative school rank: pubs/person + cites/person.

In the Scopus database, two papers on scientific journal benchmarking (Björk and Holmström, 2006; Björk and Öörni, 2009) corresponding to the above mentioned papers (Schaefer, 2006; Macauley and Green, 2007) were found. It was underlined there that authors did not often use full information planning journal publications. Therefore the task is to work out and test a method for scientific journal benchmarking. Readership, scientific prestige (IF), time between submission of an article and its publication, acceptance rate and indicators of an article's publication and reviewing quality are considered as benchmarking options.

There were some difficulties in obtaining information at the starting point because not all of these options are revealed by journal editorial. The first three options have been already observed in other works.

The article by Guha and Arora (2003) is notable as it states that benchmarking of the publication productivity of institutions is an essential criterion for assessing level usages of the resources. Here "the resources" stands for resources of a library, and in general the benchmarking method for library management is described.

Lots of papers (246 documents, as of March 2012) were found in the Scopus database relating to a "journal ranking" query. Their analysis allowed the identification of some articles which are of major importance for further development of journal benchmarking methodology and publication management. Lancho-Barrantes *et al.* (2010) in his paper highlights the limitations of citation indicators such as a lack of journal covering, a lack of standard procedure in accordance with a reference list, and reviewers' prejudice and citation habits. It results in the incompatibility of these indicators in different areas of knowledge. The most popular indicators IF (Thomson Scientific) and SJR (Scopus) are shown to correlate with a number of references per article in reference lists, but significant correlations with other bibliometric indicators were not presented. The authors consider these results to be a starting point for more sophisticated indicator models and for strategy planning, aimed at improving the way of evaluating science in general. E.g. Henk F. Moed (2010) proposed "source normalized impact per paper" (SNIP), a new measure of citation impact for journals as an alternative way to the traditional journal IF. This indicator, proposed for Scopus, is intended to solve a typical problem for earlier introduced IFs (SJR) and is based on the fact that citation habits vary among different areas of science and may therefore lead to systematic differences (Leydesdorff and Opthof, 2010). Loet Leydesdorff and Tobias Opthof underline that using IF and SJR leads to two problems: first, the method of citation depends on knowledge area and leads to systematic differences; second, there are no statistics about these differences and their importance. The SNIP recently introduced on the platform of Scopus database solves the first problem and such an approach allows the decrease of IF's dispersion in different research areas. For example, for Annals of Mathematics IF = 2.793, SNIP = 0.247; and for Molecular Cell IF = 13.156, SNIP = 0.386.

Another approach for journal rating was introduced in What makes a journal international? (Calver *et al.*, 2010), it presents the results of testing 39 journals on the basis of a "Single numeric index" (Index of International Journals (IIJ)). This index is based on ten variables; each variable covers a country and is represented by members of editorial boards, authors and co-authors, citing their own articles. On the basis of the quantitative taxonomic analysis, six journals' categories reflecting distinct cross-cultural

differences not revealed with IIJ were singled out. These categories correlated with the H-index well. Given categories do not reveal publication quality, but can help the editors make typical journal profiles and help authors find appropriate journals.

Revealing the correlation between journals' IF and posting their articles for open access (OA) is of great value for benchmarking tools development. The paper by Harnad and Brody (2004) presents OA/non-OA Impact Ratio, demonstrating that posting can increase article citation impact (depending on the subject category) from 2.5 to 5.8 times against those under restricted access. Y. Gargouri *et al.* (2008) based their research on the data collected from 27,197 articles from 1984 journals, published between 2002 and 2006. The authors describe OA advantages, that are understood to be citation impact growth of the scientific articles deposited in open electronic archives, when compared to the ones published in non-OA journals, reviews, etc. According to Gargouri *et al.* (2008), OA advantages do not result from author self-selection (choosing best papers for OA). Furthermore, OA advantages are higher for the top-rated journals, American journals and reviews.

Along with OA/non-OA Impact Ratio, such indicators as reads/cites (Kurtz *et al.*, 2005; Odlyzko, 2006), download/citation (Harnad and Brody, 2004) are used for OA impact evaluation. According to M.J. Kurtz *et al.* (2005), the ratio of "reads" to "cites" is 17:1 and even 12:1 in Astrophysics, and A. Odlyzko (2006) anticipates the same trend for Mathematics.

Thus, within the framework of performing journal benchmarking emerges a task of empirically revealing the relationship between these indicators and the IF of the journals monitored.

Apart from the above-mentioned articles in Scopus and Google Scholar, no more papers were found, i.e. none devoted to the quantitative identification of world-recognized journals, especially the ones focussing on the promotion of scientific journals for the world market of scientific periodicals and the improvement of their position in the world ranking systems.

