Should era of the impact factor end in Hungary?

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Introduction

Besides impact factor more and more scientometric indicators appear, and some of these seem to be prosperous. The aim of this presentation is to introduce briefly the situation of the Hungarian biomedical journals focusing on the scientometric novelties for example the expanse of Journal Citation Reports Web, Hirsch-index, Eigenfactor and SCImago Journal algorithms. And we would like to express the differences and similarities between Impact Factor and other scientometric indicators. It is important to mention that these indicators are based on citations.

Materials and Methods

There are well-designed, well-edited websites behind these scientometric indicators or they appear in well-known databases (Web of Science,Journal Citation Reports; Scopus). We searched for the data in these databases, and we arranged the biomedical journals in tables according to different points of view.
The first step was to check the Web of Science , Journal Citation Reports and the Scopus databases to see which Hungarian journals they contained, and then we checked what medical journals can be found in the databases. Furthermore, on the basis of the topics found in the databases we selected the medical journals and journals connected to medicine ranking them by the certain indicators. Thanks to this list, we could compare the main Hungarian medical journals by their performance. Naturally, the selection was subjective; however, we tried to make it in a holistic way. The information about the scientometric indicators based on algorithms was obtained from their websites. Because of the comparison we took into consideration the 2008 values. In the Journal Citation Reports Web issue we examined the IF, the 5-year IF, the Eigenfactor and the article influence evaluation. We watched Hirsch-index in Web of Science and Scopus, strictly in connection with Hungarian journals. SCImago Journal Rank (SJR) gains information from Scopus, therefore the SJR values appear on the website of SCImago and also in Scopus database. The data on the SJR homepage and that of found in Scopus database do not match completely. The first shows us among others h-index and the SJR values, while Scopus works with the SJR and SNIP values on its Sources link. The date of the retrievals in this presentation is May, 2010.

Impact Factor

So far, impact factor was considered dominant, because it is not used only for ranking journals, but in several scientific institutions when considering tenders IF is looked upon as the author's personal scientific indicator. Otherwise it should not be, because also the father of IF, Eugene Garfield warns us in his writings.
I think IF does not have to be introduced. Shortly: a quotient, that is based on the journals' average citations referring to the two previous years. The five-year IF includes the previous 5 years, as its name shows as well. Eigenfactor and Article Influence Score are new, algorithm based scientometric indicators, I will speak about them a little bit later. (1)

H-index

H-index has been more and more popular since 2005. It was invented by Jorge Hirsch, an American physicist (2). Hirsch wanted to make the measurement of individual scientific activity fairer. Not only individuals can have h-index, but also journals. Its popularity is

growing quickly: new versions appear in articles, and the h-index can be found in well-known databases as well (Web of Science, Scopus).
Its calculation is quite simple. We need to rank the author's publications or in this case rank the articles of a journal in a descending order by how many times each have been cited. The index of a researcher/journal is H, if H number of his/its articles has been cited at least H times, while the other publications have not been cited more than H times. It is important to mention that H-index cannot be greater than the sum of the publications. (3)

This question can come up: we should calculate the total citation in the case of journals like we do in the case of authors? Or we should calculate the citations of a concrete period? (4) Namely, how many times have the articles of a journal been cited in one year?

Web of Science database				**Scopus database**			
All years (1976-2010) h=18		**Year published 2008** h=2		**All years (1973-1975; 1996-2010)** h=12		**Year published 2008** h=2	
Publications	**Citations**	**Publications**	**Citations**	**Publications**	**Citations**	**Publications**	**Citations**
1.	46	1.	4	1.	31	1.	2
2.	41	**2.**	**2**	2.	23	**2.**	**2**
3.	38	3.	2	3.	23	3.	1
4.	31	4.	1	4.	19	4.	1
5.	28	5.	1	5.	16	5.	1
6.	26			6.	15		
7.	26			7.	15		
8.	21			8.	13		
9.	21			9.	13		
10.	20			10.	13		
11.	20			11.	13		
12.	20			**12.**	**13**		
13.	20			13.	12		
14.	19			14.	12		
15.	19			15.	11		
16.	18			16.	11		
17.	18			17.	11		
18.	**18**			18.	11		
19.	17			19.	11		
20.	17			20.	11		

Table I. H-index of *Acta Alimentaria*, the English-language Hungarian journal. Data from Web of Science (5) and Scopus (6) database.

