



EPS Statement

## On the use of bibliometric indices during assessment

V - 11 June 2012

Recent years have seen quantitative bibliometric indicators being increasingly used as a central element in the assessment of the performance of scientists, either individually or as groups, and as an important factor in evaluating and scoring research proposals. These indicators are varied, and include e.g. citation counts of individual papers published by researchers; the impact factors of the journals in which they publish; and measures that quantify personal research contributions over an extended period such as the Hirsch H-index, and variants with corrections such as the G-index.

Although the use of such quantitative measures may be considered at first glance to introduce objectivity into assessment, the exclusive use of such indicators to measure science “quality” can cause severe bias in the assessment process when applied simplistically and without appropriate benchmarking to the research environment being considered. Funding agencies are aware of this, nevertheless experience shows that the reviewing of both individuals and projects on the national and European level is still relying excessively on the use of these numerical parameters in evaluation. This is a problem of much concern in the scientific community, and there has been extensive debate and discussion worldwide on this topic (see for instance [1]).

Since the very first applications of bibliometric indicators in this way, scientists and science organisations have taken strong positions against such purely numerical assessment. Various organisations in Europe have published studies on their potential adverse consequences on the quality of funded scientific research. A prime example is the publication of the *Académie des Sciences of the Institut de France* that has presented clear recommendations on the correct use of bibliometric indices [2]. Other publications have addressed the role of peer review in the assessment of scientists and research projects e.g. the European Science Foundation *Peer Review Guide* published in 2011 [3] with recommendations for good practices in peer review following an extensive European survey on peer review practices [4]. Other recent examples are a study of peer review in publications by the Scientific and Technology Committee of the House of Commons in the UK [5], the peer review guide of the Research Information Network in the UK [6] and the recommendations formulated at a workshop dedicated to quality assessment in peer review of the Swedish Research Council [7].

A common conclusion of these studies is the recognition of the important role of **peer review** in the quality assessment of research, and the recommendation to apply bibliometric performance indicators **with great caution**, and only by peers from the particular discipline being reviewed.

The European Physical Society recognizes and takes note of these recommendations for unbiased assessment procedures, and emphasizes in the following those aspects that are particularly important (in some cases unique) in the context of the assessment of the performance of the work of physicists, and of the quality and originality of physics research projects.

1. Evaluation should exclusively be carried out by peers, who must be independent and must have no conflict of interest with the evaluation process. They must strictly respect a published code of conduct. Whilst recognizing the role of confidentiality in some forms of peer review, the names of evaluators should normally be made public, either before or after the assessment procedure as appropriate to the evaluation being carried out.

2. An unbiased assessment of the scientific quality of individual researchers or their projects using bibliometric indices must take into account many factors such as: the scientific content; the size of the research community; the economic and administrative context; and publishing traditions in the field. Publishing habits and traditions significantly vary between different fields of physics research, and are reflected for example in areas such as the name order in the list of authors and the particular choice of the journals in which to publish. A special example is publishing in the field of physics with large facilities where traditions are very different from many other fields. For example, accelerator physicists publish their work essentially in conference proceedings, while only a small percentage of their work appears in peer-reviewed journals. Another example is the publication policy of the large collaborations of physicists in the field of experimental particle and astroparticle physics. These collaborations apply strict procedures for the assessment and endorsement of results by every member of the collaboration prior to the internal publication of results. The external publication of results is also endorsed by the full collaboration. As a consequence of this policy, their articles in refereed journals often have long author lists published uniquely in alphabetical order.

3. The annually-published impact factors of refereed journals are averaged over many papers, and publishing in a high impact journal does not guarantee that every individual article is equally highly cited. Such quantitative measures based on the number of publications and/or citation statistics of researchers are one aspect of assessment, but they cannot and must not replace a broader review of researchers' activities carried out by peers.

The European Physical Society, in its role to promote physics and physicists, strongly recommends that best practices are used in all evaluation procedures applied to individual researchers in physics, as well as in the evaluation of their research proposals and projects. In particular, the European Physical Society considers it essential that the use of bibliometric indices is always complemented by a broader assessment of scientific content taking into account the research environment, to be carried out by peers in the framework of a clear code of conduct.

[1] <http://www.nature.com/news/specials/metrics/index.html>

[2] Institut de France, Académie des Sciences, Du Bon Usage de la Bibliométrie pour l'Évaluation Individuelle des Chercheurs, 17 January 2011  
(<http://www.academie-sciences.fr/activite/rapport/avis170111gb.pdf> - english version)

[3] European Science Foundation, European Peer Review Guide, Integrating Policies and Practices for Coherent Procedures, March 2011  
(<http://www.esf.org/activities/mo-fora/peer-review.html>)

[4] European Science Foundation, Survey Analysis Report on Peer Review Practices, March 2011  
(<http://www.esf.org/activities/mo-fora/peer-review.html>)

[5] Peer review in scientific publications, Science and Technology Committee, House of Commons, UK, 18 July 2011  
(<http://www.publications.parliament.uk/pa/cm201012/cmselect/cmsctech/856/85602.htm>)

[6] Peer review, A guide for researchers, Research Information Network, UK, March 2010  
(<http://www.rin.ac.uk/our-work/communicating-and-disseminating-research/peer-review-guide-researchers>)

[7] Swedish Research Council, Quality Assessment in Peer Review, 5 November 2009  
([www.cm.se/webbshop\\_vr/pdf/2011\\_01L.pdf](http://www.cm.se/webbshop_vr/pdf/2011_01L.pdf))