For this paper, an example journal scoreboard on the subject of lasers and optics will be built up and in order to demonstrate how one can be used for imitation modeling for achieving higher IF for a selected journal through manipulation by the International Collaboration (Int.Coll.) and Reference per Document (Ref./Doc.) indicators. Several strategies for the promotion of scientific journals in world Scientometric databases will be presented and analyzed in this paper.

Methodology

Within the framework of this present research, journal benchmarking is understood as an analytic procedure of continuous monitoring and comparing of the advance of a definite journal(s) against that of a competitive journal(s) in the same subject area, together with the application of the best practices defined in order to improve own advance and gain a position among leading scientific journals.

As a realization of such an analytic procedure, it is suggested to build up a journal scoreboard, which is a matrix of journal indicators (I_{ij}) with dimension (size) of $m \times n$, where I_{ij} is a j journal indicator for an i journal, $1 \leqslant i \leqslant m$, $1 \leqslant j \leqslant n$, where m is the quantity of journals, n is the quantity of indicators. Scopus journals and indicators are chosen from the SCIMAGO platform. As an alternative, the Journal Citation Reports system of indicators can be used and the integral indicators SJR and IF can be taken as target indicators of leading journals. Besides, short-, middle- or long-term goals to achieve SJR or IF values of top journal positions must be set.

Various practices of journal management (e.g. international co-authorship support, invited papers from highly cited authors, setting advanced, cutting-edge themes and subject matters, increasing requirement for minimum amount of sources for reference list section, etc.) can be used as guidelines to reach the target indicators. Applying these measures appropriately, the journal's team can manipulate different journal indicators, including but not limited to the ones of integral type (SJR, IF).

For prediction calculations for the concrete journal scoreboard presented in the article, the measures for international co-authorship support and reference list expansion will be considered. These measures correspond to the control indicators Int.Coll. (percent) and Ref./Doc. provided by SCIMAGO platform.

For the journal scoreboard on the Lasers and Physics subject developed for this paper, we will draw up a series of equations of simple linear and multivariate (multiple) regression, that allow IF-rise forecasts to be made depending on the above-mentioned control indicators.

Results and discussion

As an analytical procedure for journal benchmarking, building up a journal scoreboard was suggested for the methodological part of the present article.

For illustrative purposes a journal scoreboard for *Laser Physics*, one of the leading Russian journals, and its competitors was built up. 35 rival journals on the subject of "lasers" were chosen on the SCIMAGO platform. For the 36 journals we built a matrix with selected indicator values that were provided by the above-mentioned platform (Table I). We chose indicators of three types:

- absolute indicator (H-index);
- relative indicator (Int.Coll. (2011), percent); and
- specific indicators (SJR, Ref./Doc., IF = Cites/Doc. (two years)).

As a result we have a 36×5 indicators matrix (Table I). In this matrix the first 17 journals were selected in June 2012. Later we identified several more journals on the SCIMAGO platform that met our requirements (in the "Atomic and Molecular Physics, and Optics" category), and in September 2013 we added 19 of them to the matrix. On the basis of this matrix, a cross-correlation matrix was calculated (Table II).

A good correlation between SJR and IF is known on a large sample (sampling is concerned with the selection of a subset of individuals from within a statistical population to estimate the characteristics of the whole population, http://en.wikipedia.org/wiki/Sampling_(statistics)) and Gonzalez-Pereira *et al.* (2009) characterizes IF values in this case as much higher.

A good correlation is detected on small sampling between these indicators ($r = 0.97$). Besides, there is a good correlation between Ref./Doc. and SJR (IF). It means that, according to this scoreboard, various scenarios of increasing citation impact of an article can be recommended to the editors of the selected journal (in our case *Laser Physics*) that are to provide a certain growth of the journal's IF in the future. The correlation between Int.Coll. and SJR (IF) is considerably worse (Table II). The former correlation is explained by the fact that review articles are cited more frequently, while the latter by the fact that articles written in collaboration with highly cited co-authors from abroad have a higher citing impact compared to those written by one author or a group of authors from the same country.

Table I.
Journal scoreboard for the laser and optics subject (June 2012-September 2013)