Examples from both Web of Science and Scopus. If we search for a journal, it is quite easy to find out its h-index, if we arrange the list in a descending order. Table I shows h-index of the English language journal which is being published in Hungary, titled *Acta Alimentaria*. In Web of Science (5) h-index is 18 referring to all the years, while referring to 2008 it is 2. 1177 publications of Acta Alimentaria are indexed in WoS (there are 47 items from 2008). In Scopus (6) 644 publications are indexed (there are 45 items from 2008). H-index is 12 referring to all the years, while it is also 2 if we look at the year of 2008. This means that 18 and 12 articles in Web of Science and Scopus have been cited at least 18 and 12 times, respectively. In the other case, the articles published in 2008 have been cited at least twice. It is important to mention that h-index is hugely influenced by how many elements of the journal's articles are indexed in Web of Science and Scopus.

Appearance of PageRank among the other indicators

Besides impact factor, there are more and more alternatives as I have already mentioned, which have in common that they measure the quality of the journals' citations. There are journals with different quality, therefore the citations of the more prestigious journals should have count more. To determine potency, it is necessary to analyze the network of scientific journals by the help of a mathematic algorithm. These kinds of possibilities are for example Eigenfactor (Univ. of Washington), SCImago (univ.s of Spanish). These algorithms analyze the citation links between journals in iterative cycles in the same way as the Google PageRank algorithm. (3,7)

Eigenfactor

The Eigenfactor algorithm was developed by Carl T. Bergstrom and his team at the biology department of Washington university. A website in connection with it was launched in 2007 (8). They calculate 2 values, the Eigenfactor and the value of Article Influence. How do they work? Eigenfactor algorithm is similar to the method of Google. When ranking websites, the algorithm of Google takes it into consideration how many references the website has received and where the hyperlinks are come from. The algorithm of Eigenfactor works similarly, ranks the journals by citations, and emphasizes the citations by which journal contains them. (9) Its source, as mentioned above, is the Journal Citation Reports (JCR). The data of JCR contain also the citations of the journals. The base of Eigenfactor is that journals are ranked by their influence. A journal is prestigious if it is cited by other prestigious journals. It examines the given journal's citation in the previous five years. Maybe it is interesting to mention that the Eigenfactor algorithm tries to simulate the process when we collect all the available literature on a subject. We read different articles, see the bibliography of them and collect the relevant items. This algorithm determines the frequency of the probable time and the quantity of this process. (10) While Eigenfactor measures the prestige of journals, the Article Influence (AI) measures the influence of the articles. In this sense the value of AI is more convenient to be contrasted with impact factor. The prestige of a given journal, its Eigenfactor number has to be divided by the number of the articles in the journal. The average article influence number is 1. If the value is greater than one, the article is influential; if it is smaller than one, the article is less influential (11).
It is important to notice that Eigenfactor and AI ignore self-citations and journals publishing less than 12 articles (3, 12).

SCImago

The SCImago team consists of researchers from Spanish universities. They've constructed an algorithm to rank journals and countries. We would like to talk about the first option, namely the ranking of journals. The SCImago website was launched in December, 2007 (13). The algorithm gains information from Scopus (Eigenfactor's source is JCR). Scopus indexes more journals than JCR and there also more non-English language journals. SJR expresses the average number of weighted citations received in the given year by publications published in the journal in the three previous years. The value reflects the prestige of source, too. Its curiosity is that if you search for a certain journal, h-index also appears on the website. (3, 14) The calculation of h-index is explained above. SJR does not determine h-index for a certain year, but for all the indexed years. It is quite obvious that this value of h-index is greater than h-index referring to a certain year.

SNIP (Source Normalized Impact per Paper)

This indicator appears next to the journal titles of Sources in Scopus database, or you can search SJR or SNIP values at Scopus Info website. SNIP corrects for differences in the frequency of citation across research fields. It developed by Henk Moed at University of Leiden. (15)

Results

Table II shows Hungarian biomedical journals and journals connected to medicine from JCR, where we can see besides IF, the five-year IF, Eigenfactor and the value of Article Influence (1) Table III contains the Hungarian biomedical journals that can be found in Scopus database. We can see that it indexes a greater number of Hungarian journals than WoS. H-index and values connected to SCImago appear here. (6)

Abbreviated Journal Title	ISSN	{2008} Total Cites	Impact Factor	5-Year Impact Factor	{2008} Articles	Eigenfactor Score	Article Influence Score
Acta Aliment	0139-3006	319	0,441	0,534	43	0,00046	0,096
Acta Biol Hung	0236-5383	371	0,619	0,692	75	0,00089	0,188
Acta Physiol Hung	0231-424X	301	0,491	-	29	0,00034	-
Acta Vet Hung	0236-6290	417	0,624	0,664	56	0,00081	0,147
Acta Zool Acad Sci H	1217-8837	202	0,522	0,359	24	0,00030	0,104
Magy Allatorvosok	0025-004X	137	0,088	0,110	91	0,00010	0,009
Pathol Oncol Res	1219-4956	622	1,260	1,376	75	0,00162	0,336

Table II. Hungarian biomedical journals in JCR Web 2008 (1).

