



SUPPLEMENTARY MATERIAL TO
**Efficiency in managing peer-review of scientific manuscripts –
Editors' perspective**

OLGICA NEDIĆ^{1*}, IVANA DRVENICA², MARCEL AUSLOOS^{3,4}
and ALEKSANDAR DEKANSKI⁵

¹*Institute for the Application of Nuclear Energy – INEP, University of Belgrade, Banatska 31b, Belgrade, Serbia,* ²*Institute for Medical Research, University of Belgrade, Dr Subotica 4, Belgrade, Serbia,* ³*School of Business, University of Leicester, University Road, Leicester, United Kingdom,* ⁴*Group of Researchers for Applications of Physics in Economy and Sociology (GRAPES), rue de la Belle Jardiniere 483, Angleur, Belgium and* ⁵*Institute of Chemistry, Technology and Metallurgy, Department of Electrochemistry, University of Belgrade, Karnegijeva 4, Belgrade, Serbia*

J. Serb. Chem. Soc. 83 (12) (2018) 1391–1405

MODEL DETAILS

Seven multiple-choice questions comprised a model questionnaire to assess the efficiency (Table S-I). For 6 questions, a choice of 4 responses is available, indicating different levels of efficiency (Table S-I, questions 1–6). The efficiency interval limits for each response were determined empirically.

Since the absolute number of managed articles significantly varies between journals, in order to compare data between editors and journals, responses to questions are expressed as portions of the total number of processed articles. Thus, responses to 5 questions (1–4 and 6) relied on objective data, as they can be measured. The response to the question number 5 relies more on the subjective impression of the editor.

To each answer, defining a certain level of efficiency, a “weight factor” (*WF*) is assigned enabling the transformation of the data into simple numbers which can be further statistically analysed. For example, for the question “How many reviewers do you invite in the first round?”, if the answer is >4, this response is assigned *WF* = 1 (*WF*1) indicating the lowest level of efficiency; if the answer is 1 or 2, this response is assigned *WF* = 4 (*WF*4) indicating the highest level of efficiency. In general, *WF* = 4 recognizes the most efficient occurrence, indicating the least employment of editorial resources in order to manage submitted articles (such as the number of invitations to reviewers and the actual number of responses, the number of adequate reports, and the time needed to obtain them).

In the last question (Table S-I, question 7), the method used for finding reviewers is taken into consideration. More than one qualitative answer can be chosen; there are no *WF*s for it. Finally, in order to evaluate how the duration of the editorial activity influences the peer-review efficiency, a question on how long the person has been an editor is introduced.

* Corresponding author. E-mail: olgica@inep.co.rs

An on-line survey was constructed with two parts: I and II; editors were invited to participate by e-mail. After the first call, a reminder was sent 2 weeks later to those who did not respond and, again, 2 weeks later. After the third call, no more answer was requested nor received. The survey started on November 1, 2015 and lasted for 6 weeks (general information on journals was collected in October 2015).

TABLE S-I. Seven multiple-choice questions used to estimate peer-review efficiency; for 6 questions only one quantitative response could be chosen; each response was assigned a weight factor (*WF*); for the 7th question more than one qualitative response could be chosen and there were no *WFs*

| Question | Weight factor (<i>WF</i>) | | | |
|--|---|------------------------------------|--------------------|-----------------|
| | 1 | 2 | 3 | 4 |
| 1. How many reviewers do you invite in the first round? | >4 | 4 | 3 | 1-2 |
| 2. What is the portion of manuscripts for which a second round of reviewer invitation is needed? | >60 % | 41–60 % | 25–40 % | <25 % |
| 3. What is the portion of invitations to reviewers without response? | >60 % | 41–60 % | 25–40 % | <25 % |
| 4. What is the portion of inadequate reports? | >10 % | 6–9 % | 3–5 % | 1–2 % |
| 5. How do you estimate the quality of reports? | Predominantly poor | Equivalent number of good and poor | Predominantly good | Good |
| 6. How do you estimate the timeliness of report submission? | >10 days after deadline | <10 days after deadline | On time | Before deadline |
| 7. How do you search for reviewers? | I invite a colleague who was already a reviewer for this journal I invite a colleague who was an author of article in this journal I invite a colleague whom I know personally I use bibliographic databases (WoS, SCOPUS, Google Scholar, PubMed) I review manuscripts frequently by myself Other (please, state how) | | | |

I. In the first part of the questionnaire, the surveyed editors were asked to identify their editorial role. Editors-in-chief were further directed to general questions on the journal they manage, such as number of sub-editors, number of members in the editorial board, journal position in WoS or SCI database, number of printed articles per year, language of publication and mode of financing.

II. In the second part of the survey, all participants were asked about their personal practice and outcomes on several aspects which contribute to peer-review efficiency and depend on management skills of editors.

