



Chasing after the high impact

Athanassios C. Tsikliras*

School of Biology, Department of Zoology, Aristotle University of Thessaloniki, UP Box 134, 541 24 Thessaloniki, Greece

ABSTRACT: In this paper, I present the perspectives of a young non-native English speaking scientist from a southern European country (Greece) on the impact factor system that is commonly used to assess the performance of countries, institutions, and scientists, including the role this plays in the selection of a journal to which to submit a manuscript. Although young scientists may not always be aware of the advantages and pitfalls of the impact factor system when it comes to the choice of which journal to submit to, journal ranking is among the selection criteria, following the journal's general scope and rapid manuscript handling but preceding choice of a journal which allows authors to suggest potential referees, and open access journals. The impact factor system is briefly criticised and some improvements are suggested, such as adjustment among scientific disciplines, accounting for the number of authors and the position of an author among them as well as including a page (or word) count.

KEY WORDS: Impact factor · Submission criteria · Bibliometrics

Resale or republication not permitted without written consent of the publisher

SUBMISSION CRITERIA

The evaluation system of journals (and individuals) that has been built upon bibliometric indices is gradually becoming very complex, with results that are often inconsistent (e.g. the number of citations may vary depending on the search engine used: Meho & Yang 2007). The increasing use of meta-analyses and statistics that are performed to evaluate individual work will soon make CVs look like journal articles. Senior scientists are well aware of journal rankings and bibliometric indices, as well as of the advantages and pitfalls of such methods. However, scientists at the beginning of their careers might not be so well-informed; this essay presents the perspective of a young non-native English speaking scientist (and relevant experience from colleagues) from a southern European country (Greece).

When submitting the first series of papers, most of which are derived from postgraduate theses, a young scientist rarely has an option. The journal selection decision is usually taken by the supervisor (often the corresponding author) who employs criteria, such as quick publication for a forthcoming promotion, journal

ranking and prestige, fair review, even acquaintance with the editor or member of the editorial board. Young scientists, at this early career stage, may not even have heard of journal ranking based on impact factors (IF); all they want is to get their work published. They know, however, that *Nature* and *Science* are considered the 'best' journals but they are not necessarily sure why. Later on, when applying for a job or a post-doctoral position, young scientists realise that a single article in a high impact factor journal can change their employment prospects (Lawrence 2007). It is at this point that chasing after the high impact begins, because scientists with good publication and citation records are generally preferred (Bornmann & Daniel 2005). However, hiring a person is more than numbers; it is a mix of abilities that include originality in research positions, and communicative/lecturing ability in academic ones (Lawrence 2007).

Irrespective of their research field, seniority or the country in which they work, the objective of all scientists is to ensure that their work gets the best exposure. Yet, when it comes to submitting, authors face 2 issues. The first one is whether the journal chosen for sub-

*Email: atsik@bio.auth.gr

mission is a Thomson's ISI-indexed journal (<http://portal.isiknowledge.com>), which is often a prerequisite for gaining a PhD, and the second considers the rank of this journal compared to others in its category.

If you are a young Greek scientist, the answer to the first issue is one-way because, nowadays, most senior faculty members at Greek universities (and probably in other Mediterranean countries as well) believe that IF is a panacea of scientific output and that a non-ISI listed journal, i.e. with no official IF, is equivalent to conference proceedings. This implies that a publication in *Acta Adriatica* (a Croatian journal published since 1935) or *Fishbyte* (in which some highly cited articles have been published, e.g. Pauly & Munro 1984, with more than 150 citations) or in newly launched journals is not considered to be a primary peer-reviewed publication. Indeed, in a CV, this publication should be placed under 'other peer-reviewed publications' rather than 'Science Citation Journals'. As long as the employment of young scientists and promotion of junior faculty is increasingly based on citation analysis and IF (Holden et al. 2005), they are forced to publish through ISI-listed journals. Although the ISI system is not universal and covers less than 10% of the world's journals (Cameron 2005), the unofficial estimate of citations per year for every journal that is available online is now possible (e.g. journal impact analysis using Harzing's Publish or Perish, www.harzing.com and ranking and mapping scientific knowledge, www.eigenfactor.org; Bergstrom 2007) and could offer an alternative to ISI that may cover all journals (but see Pauly & Stergiou 2005). Hence, the first issue might no longer be of concern since it is now possible to calculate the impact of all journals. There remains the issue of publishing in high or low impact journals.