Journals (country)	SJR		H-index		Ref./Doc.		International collaboration (%)		Cites/Doc. (2 years)	
	06.2012	09.2013	06.2012	09.2013	06.2012	09.2013	06.2012	09.2013	06.2012	09.2013
Progress in Optics (the Netherlands)	1.484	3.535	29	31	0	109.67	20	50	7.17	5.8
Laser Physics Letters (Germany)	1.835	2.172	29	44	33.31	26.42	26.42	33.33	4.54	7.61
Laser and Photonics Reviews (Germany)	3.2514	4.453	22	34	128.66	109.47	50	42.86	3.85	8.01
Optic Express (USA)	1.956	2.26	123	143	24.18	24.8	27.44	28.76	2.01	3.85
Optics Letters (USA)	2.571	2.294	155	170	14.46	14.85	25.67	30.24	1.88	3.57
Laser Physics (Russia)	0.748	0.752	29	34	27.7	29.9	14.45	16.38	1.79	2.54
Applied Optics (USA)	0.591	0.966	106	118	21.84	23.26	16.06	16.75	0.96	1.79
Laser and Particle Beams (UK)	0.233	0.855	33	37	29.17	33.78	25.71	26.92	0.93	2.06
Chinese Optics Letters (China)	0.559	0.447	16	19	15.84	15.57	10.09	6.9	0.63	0.97
Journal of Russian Laser Research (USA)	0.306	0.35	16	18	19.88	23.55	24.24	21.88	0.43	0.69
Applied Physics B: Laser and Optics (Germany)	1.972	1.072	75	83	27.3	26.31	27.04	24.68	1.18	1.79
IET Optoelectronics (UK)	0.131	0.631	26	28	0	21.29	29.03	21.43	0.62	1.16
Ukrainian Journal of Physical Optics (Ukraine)	0.138	0.334	4	5	22	15.05	10	10	0.33	0.57
Optical Engineering (USA)	0.089	0.437	60	66	25.69	23.28	17.14	11.81	0.36	0.91
Journal of Laser Applications (USA)	0.059	0.226	28	28	24.64	27.65	24	17.5	0.37	0.52
Infrared and Laser Engineering (China)	0.046	0.289	10	15	11	11.39	0.86	0.49	0.3	0.81
Optical Review (Germany)	0.279	0.401	23	26	14.46	19.33	11.43	13.16	0.39	0.62
Journal of the Optical Society of America B: Optical Physics (USA)		1.324		98		31.76		23.88		2.35
Nature Photonics (UK)		11.897		100		22.59		25.63		17.03
Advances in Optics and Photonics (USA)		11.326		19		159.38		12.5		13.47
IEEE Photonics Journal (USA)		1.185		11		23.67		32.95		2.25
Journal of Biomedical Optics (USA)		1.024		77		9.09		6.46		2.51
Journal of Optics (UK)		1.008		47		30.4		20.08		1.88

(*continued*)

Table I.

Journals (country)	SJR		H-index		Ref./Doc.		International collaboration (%)		Cites/Doc. (2 years)	
	06.2012	09.2013	06.2012	09.2013	06.2012	09.2013	06.2012	09.2013	06.2012	09.2013
Photonics and Nanostructures – Fundamentals and Applications (the Netherlands)		0.838		22		26.49		26.44		1.88
Journal of Modern Optics (UK)		0.657		59		29.75		13.89		1.19
Journal of the Optical Society of Korea (South Korea)		0.648		10		17.93		8.45		1.1
Infrared Physics and Technology (the Netherlands)		0.562		32		23.99		16.47		1.64
Journal of the European Optical Society (UK)		0.408		9		23.67		17.65		0.71
Opto-electronics Review (UK)		0.354		24		27.53		17.02		0.92
Journal of Photonics for Energy (USA)		0.332		4		27.25		25		0.78
Optoelectronics Letters (Germany)		0.273		8		16.31		3.31		0.98
Optica Applicata (Poland)		0.265		16		20.66		13.25		0.66
Chinese Optics (China)		0.239		3		17.63		2.27		0.51
Journal of Optical Technology (a translation of *Opticheskii Zhurnal*) (USA)		0.221		14		13.92		2.89		0.2
International Journal of Optics (USA)		0.169		3		30.74		26.83		0.37
Optica Pura y Aplicada (Spain)		0.162		4		15.02		25.4		0.18

H-index in our calculations happens to be less informative. It is determined by H-index calculation inferiority on a fundamental level, because all the publications and citations of an author, a journal or a university or an institute cannot be defined by one arbitrarily selected figure.

Based on calculations performed for the scoreboard on the subject of lasers and optics, we derived the following (compare Table I):

$$\text{Cites/Doc.}(2\text{ years}) = 0.119(\text{Int.Coll.}) + 0.324,\ R^2 = 0.13 \quad (1)$$

$$\text{Cites/Doc.}(2\text{ years}) = 0.071(\text{Ref./Doc.}) + 0.404,\ R^2 = 0.35 \quad (2)$$

Graphs of these equations of linear regression are presented in Figures 1 and 2.

Figures 1 and 2 present graphs of these equations of linear regression.

