

# Peer-review efficiency as estimated by editors of scientific journals

*Olgica Nedić, Ivana Drvenica, Marcel Ausloos and  
Aleksandar Dekanski*

- Rate of information generation ↑↑↑
- Number of researchers, studies and papers ↑↑↑
- Number of journals, published pages, individuals involved in editorial activity ↑
- Editors develop strategies
- The aim of the study: to investigate efficiency in scientific reviewing seen by journal editors
- Suggest measures for improvement?

- Journals (from Serbia) regularly publishing articles in the field of chemistry and associated disciplines
- 28 journals: 11 international, 17 national
- 20/28 managed only by editor-in-chief
- Editorial population: 70
- Responses: 24/28 journals, 50/70 editors (22 + 28)
- Two parts of the questionnaire

Name of the journal	Referencing in WoS database
Nuclear Technology and Radiation Protection	Nuclear Science & Technology (25/34)
Thermal Science	Thermodynamics (25/55)
Chemical Industry and Chemical Engineering Quarterly	Chemistry, Applied (48/72), Engineering, Chemical (89/135)
Hemijska industrija (Chemical Industry)	Engineering, Chemical (121/135)
International Journal of Electrochemical Science	Electrochemistry (21/28)
Journal of Medical Biochemistry	Biochemistry & Molecular Biology (257/290)
Journal of Mining and Metallurgy, Section B: Metallurgy	Metallurgy & Metallurgical Engineering (35/74)
Journal of the Serbian Chemical Society	Chemistry, Multidisciplinary (114/157)
Kragujevac Journal of Science	Uncategorized
MATCH Communications in Mathematical and in Computer Chemistry	Chemistry, Multidisciplinary (80/157), Comp. Sci., Interdisc. Appl. (45/102)
Science of Sintering	Materials Science, Ceramics (14/26), Metallurgy & Metall. Eng. (49/74)
Vojnotehnički glasnik (Military Technical Journal)	
Facta Universitatis - Series: Physics, Chemistry and Technology	
Hemijski pregled (Chemical Overview)	
Acta Periodica Technologica	
Arhiv za farmaciju (Archive for Pharmacy)	
Bakar (Copper)	
Metallurgical and Materials Engineering	
Processing and Application of Ceramics	
Reciklaža i održivi razvoj (Recycling and Sustainable Development)	
Savremene tehnologije (Advanced Technologies)	
Scientific Technical Review	
Svet polimera (World of Polymers)	
Tehnika (Technics)	
Voda i sanitarna tehnika (Water and Sanitary Technics)	
Zaštita materijala (Material Protection)	
Zbornik Matice srpske za prirodne nauke (Matica Srpska Journal of Natural Sciences)	
Acta Periodica Technologica	