Calculation of peer-review efficiency

After assigning *WFs* to the answers (Table S-I, questions 1–6), an “overall efficiency” of the peer-review process managed by an editor can be calculated from his/her responses. The overall efficiency (*E*) of peer-review activity managed by one editor (or in one journal) is estimated in two ways. The first one results from the calculation of an arithmetic mean value (average *WF*) for the 6 *WFs* (*i.e.* responses to 6 questions) characteristic for a particular jour-

nal. The second efficiency measure takes into consideration the area (expressed in arbitrary units, AU) of the hexagon (drawn as a radar chart) constructed for each journal using its 6 individual *WFs*. The choice of axes for the hexagon construction follows the order of questions (from 1 to 6).

The overall efficiency (*E*) for each editor is, finally, expressed as the percentage of the maximal efficiency (E_{\max}). Two E_{\max} values are calculated, one for each approach for the data presentation: $E_{1\max}$ corresponding to the maximal arithmetic mean $WF = 4$ (*i.e.* all 6 individual *WFs* are 4), while $E_{2\max}$ is reached when the relative area of a hexagon is maximal (*i.e.*, defined by 6 *WFs* which are all equal to 4). Thus, two *E* values are calculated for each editor: E_1 from the mean *WF* and E_2 from the hexagon area.

Notice that when a journal is managed by only one editor, the calculated efficiency corresponds to the peer-review efficiency of this particular journal. When several editors are responsible for the peer-review process in the same journal, *WFs* are determined for each editor and then average *WFs* are calculated as mean values for that set of editors in order to obtain average *WFs* for the particular journal. Although this data processing reduces the accuracy to some extent, it is necessary to enable a comparison between different journals.

Study population to test a model

The number of chemical and chemistry-associated journals included in this study was 27. The list was made by using bibliographic databases: the Web of Science Core Collection (WoS) for extracting international journals referenced in InCites Journal Citation Reports (11 of them) and the Serbian Citation Index (SCI) for identifying journals referenced only in national citation index (16 of them). A scope and contents of more than 100 journals were investigated and the final list was made after checking topics of published articles (especially in journals without words “chemistry” or “chemical” in their titles). The information on each journal was initially searched for on its website (in October 2015), collecting the name(s) of editor(s) (in-chief and sub-editors). The most important filtering criterion for inclusion in the list was that journals are regularly published (over several years, including 2015). The list of journals is given in Table S-II (titles of some national journals are translated into English). The number of journals having only editor-in-chief is 12, whereas 15 journals are managed by an editor-in-chief and sub-editor(s). Seventeen journals publish articles only in English, 7 both in English and Serbian and 3 only in Serbian. The editorial population involved in the study is 70.

TABLE S-II. List of journals involved in the study, their referencing in InCites Journal Citation Reports (JCR) and the number of responses received through the survey

| Name of the journal (ISSN/eISSN) | Referencing in JCR Category (rank/number of journals) | Responses/ Invitations |
|--|--|---------------------------|
| Nuclear Technology and Radiation Protection (1451-3994 / 1452-8185) | Nuclear Science & Technology (25/34) | 1/1 |
| Thermal Science (0354-9836 / 334-7163) | Thermodynamics (25/55) | 2/4 |
| Chemical Industry and Chemical Engineering Quarterly (1451-9372 / 2217-7434) | Chemistry, Applied (48/72) Engineering, Chemical (89/135) | 1/4 |
| Hemijska industrija (Chemical Industry) (0367-598X / 2217-7426) | Engineering, Chemical (121/135) | 6/9 |
| International Journal of Electrochemical Science (– / 1452-3981) | Electrochemistry (21/28) | 1/1 |
| Journal of Medical Biochemistry (1452-8258 / –) | Biochemistry & Molecular Biology (257/290) | 1/2 |

TABLE II. Continued

| Name of the journal (ISSN/eISSN) | Referencing in JCR Category (rank/number of journals) | Responses/ Invitations |
|---|---|---------------------------|
| Journal of Mining and Metallurgy, Section B: Metallurgy (1450-5339 / 2217-7175) | Metallurgy & Metallurgical Engineering (35/74) | 1/2 |
| Journal of the Serbian Chemical Society 0352-5139 / 1820-7421 | Chemistry, Multidisciplinary (114/157) | 14/16 |
| Kragujevac Journal of Science (1450-9636 / 2466-5509) | Uncategorized | 1/1 |
| MATCH Communications in Mathematical and in Computer Chemistry (0340-6253 / -) | Chemistry, Multidisciplinary (80/157) Computer Sci. Interdisc. Appl. (45/102) | 2/2 |
| Science of Sintering (0350-820X / 1820-7413) | Mathematics, Interdisc. Appl. (28/99) Materials Science, Ceramics (14/26) Metallurgy & Metallurgical Eng. (49/74) | 1/2 |
| Vojnotehnički glasnik (Military Technical Journal) (0042-8469 / 2217-4753) | - | 1/1 |
| Facta Universitatis - Series: Physics, Chemistry and Technology (0354-4656 / -) | - | 2/2 |
| Hemijski pregled (Chemical Overview) (0440-68267 / -) | - | 1/1 |
| Acta Periodica Technologica (1450-7188 / 2406-095X) | - | 1/2 |
| Arhiv za farmaciju (Archive for Pharmacy) (0004-1963 / 2217-8767) | - | 1/2 |
| Bakar (Copper) (0351-0212 / -) | - | -/1 |
| Metallurgical and Materials Engineering (2217-8961 / -) | - | -/1 |
| Processing and Application of Ceramics (1820-6131 / 2406-1034) | - | 1/1 |
| Reciklaža i održivi razvoj (Recycling and Sustainable Development) (1820-7480 / 2560-3132) | - | 2/3 |
| Savremene tehnologije (Advanced Technologies) (2217-9712 / -) | - | 1/1 |
| Scientific Technical Review (1820 0206 / -) | - | 1/2 |
| Svet polimera (World of Polymers) (1450-6734 / -) | - | -/1 |
| Tehnika (Technics) (0040-2176 / 2560-3086) | - | 3/3 |
| Voda i sanitarna tehnika (Water and Sanitary Technics) (0350-5049 / -) | - | 1/1 |
| Zaštita materijala (Material Protection) (0351-9465 / 2466-2585) | - | 3/3 |
| Zbornik Matice srpske za prirodne nauke (Matica Srpska Journal of Natural Sciences) (0352-4906 / -) | - | 1/1 |