To detect the outliers, the mean and standard deviation method of the residuals is used when they are calculated, compared and excluded according to the three-sigma rule. Thus, the points (33.33, 7.61) and (42.86, 8.01) were excluded in the first case,

Table II.
Cross-correlation matrix for journals included in journal scoreboard for the laser and optics subject (September 2013)

	SJR	H-index	Ref./Doc.	International collaboration (%)	Cites/Doc. (2 years)
SJR	1.00	0.26	0.63	0.26	0.97
H-index		1.00	−0.08	0.25	0.30
Ref./Doc.			1.00	0.41	0.59
International collaboration (%)				1.00	0.36
Cites/Doc. (2 years)					1.00

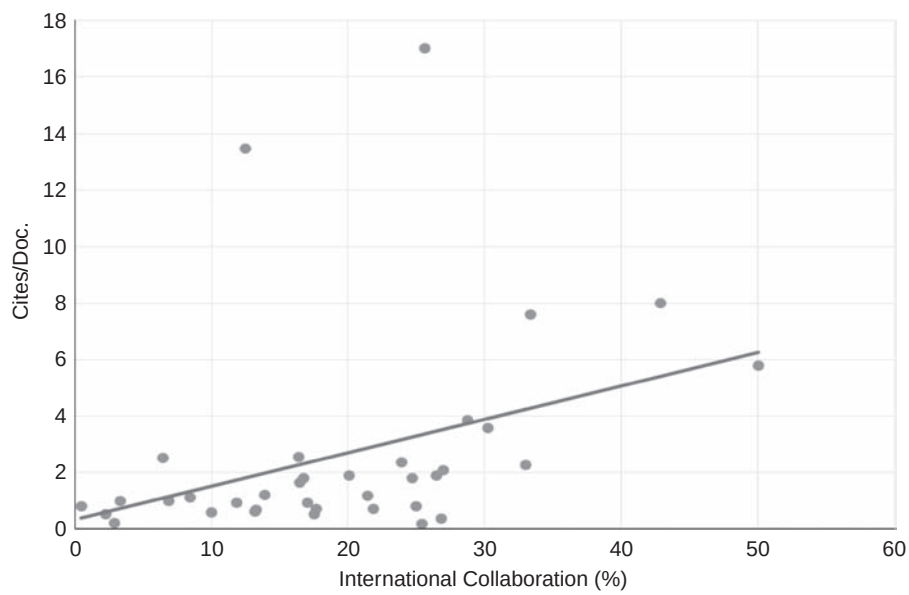

Figure 1.
Linear regression of equation (1)

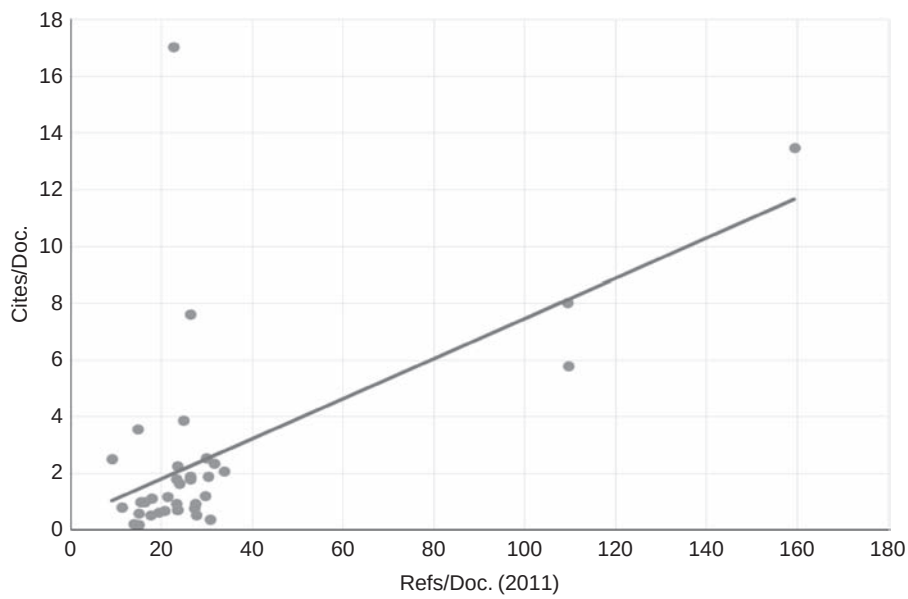

Figure 2.
Linear regression of equation (2)

and (22.59, 17.03) in the second case, thus we have the following equations of linear regression:

$$\text{Cites/Doc.(2 years)} = 0.117(\text{Int.Coll.}) - 0.390,\ R^2 = 0.48 \quad (3)$$

$$\text{Cites/Doc.(2 years)} = 0.060(\text{Ref./Doc.}) + 0.198,\ R^2 = 0.47 \quad (4)$$

Graphs of these equations of linear regression are presented in Figures 3 and 4. After removing outliers, the coefficient of correlation rose from 0.36 to 0.69 in the first case and from 0.59 to 0.85 in the second case.

Let us assume that for *Laser Physics*, a Russian journal, we managed to increase the Int.Coll. indicator (e.g. as a result of a policy of inviting prestigious and highly cited authors from abroad for collaboration) from 16.38 (Table I) to 30 percent, then according to equation (3) its IF is anticipated to be about three (Cites/Doc.(2 years) = 3.12).