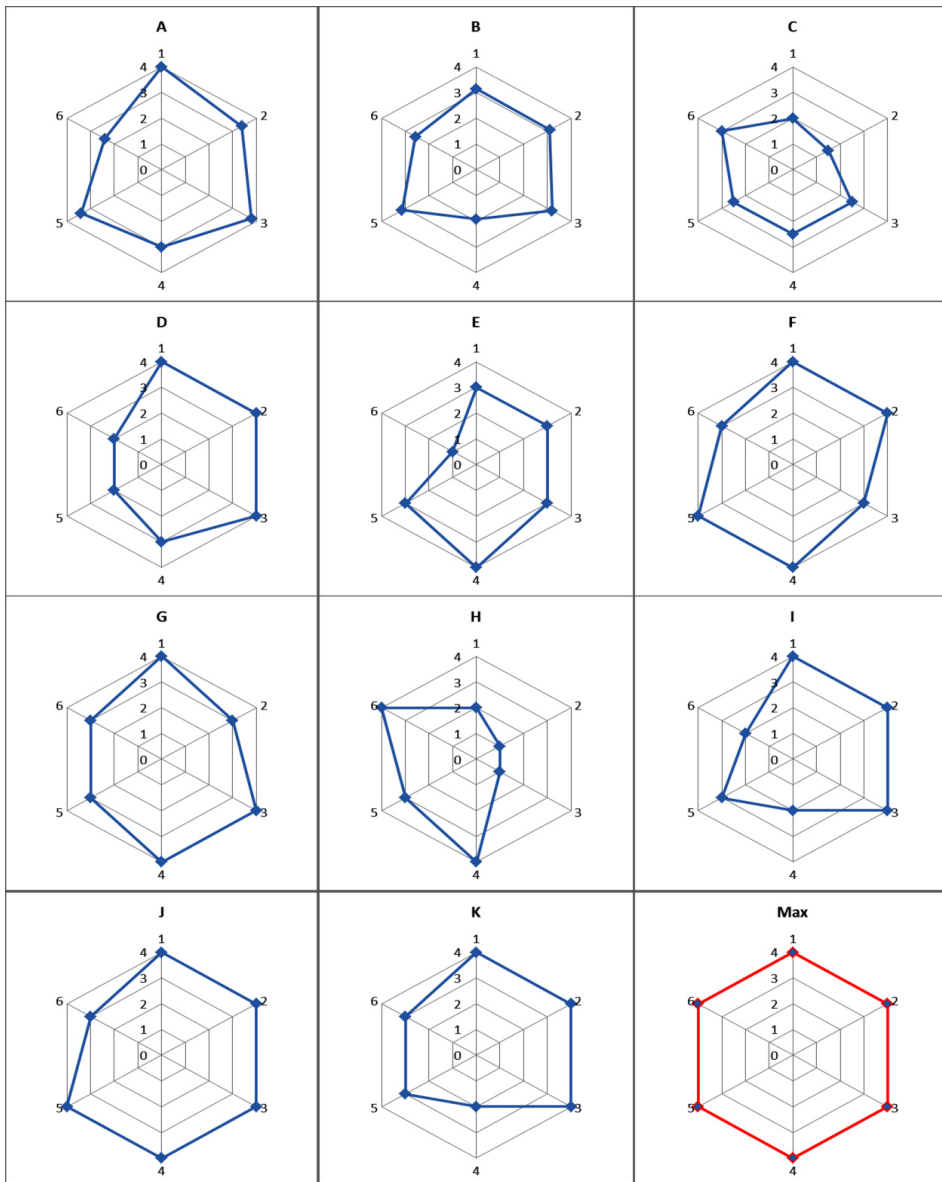
Parameter/Weight factor	WF1	WF2	WF3	WF4
Number of reviewers invited in the first round	>4	4	3	1-2
Portion of manuscripts for which a second round of reviewer invitation is needed	>60%	41-60%	25-40%	<25%
Portion of invitations to reviewers without response	>60%	41-60%	25-40%	<25%
Portion of inadequate reports	>10%	6-9%	3-5%	1-2%
Quality (competence) of reports	Predominantly poor	Equal number of good and poor	Predominantly good	Good
Timeliness of report submission	>10 days after deadline	<10 days after deadline	On time	Before deadline
How do you search for reviewers?				
I invite a colleague who was already 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 scientific databases (WoS, SCOPUS, Google Scholar, PubMed)				
I review manuscripts frequently by myself				
Other (please, state how)				

- WF = 4: the most efficient occurrence – the least employment of editorial resources
- The overall efficiency of peer-review estimated in 2 ways:  
arithmetic sum/mean value for 6 individual WFs - E1  
figure area of a hexagon (drawn as a radar chart) - E2
- Average WFs for journals with several editors
- Data analysis:  
international journals  
national journals  
subeditors in the *J. Serb. Chem. Soc.* (JSCS)  
together for all for the most relevant data

Journal	Number of reviewers invited in the first round	Portion of manuscripts for which a second round of reviewer invitation is needed	Portion of invitations to reviewers without response	Portion of inadequate reports	Quality (competence) of reports	Timeliness of report submission	Sum	Average	E <sub>1</sub> / %	Relative surface area of hexagon (AU)	E <sub>2</sub> / %
		Weight Factor									
A	4	3.4	3.8	3	3.4	2.4	20.0	3.33	83.25	28,5	68.51
B	3.1	3.1	3.2	1.9	3.1	2.6	17.0	2.83	70.75	22,5	54.09
C	2	1.5	2.5	2.5	2.5	3	14.0	2.33	58.25	14,2	34.13
D	4	4	4	3	2	2	19.0	3.17	79.25	26,1	62.74
E	3	3	3	4	3	1	17.0	2.83	70.75	20,8	50.00
F	4	4	3	4	4	3	22.0	3.67	91.75	34,6	83.17
G	4	3	4	4	3	3	21.0	3.50	87.50	31,6	75.96
H	2	1	1	4	3	4	15.0	2.50	62.50	16,9	40.62
I	4	4	4	2	3	2	19.0	3.17	79.25	26,0	62.50
J	4	4	4	4	4	3	23.0	3.83	95.75	38,1	91.59
K	4	4	4	2	3	3	20.0	3.33	83.25	29,0	69.71
Mean	3.46	3.18	3.32	3.13	3.09	2.64	18.82	3.135	78.386	26.21	63.000
SD	0.815	1.051	0.939	0.910	0.577	0.779	2.822	0.4710	11.7746	7.265	17.4660
CV	0.236	0.331	0.283	0.291	0.187	0.295	0.150	0.1502	0.1502	0.277	0.2772
Max	4	4	4	4	4	4	24.0	4.00	100.00	41,6	100.00