It is often assumed that the higher the IF, the higher the prestige and the quality of a journal (Harzing & van der Wal 2008, this Theme Section). A relationship with prestige is understandable, but IF is not necessarily linked to quality. The following example from the marine science field will support this view. The *Journal of the Marine Biological Association of the UK* (JMBA) has a publishing history of more than 120 yr (first published in 1887), having published key articles on marine science that are still cited (e.g. Garstang 1900). It has been considered among the core marine journals, characterised by its broad multidisciplinary scope and the high quality of its papers (Pudovkin 1993). Yet, in terms of ranking, it has remained below average in the marine and freshwater biology category ($n = 79$, min: 0.278, max: 3.444, median: 1.196) in the last 10 yr (mean $IF_{1997-2006}$ of JMBA \pm SD = 0.77 ± 0.115) and is currently ranked 60th out of 79 journals (source: ISI Web of Knowledge; <http://portal.isiknowledge.com>).

Manuscript submission is always a matter of comparing journals (usually 2 to 3) to find the one most suitable to accommodate one's work. I believe that the prime criterion is unbiased: authors tend to select a journal based on whether its general scope covers the subject of the manuscript. Rapid and online handling might also be a priority especially for young non-English scientists. Transparent and fair editing and review processes are generally preferred. Surprisingly enough, editor and reviewer decisions have been reported to bias the scientific output for several reasons, including authors' nationality, language and gender (Møller & Jennions 2001, Buéla-Casal 2004, Budden et al. 2008, Lawrence 2007). Journal ranking based on IF comes next and, although it may not be the top priority (had that been so, all first submissions would have been to *Nature/Science* or at least to the top journal in the respective field), it is certainly among the factors that account for journal selection.

Some scientists prefer to submit to journals whose editorial policy is to invite the authors to suggest suitable referees. Longhurst (2007) maintains that this increases (in many cases guarantees) the chances of having the paper published and may end up with the same persons alternating as authors and reviewers—a situation termed 'in-group peer reviewing'. A final criterion, not crucial but certainly important, is online access, with open-access journals generally preferred because they provide a wider audience, more citations and thus, greater impact (Curti et al. 2001).

BRIEF CRITIQUE OF THE JOURNAL RANKING SYSTEM BASED ON IF

There is no doubt that the IF ranking system is a useful tool for comparisons among countries and institutions (e.g. Garfield 1993) as well as for publishers (e.g. Cameron 2005) in order to promote their journals. However, the first impression of young scientists when they come across the IF is that its estimation seems arbitrary because it is defined as the ratio of citations in 1 year to articles published during the 2 preceding years divided by the total number of articles published in the 2 preceding years. This means that if a journal publishes more articles in one year than in the previous one, then its IF declines, which is obviously an artefact. The IF system has several drawbacks that have been outlined in the past (Seglen 1997, Hecht et al. 1998, Colquhoun 2003, Cameron 2005), the detailed description of which is beyond the scope of this work. However, one thing that can and should be achieved is to correct the IF system among scientific disciplines because the number of scientists/articles/journals and thus the number of citations differ. Although the effect

of field size on IF has been described as a 'myth' (Garfield 1998, 2006), the median IF increases linearly, albeit weakly, with number of articles/journals published per field (graph not shown, data from ISI Web of knowledge). Thus, an IF of 2 is high for fisheries (n = 41, min: 0.176, max: 4.257, median: 1.051) but average for physiology (n = 75, min: 0.122, max: 31.441, median: 2.019) and low for cell biology (n = 156, min: 0.236, max: 31.354, median: 2.949) (source: ISI Web of knowledge). Where individual scientists are concerned, the journal IF may not be an adequate method for their evaluation because it does not account for the citations the articles themselves receive. An individual ranking system (personal impact factor), performed on an article basis, should be able to account for the numbers of pages (or number of words) and citations per year as well as the number of authors (already incorporated in the h-index: Batista et al. 2006) and the position of an author among them. Such indices can be easily adjusted on a field basis provided that mean (or median) values have been calculated.

My view is that the whole issue of journal ranking and IF is rather controversial. Is the worth of a single article in *Nature/Science* (ranked among the top journals) higher than 10 articles in journals ranked around 3 or even 30 articles in journals ranked around 1? I think that question is a matter of perception and will remain unanswered both theoretically and practically (when it comes to being employed).