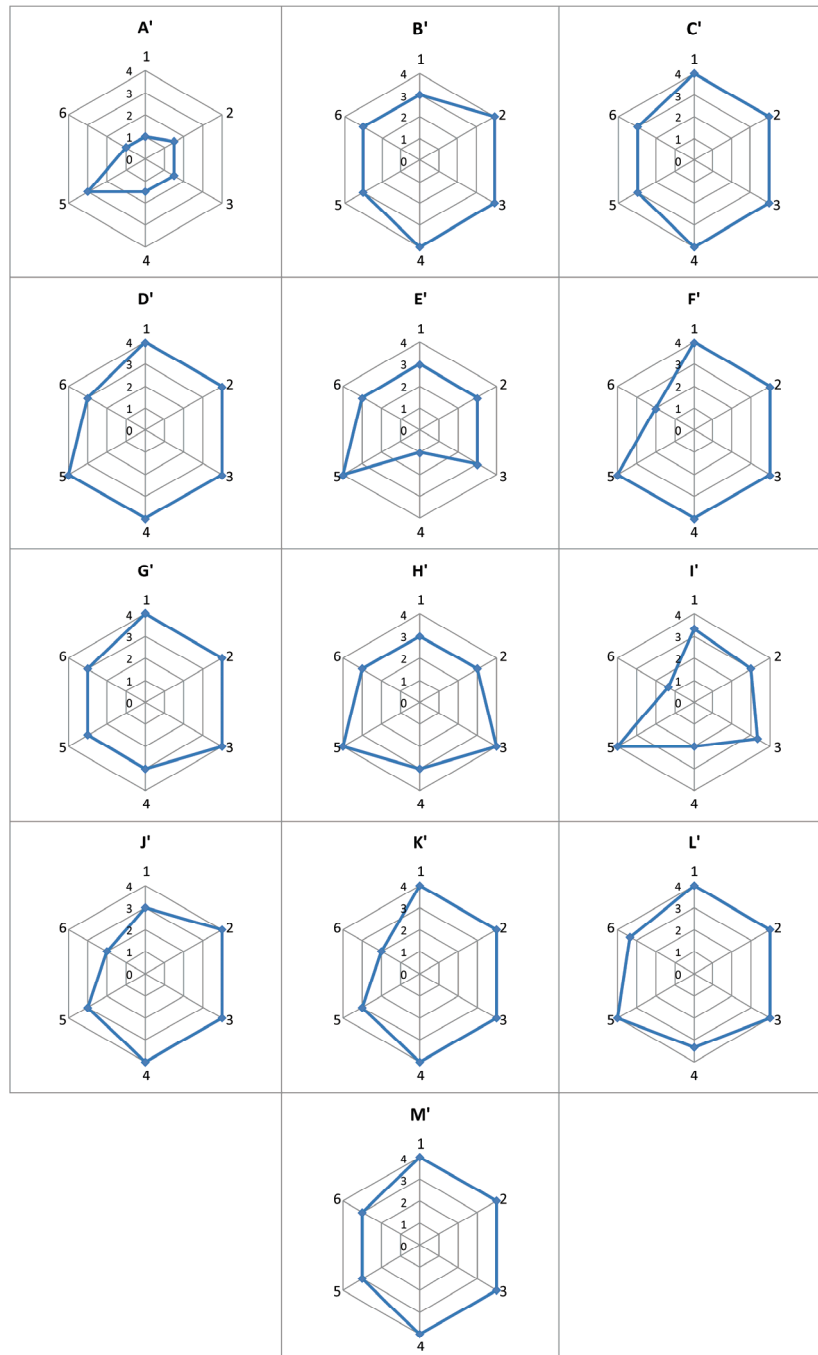


Fig. S-1. Efficiency (E_2) of the peer-review process in SCI journals, estimated via hexagon construction, using a 6 weight factor scheme for each journal (A'–M').