

Informed Peer Review and Uninformed Bibliometrics?

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Abstract

In the recent literature about the relation of bibliometric indicators and Peer Review the question is discussed whether bibliometric performance indicators can predict successful research grant applications and excellent future research performance. There is a broad spectrum of findings and answers. For example van den Besselaar and Leydesdorff (2007) report a strong correlation between low bibliometric performance and decline of corresponding grant applications. On the other hand Hornbostel et al. 2008 report a virtually equal bibliometric performance of approved and rejected applications. Melin and Danell (2006) present similar results. Based on the h-Indices of the applicants of the BIF (Böhringer Ingelheim Fonds) and also of the applicants of the Molecular Biology Organisation (EMBO) Heidelberg, Bornmann and Daniel (2006) find a correlation between higher values of the h-index and approval of the applications. Based on these findings in the present work a couple of questions is raised and corresponding bibliometric indicators are investigated and discussed. Due to the high quality of the basic data from the evaluation of the Emmy Noether-Programme (DFG) this study can also be used as a test of adequacy and reliability of the bibliometric indicators in the case of individual researchers.

Introduction and methodology

In preparation of the bibliometric analyses for the evaluation of the Emmy Noether Programme (DFG) (cf. Hornbostel et al. 2009) the publication lists of the approved (about 40%) and rejected applicants have been compiled and checked for completeness and consistency by the applicants. For equal treatment and comparability a publication period of four years before and after funding decision was chosen. For comparability with the corresponding Journal Impact Factor values as well as for an optimisation of the sample size for each publication a citation window of the publication year plus two subsequent years was chosen.

This high quality bibliometric can also serve as basis for tests of the validity and adequacy of the classical indicators of publication and citation performance as well as for the development of problem specific bibliometric indicators for the evaluation of individual researchers.

Research questions and hypotheses

In the preceding studies first the classical bibliometric indicators (for example number of publications (complete and fractional counting), citations per publication, h-Index) were investigated in four fields of research (human medicine, biology, chemistry and physics). In each field four samples (publications of approved and rejected applicants, publications before and after funding decision) were arranged. The corresponding bibliometric indicators for the samples showed no considerable difference between the funded and not funded applicants as well as the performance before and during the funding period. In the literature different findings concerning relations of funding decisions and bibliometric performance indicators are reported. This raises a couple of questions and hypothesis about the possible reasons of these differences.

A first sample of hypotheses concerns self-selection effects in the group of potential applicants. A second set of questions is about the complete set of information – also beyond bibliometric measures –

available as possible basis of the decisions for the reviewers and the question of the share of bibliometric information. Finally a third set of questions is concerned with possible bibliometric indicators for individual “qualities” like for example skills, persistence, decisiveness, independence and research experience.

Results and discussion

The basic data collected for the evaluation of the Emmy Noether-Programme (DFG) allow tests of adequacy and reliability of the classical bibliometric indicators in the case of individual researchers. The hypothesis that bibliometric indicators alone are not sufficient to make predictions about future success in research cannot be declined even if a strongly extended set of bibliometric indicators is investigated. However, publication and citation performance can be seen as a *conditio sine qua non* for a successful application, but the hypothesis that only bibliometric information flows into the decision processes can be declined.

The distributions of the values of bibliometric indicators possess characteristics that cannot be sufficiently covered by conventionally used parameters like for example mean, variance, skewness and kurtosis. For example the design of the funding instrument and explicit requirements for applications are reflected in the shape of the distributions but not necessarily in the sheer parameters.

Apart from measuring sheer research outputs adequate bibliometric indicators may reflect and indicate also individual “qualities” like for example skills, research experience, persistence or selectivity and decisiveness.

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