Acknowledgements. I thank H. Browman and K.I Stergiou for the invitation to this Theme Section and for their thorough and constructive comments on an earlier version of this article. I am grateful to K.I. Stergiou for inspiring me to write this article and the fruitful debates regarding the 'impact factor issue'.

LITERATURE CITED

- Batista PD, Campiteli MG, Kinouchi O, Martinez AS (2006) Is it possible to compare researchers with different scientific interests? *Scientometrics* 68:179–189
- Bergstrom C (2007) Eigenfactor: Measuring the value and prestige of scholarly journals. *Coll Res Libr News* 68:314–316
- Bornmann L, Daniel HD (2005) Does the h-index for ranking of scientists really work? *Scientometrics* 65:391–392
- Budden AE, Tregenza T, Aarssen LW, Koricheva J, Leimu R, Lortie CJ (2008) Double-blind review favours increased representation of female authors. *Trends Ecol Evol* 23:4–6
- Buela-Casal G (2004) Assessing the quality of articles and scientific journals: proposal for weighted impact factor and a quality index. *Psychology Spain* 8:60–76
- Cameron BD (2005) Trends in the usage of ISI bibliometric data: uses, abuses, and implications. *Libraries and the Academy* 5:105–125
- Colquhoun D (2003) Challenging the tyranny of impact factors. *Nature* 423:479
- Curti M, Pistotti V, Gabutti G, Klersy C (2001) Impact factor and electronic versions of biomedical scientific journals. *Haematologica* 86:1015–1020
- Garfield E (1993) What citations tell us about Canadian research. *Can J Inf Libr Sci* 18:14–35
- Garfield E (1998) The use of journal impact factors and citation analysis for evaluation of science. 41st Annual Meeting of the Council of Biology Editors, Salt Lake City, UT. *The Scientist*, available at: [http://www.garfield.library.upenn.edu/papers/eval_of_science_CBE\(Utah\).html](http://www.garfield.library.upenn.edu/papers/eval_of_science_CBE(Utah).html)
- Garfield E (2006) The history and meaning of the journal impact factor. *J Am Med Assoc* 295:90–93
- Garstang W (1900) The impoverishment of the sea. *J Mar Biol Assoc UK* 6:1–69
- Harzing AWK, van der Wal R (2008) Google Scholar as a new source for citation analysis. *Ethics Sci Environ Polit* 8: 61–73
- Hecht F, Hecht BK, Sandberg AA (1998) The journal 'impact factor': a misnamed, mislead, misused measure. *Cancer Genet Cytogenet* 104:77–81
- Holden G, Rosenberg G, Barker K (2005) Bibliometrics: a potential decision making aid in hiring, reappointment, tenure and promotion decisions. In: Holden G, Rosenberg G, Barker K (eds) *Bibliometrics in social work*. The Howarth Social Work Practise Press, Binghampton, NY, p 67–92
- Lawrence PA (2007) The mismeasurement of science. *Curr Biol* 17:R583–R585
- Longhurst A (2007) Doubt and certainty in fishery science: Are we really headed for a global collapse of stocks? *Fish Res* 86:1–5
- Meho LI, Yang K (2007) Impact of data sources on citation counts and rankings of LIS faculty: Web of Science versus Scopus and Google Scholar. *J Am Soc Inf Sci Technol* 58(13):2105–2125
- Møller AP, Jennions MD (2001) Testing and adjusting for publication bias. *Trends Ecol Evol* 16:580–586
- Pauly D, Munro JL (1984) Once more on the comparison of growth in fish and invertebrates. *Fishbyte* 2:21–22
- Pauly D, Stergiou KI (2005) Equivalence of results from two citation analyses: Thomson ISI's Citation Index and Google's Scholar service. *Ethics Sci Environ Polit* 2005: 33–35. Available online at: www.int-res.com/articles/eseep/2005/E65.pdf
- Pudovkin AI (1993) Citation relationships among marine biology journals and those in related fields. *Mar Ecol Prog Ser* 100:207–209
- Seglen PO (1997) Why the impact factor of journals should not be used for evaluating research. *Br Med J* 314:497–502

Editorial responsibility: Howard Browman, Storebø, Norway and Konstantinos Stergiou, Thessaloniki, Greece

Submitted: October 9, 2007; *Accepted:* February 6, 2008
Proofs received from author(s): February 29, 2008