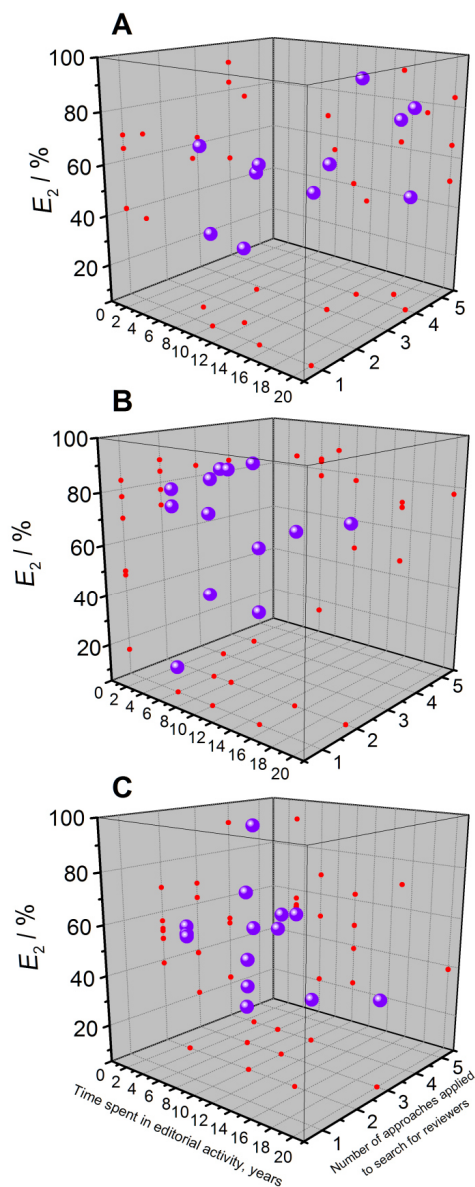
## Positive correlations between:

- number of reviewers invited and the portion of manuscripts for which a second round of invitation was needed
- number of reviewers invited and the portion of invitations without response
- number of reviewers invited and average WF
- E1 and E2



	National journals						Journal of the Serbian Chemical Society				
Journal	Sum	Average WF	E <sub>1</sub> / %	RSA AU	E <sub>2</sub> / %	Sub-editor	Sum	Average WF	E <sub>1</sub> / %	RSA AU	E <sub>2</sub> / %
A'	9.5	1.58	39.58	6.2	15.10	A''	17.0	2.83	70.75	20.7	49.76
B'	21.0	3.50	87.50	32.0	77.08	B''	12.0	2.00	50.00	8.7	20.91
C'	22.0	3.67	91.67	35.0	84.38	C''	23.0	3.83	95.75	38.1	91.59
D'	23.0	3.83	95.83	38.1	91.67	D''	18.0	3.00	75.00	22.1	53.12
E'	17.0	2.83	70.83	19.9	47.92	E''	17.0	2.83	70.75	21.6	51.92
F'	22.0	3.67	91.67	34.6	83.33	F''	20.0	3.33	83.25	29.0	69.71
G'	21.0	3.50	87.50	32.0	77.08	G''	15.0	2.50	62.50	16.0	38.46
H'	20.0	3.33	83.33	28.5	68.75	H''	15.0	2.50	62.50	16.0	38.46
I'	17.0	2.83	70.83	19.2	46.30	I''	19.0	3.17	79.25	26.0	62.50
J'	20.0	3.33	83.33	29.4	70.83	J''	17.0	2.83	70.75	19.9	47.84
K'	21.0	3.50	87.50	32.0	77.08	K''	20.0	3.33	83.25	28.6	68.75
L'	22.7	3.78	94.44	36.9	88.89	L''	17.0	2.83	70.75	20.4	49.04
M'	22.0	3.67	91.67	35.0	84.38	M''	12.0	2.00	50.00	9.5	22.84
						N''	18.0	3.00	75.00	23.4	56.25
Mean	19.86	3.309	82.745	29.14	70.215	Mean	17.14	2.856	71.393	21.43	51.511
SD	3.643	0.6085	15.1730	9.011	21.6659	SD	3.009	0.5007	12.5187	7.742	18.6102
CV	0.183	0.1839	0.1834	0.309	0.3086	CV	0.176	0.1753	0.1753	0.361	0.3613
Max	24.0	4.00	100.00	41.6	100.00		24.0	4.00	100.00	41.6	100.00