If the Ref./Doc. indicator for this journal is increased from 29.9 (Table I) to 50, then according to equation (4), this journal's IF is anticipated to rise to 3.2.

For the benchmark data (Table I) the following linear and non-linear equations of multivariate (or multiple) regression are true:

$$\text{Cites/Doc.(2 years)} = 0.047(\text{Ref./Doc.}) + 0.063(\text{Int.Coll.}) - 0.286,\ R^2 = 0.37 \quad (5)$$

$$\text{Cites/Doc.(2 years)} = 0.079(\text{Ref./Doc.})^{0.192}(\text{Int.Coll.})^{0.857},\ R^2 = 0.33 \quad (6)$$

If the points (22.59, 25.63, 17.03) and (159.38, 12.50, 13.47) are excluded in the first case, the correlations improve:

$$\text{Cites/Doc.(2 years)} = 0.071(\text{Ref./Doc.}) + 0.034(\text{Int.Coll.}) - 0.435,\ R^2 = 0.55 \quad (7)$$

in the second case, they suffer almost no change.

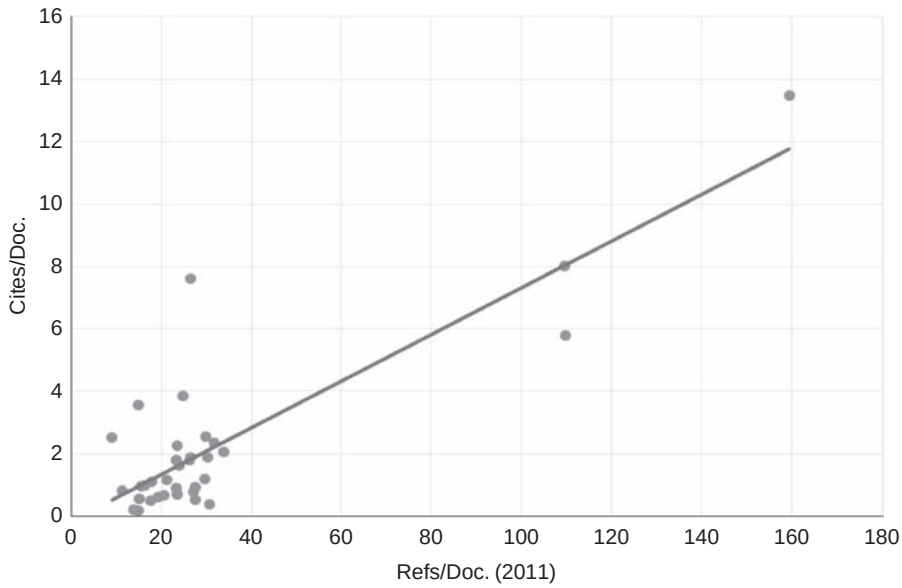

Figure 3.
Linear regression of equation (3)

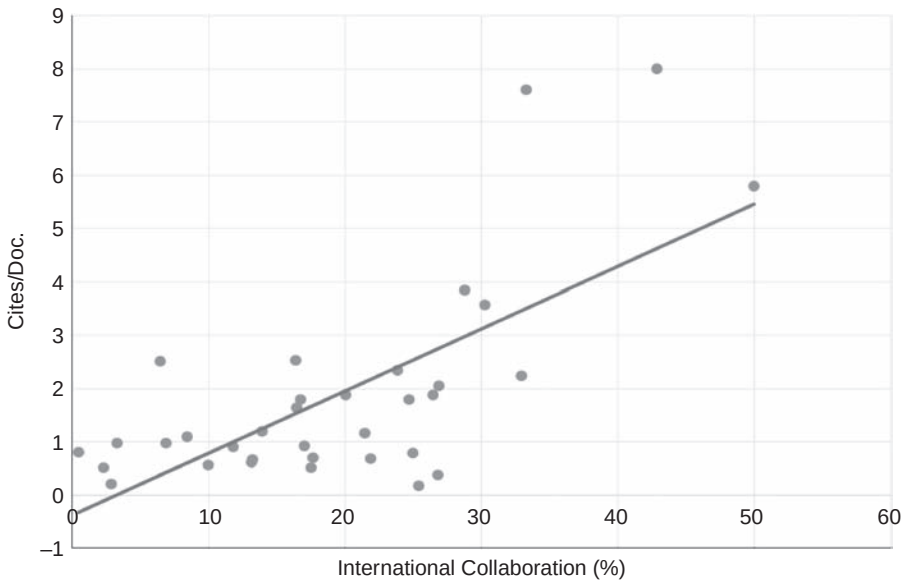

Figure 4.
Linear regression of equation (4)

Continuing the work with equation (7), we make a calculation conjugate to previously made calculations for equations (3) and (4), for *Laser Physics*. In this case equation (7) with Ref./Doc. = 50 and Int.Coll. = 30 percent, the result for Cites/Doc. = 4.14.