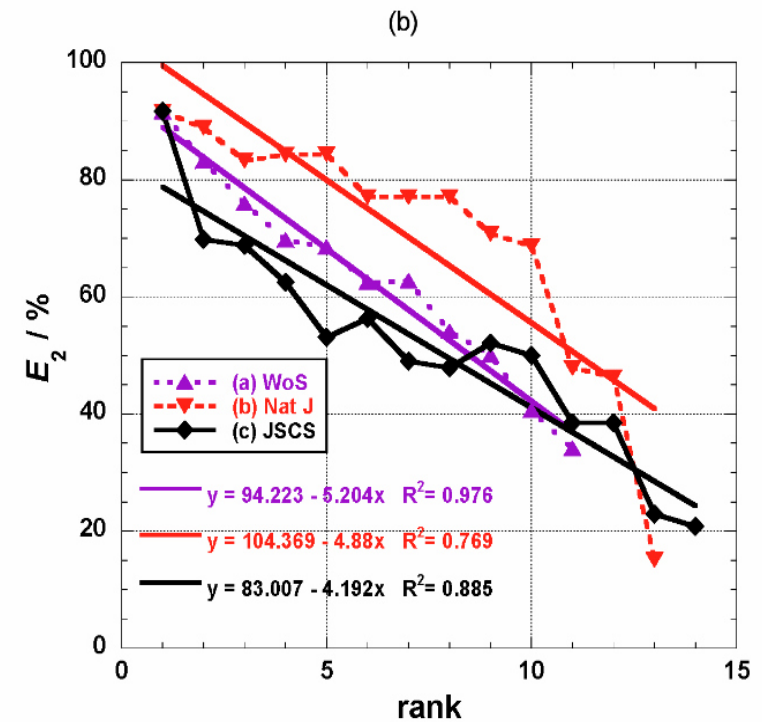
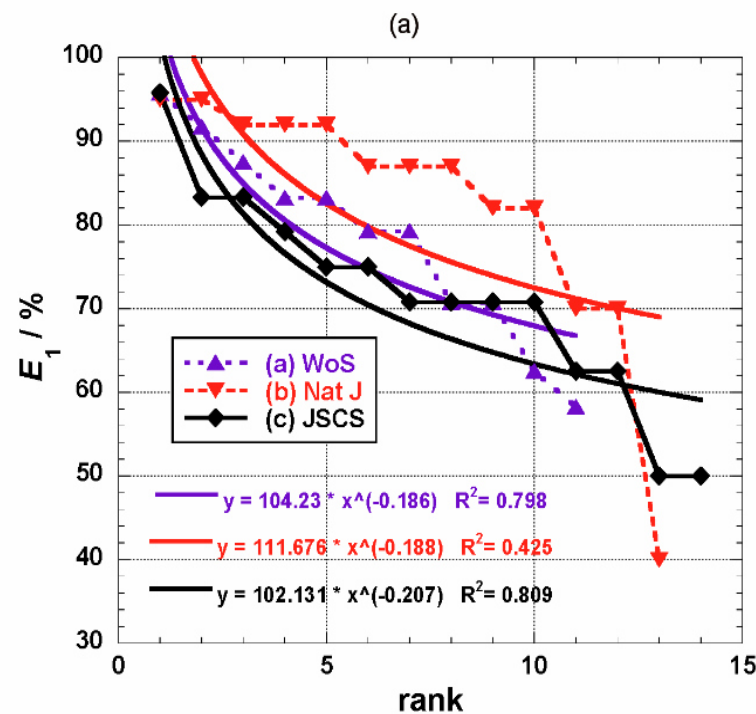
## Efficiency, time spent in editorial activity and number of approaches applied to search for reviewers



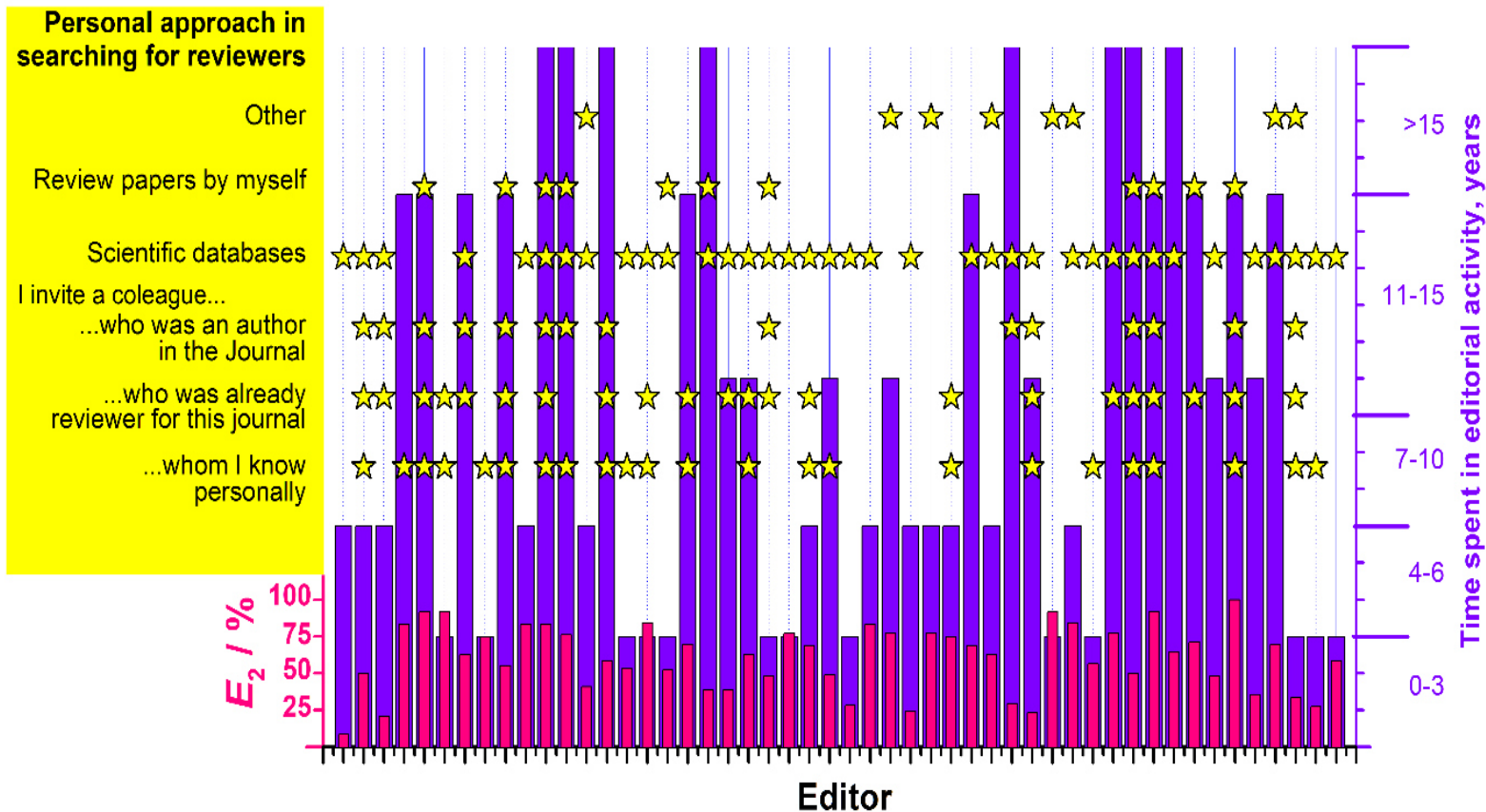
- **No correlation** between  $E$  values and the time spent in editorial activity
- **Positive correlation** between  $E$  values and the number of approaches applied to search for reviewers
- **No correlation** between  $E$  values and particular way(s) used to search for reviewers

## Testing coherence of E by rank-size low methodology (with “best fits”)

- Variation between editors in international and national journals is weak, subeditors in JSCS somewhat differ
- No model



## Cumulative data for all editors



- 37/50 use scientific databases
- 23/50 invite colleagues whom they know or who already reviewed
- 15/50 invite authors
- 11/50 review by themselves
- 8/50 employ other strategies

## Data interpretation

- Higher efficiency in national than in international journals → smaller number of papers, lower requirements?
- Distribution of data on subeditors in one journal somewhat different → editors manage editorial activity and evaluate its outcome mostly in an individual manner, regardless of the general journal policy?
- Positive correlation between number of reviewers invited in the first round and the portion of invitations without response → frequent invitation of “reliable” or “known” reviewers?
- Some answers relied on objective parameters, the one on the quality on subjective impression → greater dissatisfaction - more stringent criteria?
- There is no specific invitation pattern in searching for reviewers which results in more efficient peer-review process.
- Suggestions?