Calculating for equation (5) with the same argument values, we will have a smaller IF (Cites/Doc.(two years) = 3.95).

Now it can be seen that building up linear and polynomial regression equations of the following type: Cites/Doc.(two years) = *f*(Ref./Doc., Int.Coll.) may be used for the journal scoreboard to forecast objective values of journals' IFs.

Trend diagrams over different years within a three-year time period can be built up on the basis of such scoreboards. For example, we can make an IF − ΔIF diagram with breakdown of positive quadrant in $\Delta IF = 0$, $IF = IF_{av}$ axes for four sectors: first, top journals $IF > IF_{av}$, $\Delta IF > 0$; second, journals losing competitiveness $IF > IF_{av}$, $\Delta IF < 0$; third, "catching up" journals $IF < IF_{av}$, $\Delta IF > 0$; and finally, outsiders $IF < IF_{av}$, $\Delta IF < 0$.

Here the current value of IF corresponds to the Cites/Doc. (two years) indicator in Table II, ΔIF is an average annual IF value for a three year period (2010-2012), IF_{av} is an average IF value for the journals selection in general.

As was mentioned in "Introduction", journal benchmarking for OA journals may need to take into account-specific indicators such as OA/Non-OA-Impact Ratio, reads/cites and download/citation. Along with traditional standard indicators posted on the SCIMAGO platform, these specific ones can be included in the journal scoreboard to evaluate their influence on integral IF and SJR indicators.

Starting a journal benchmarking procedure we should set short-, middle- and long-term goals to achieve IF values of top journal positions. But, as we mentioned above, to set a goal to achieve the high-impact positions of Anglo-American journals is ($IF \geqslant 10$) senseless. For example, it is reasonable for the Russian journal *Laser Physics* to achieve IF = 5 in 2020.

Working on the previously formed regression quotations, different variants of indicator values for Ref./Doc. and Int.Coll., resulting in IF = Cites/Doc.(two years) = 5, can be calculated.

Making a journal benchmarking excepting integral indicators IF and SJR, some other indicators may be considered. For instance we can consider the mentioned above SNIP indicator, offered by Henk F. Moed (2010).

We should underline that such benchmarking in terms of the journal scoreboard can be made for journals in the Web of Science database on the basis of Journal Citation Report indicators.

Now let's observe seven strategies for increasing the IF values of national journals. First and foremost they are relevant to the countries of the former Soviet Union and developing countries, which are just entering the global "publish or perish" race:

(1) Invitation to cooperate with highly cited authors, developing breakthrough solutions to problems which are relevant to the research areas mentioned above gives a guarantee of journal IF growth. But the problem is that highly cited authors choose only high-impact journals. It is possible to attract them only in rare cases due to their close relationship with the editorial board members or to high salaries.

(2) Search for talented young researchers who are able to compete in breakthrough research with mature researchers, but who have not yet maintained a sufficient reputation to be published in high-rating journals, rendering it necessary to be published in low-impact journals.

(3) Improving national journal positioning in the world ranking systems by means of international co-authorship activation (Table II). The editorial board can give priority to international co-authorship articles; meaning publication order after reviewing (urgency of publication). It is clear that after publication, the probability of an article's citation will sharply increase due to the article's

improvement in quality, especially if comparisons were made between this paper and one written without a foreign co-author or good knowledge of the foreign author's publications. One more advantage is that the foreign co-author will cite this paper in other rating journals, and this will improve the national journal IF value where the article was published.

(4) Improving national journal positioning in the world ranking systems by means of OA involvement. It can be achieved by applying certain policies on self-archiving and copyright within the frameworks of the SHERPA/Romeo project (www.sherpa.ac.uk/romeo/), reducing embargo, introducing OA options or turning journals into OA journals, refusing to issue printed journals.

(5) Forming a consolidated community of authors choosing for publication one and the same journal especially selected by them can improve its IF value: To achieve this, authors should cite articles in this very journal regularly, including their own, and also articles published in this and in other high-rating journals. For national translated journals with IF this means that articles published in the English version of these journals should be cited. Such a citation method must be reasonable and not be dictated by editors; otherwise it can lead to "author's citation cartels."

(6) Supporting of national scientists solidarity in citing national journals with IF and with unified national and English titles versions of the same journals.

(7) Setting up journal consortiums which will help to improve mutual citing of authors, published in journals of this consortium.

The importance of strategies five-seven is explained by the fact that articles from little known national journals with a low or close to zero IF will not be cited. Following these strategies, the editors should bring the journals to some threshold IF values that will increase their visibility.

If foreign journals with a high IF in nano, bio and computer sciences areas are often used as a phony research front due to profitable business and they do not refuse to use "author citation cartels", why can developing countries' journals and post-Soviet countries' journals not use their experience? Habits and motivation in the citing of articles are usually connected with the orientation on journals with high IF, and it is impossible to draw attention to skillfully written articles not published in them. Usually competitive science schools or even competitive clans in strategically vital research areas cite only their own colleagues and ignore the results of their competitors. There are even cases of sophisticated falsification of research results in order to mislead competitors. Moreover, monetary rewards Systems stimulates such falsifications because the reward for publication of an article in a high-IF journal can be about $30,000-40,000 (Jufang and Hyiyun, 2011). It proves the motto "Publish or Perish" is outdated and should be modified into "Publish Best or Do Not Publish".

However, with a softer attitude and analytical approach, it seems that all the participants of the process benefit from the current situation in the dissemination and consumption of new knowledge. It is more convenient for scientists to read a limited number of journals relevant to their research areas, so that they can find best articles, overviews, research papers, etc. in these journals; and reciprocally, scientists send their best papers to the editors of these journals. Librarians diminish costs, subscribing to a few high-IF journals, not to mention top commercial publishing houses that make a

profit from forcing up subscription prices, while protected by the monopoly they hold on their subject categories.

Specific interactions among the participants fundamental to this self-organization process of dissemination and consumption of new knowledge seem to cause a well-known Seglen effect, where 80-90 percent of citing corresponds to 10-20 percent of articles (Seglen, 1992). It is one of the Pareto law variants describing that which was active only in arbitrary competitive environments. However, affected by a powerful international OA to scientific knowledge movement, this ratio will shift to 50 percent (citation): 50 percent (articles). The idea is that in this case there is no need to seek publishing in high-IF journals because the articles in OA-journals and low IF traditional journals posted in OA-repositories become immediately accessible to readers through Google Scholar. And it will grow more and more difficult to ignore well written articles by highly qualified scientists. And let us not forget the useful fact that a Russian mathematician, Grigori Perelman, was awarded the Fields Medal, the highest mathematics award, for researches reflected in several non-reviewed articles posted at ArXiv.org. So OA has already been working successfully on actualizing our motto, "Publish Best or Do Not Publish". Moreover, the realization of strategies five-seven will help to align the ratio in the Seglen effect (Seglen, 1992).

Now we come to the suggestion of our ideas on improving the system of national ranking in the example of Russian journals. The citing habits differ greatly among western and Russian scientists. The first ones cite generally western (British and American) sources in their long reference lists, the latter do the same, but in shortlists of Russian translated journals, they often cite national sources not presented in Web of Science and Scopus databases. Such different citing models of western and Russian scientists work in one direction – improving the IF of western journals. Consequently, Russian scientists need reasonable parity in citing western and national articles.

There is no continuity in Russian and English versions of the same journals, very often the translated English version of a journal title does not correspond to the authentic Russian one (point 5 of mentioned above strategies). As a result, in calculating references on Russian translated journals, a lot of references become lost and it leads to a decreasing of their IF.

These strategies can be observed in action with the help of an annual basis benchmarking matrix (journal scoreboard). The importance of any benchmarking procedure is known to identify the best practice, which allows the achievement of a goal. Here an editorial article's screening is of importance; it means a strong sampling of works is to be done, written from a definite area of knowledge of the world-wide mainstream. Such works are characterized by unsatisfactory literature reviews of western sources, by a lack of novelty in methodology and by a weak empiric research basis. We should bear in mind that Russian literature references will not be taken into account by national English journals due to the language differences. Moreover, no matter how interesting and urgent the research results are for Russian scientists, they might not be of interest to foreign readers if they are out of the world-wide mainstream.

If an editor or any member of an editorial board considers an article to suit all the demands of professional research writing (good literature review, advanced methodology and wide empiric basis) then it is given to reviewers. A national translated journal with an international editorial board is likely to have a net of reviewers all over the world, including Russian scientists working abroad.

We should point out that priority in developing a net of rating journals should be given not to translated Russian journals, but to the creation of national journals in English.

Two formal conditions are suggested to improve the IF which comes from the formula of its calculation (taking the year 2013 as an example):

$$\mathrm{IF}(2013) = C/N \tag{8}$$

where C is the number of times that articles published in the journal in 2011 and 2012 were cited by articles in indexed journals during 2013, and N is the total number of "citable items" published by that journal in 2011 and 2012. "Citable items" are usually articles, reviews, proceedings, or notes; not editorials or letters to the editor:

(1) vast reference list with maximum of references to journal articles (maximizing formula numerator); and

(2) lesser volume of journal with minimum annual number of issues and articles in the journal (minimizing formula denominator).

The second condition is of special interest because it allows the self-cost of a journal to be reduced and its quality to be improved (to collect a few articles of good quality is much easier than to collect many). This strategy is used by the majority of emerging online journals, e.g. *Cybermetrics* (Spain), *Webology* (Iran), etc.

Here are some levels for journal benchmarking:

(1) author (for planning author's publication strategies);

(2) big publishing houses;

(3) journal and university associations;

(4) single journals;

(5) single universities, academic and other institutions publishing journals; and

(6) governmental.

It should be underlined further that the world monetary rewards systems greatly hinder the development of strategies and policies for improving of the national journals positioning (IFs). They lead, as is shown by Jufang and Hyiyun (2011), to the outflow of academic papers. These authors suggest reforming the promotion system and abolishing journal classification (the rewards distribution depending on the interval changes of the journals' IFs). But in our opinion, we have the opportunity not to abolish journal classification but to use it at universities and other academic institutions to stimulate publications in national journals. Here the following procedure can be suggested: a researcher from Zhejiang Chinese Medical University was supposed to prepare an article on Scientometrics research in medicine and he wanted to send it to the Scientometric journal, the IF of which is slightly above 2. If this paper is published in the above mentioned journal, according to the monetary reward system in Zhejiang Chinese Medical University (Jufang and Hyiyun, 2011), the author would receive a reward of ¥3,000 (about $480). At the same time, the university suggests the author sending his article to the medicine specialized national journal with which the university is about to make an agreement; according to which, this paper should be sent to the reviewers of the Scientometrics journal. In this case the university pays to the editorial office to review the article. With positive reviews, the article is published in the medicine specialized national journal and the author receives the same monetary reward that he would receive had he published his article in the Scientometrics journal. The fact that the IF of a national journal is much smaller in comparison with the

Scientometrics journal (even equaling zero) will not be of any great importance in terms of the article's visibility on the internet if the article is posted with well described metadata in the university OA-repository. In this case, its visibility with Google Scholar search will be even better (free PDF file) than in the case of its publication in the Scientometrics journal (paid PDF file).

Following what has been said, attention is to be focussed on two problematic issues. First, science is not represented exclusively by the English language or by British and American journals. Science is a global linguistic and cultural diversity of all best research results. The problem is how the best results of national researches can be delivered to the global scientific community. That is why the research evaluation system and journal editors should support this option. Following the arguments listed in the article, we perceive that to be the only way for such a support within journal benchmarking. The editors of national journals should ask for the author's high quality and broad English abstracts, succinctly presenting to the readers the essence of the research. In this case the reader is stimulated to bear it closer examination. He could attentively look through an article written not only in unclear language but including formulas, figures, graphics, tables and English references. As a result the reader will probably have a desire to have this paper translated into English. So the editors of French, German, Spanish, Russian and other journals should not shun their native languages in favor of English, but they should instead represent national research results for the global audience in qualitative and broad English abstracts.

Conclusion

The paper deals with journal benchmarking for strategic publication management and for the improvement of journal positioning in the world ranking systems.

The journal scoreboard and trend diagrams done on its base are considered as methodological tools of journal benchmarking. Starting journal benchmarking procedure we should set short-term, middle-term and long-term goals to achieve IF values of top journals positions. The data of SCIMAGO platform can be used as empiric basis for journal scoreboard.

The journal scoreboard having matrix dimension 36 (journals) $\times$ 5 (indicators) was made for journals pertaining to the subject of laser optics.

For this journal scoreboard a series of linear and non-linear equations of simple and multivariate (multiple) regression was built up; these equations allow forecasts for journals' IF levels to be made, depending on the Int.Coll. and Ref./Doc. indicators, that are included in the SCIMAGO database. Thus, for the Russian journal *Laser Physics,* the Int.Coll. indicator increment from 16.8 to 30 percent will increase its IF from 2.54 to 3.12, while a rise from 29.9 to 50 in the Ref./Doc. indicator will make its IF = 3.2.

If the above-mentioned correlation still holds for the both indicators, the IF might change to four.

This method includes building up the journal scoreboard and equations of regression, and there are no restrictions for subject areas. It can be used for any scientific journal to test various scenarios of a journal's IF improving, which is exactly what journal benchmarking is aimed at.

Seven strategies for improving the IF of national journals were suggested and six levels of journal benchmarking were identified.

The monetary rewards systems used in different parts of the world should be adapted to support national journals and it will diminish the outflow of academic papers from countries.

The minimum requirements for academic written articles were formulated: first, wide and detailed literature review; second, new methodology in mainstream research of specific area; third, wide and qualitative empiric research basis. Following these requirements guarantees article growth of citing and of journal IF.

The following formal conditions of IF journal growth can be derived from the formula for standard IF calculation (8):

(1) vast reference lists with numerous maximum links to the articles of the journal; and

(2) smaller journal volumes are to minimize an annual number of articles in this journal.

We also demonstrate how to adjust existing monetary rewards systems for supporting national journals in greatly decreasing the outflow of academic papers from a country.

The formal scientific communication and research evaluation system through the linguistic and cultural diversity of research results is considered.

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