Title	ISSN	2008 SJR	H index	2008 SNIP	Total Docs. (2008)	Total Docs. (3years)	Total Cites (3years)	Citable Docs. (3years)	Cites / Doc. (2years)
Acta Alimentaria	1588-2535	0,039	11	0,311	45	151	68	140	0,43
Acta Biologica Hungarica	0236-5383	0,059	15	0,313	77	141	85	139	0,59
Acta Biologica Szegediensis	1588-385X	0,044	8	0,403	79	128	64	125	0,73
Acta Microbiologica et Immunologica Hungarica	1588-2640	0,083	11	0,291	29	77	50	75	0,5
Acta Pharmaceutica Hungarica	0001-6659	0,028	7	0,038	19	77	4	76	0,02
Acta Physiologica Hungarica	0231-424X	0,063	13	0,253	32	85	41	83	0,47
Acta Veterinaria Hungarica	0236-6290	0,051	16	0,450	56	152	85	151	0,57
Acta Zoologica Academiae Scientiarum Hungaricae	1217-8837	0,033	10	0,426	24	83	27	79	0,34
Fogorvosi szemle	0015-5314	0,032	3	0,061	26	96	17	96	0,16
Ideggyogyaszati szemle	0019-1442	0,039	14	0,100	50	165	37	161	0,21
Lege Artis Medicinae	0866-4811	0,028	3	0,081	191	222	18	208	0,09
Magyar Allatorvosok Lapja	0025-004X	0,029	7	0,120	100	237	15	229	0,05
Magyar Noorvosok	0025-	0,028	3	0,023	17	161	2	159	0

Lapja	021X								
Magyar Onkologia	0025-0244	0,041	5	0,130	48	108	24	107	0,24
Magyar Pszichologiai Szemle	1588-2799	0,030	1	0,027	30	26	1	25	0,04
Magyar Sebeszet	0025-0295	0,036	10	0,168	69	168	40	156	0,29
Mentalhigiene es Pszichoszomatika	1786-3759	0,028	1	0,111	16	15	2	15	0,13
Neuropsychopharma-cologia Hungarica	1419-8711	0,048	5	0,137	25	83	26	71	0,3
Orvosi Hetilap	0030-6002	0,035	10	0,129	318	1048	207	1008	0,21
Orvoskepzes	0030-6037	0,027	1	0,000	69	91	0	91	0
Orvostörténeti közlemények	0010-3551	0,027	1	0,000	11	22	0	22	0
Pathology Oncology Research	1219-4956	0,157	23	0,568	124	149	3.916	190	134
Psychiatria Hungarica	0237-7896	0,030	4	0,045	52	113	12	108	0,11

Table III. Hungarian biomedical journals in Scopus database (6).

In WoS, there are 7 Hungarian biomedical journals with IF. *Magy Allatorvosok* (~ Hung. Veterinary J.) is the only one in Hungarian. *Pathol Oncol Res* (POR) published by Springer, but it has Hungarian members of its editorial board and its editors-in-chief are Hungarian, too. POR has the highest IF, 5-Year IF, Eigenfactor and AI Score. The ranking of the journals is almost same at the IF, 5-Year IF, Eigenfactor and AI among the Hungarian periodicals.
In Scopus, there are 24 biomedical journals and periodicals connected to medicine. POR also appears here. There are 14 journals in Hungarian. POR has the highest SJR, SNIP and h-index. The next 4 journals with the highest SJR are Hungarian periodicals in English. You can see some differences among ranking of SJR, SNIP and h-index. For example, *Orvosi Hetilap*, the oldest weekly Hungarian language medical journal is the 11st at the SJR, the 12nd at the SNIP ranking and the 7th (with two others) at the h-index. *Acta Veterinaria Hungarica* is the 5th at the SJR, but the 2nd at the SNIP and the h-index. *Acta Physiologica Hungarica* is the 3rd at the SJR, the 5th at the h-index, but just the 8th at the SNIP. *Acta Microbiologica et Immunologica Hungarica* is the 2nd at the SJR, but just the 6th (with one other) at the h-index and the 7th at the SNIP. It is interesting that *Acta Zoologica Academiae Scientiarum Hungaricae* has the 3th ranking at the SNIP, but it is not in the first 5 items at the two others indicators.
POR has the highest ranking at the all metrics. Acta Alimentaria has the 4th or 6th rank and Acta Veterinaria Hungarica takes the the 2nd or 3rd place in general, but both journals have worse ranking at the SJR: Acta Aliment is the 9th, Acta Vet Hung is the 5th.
It is interesting to mention that Hungarian language *Ideggyogyaszati Szemle (Clinical Neuroscience)* is indexed by WoS. The journal has taken the first step to have IF.
Hungarian biomedical periodicals compare to the international biomedical journals do not reach the international standard at the different bibliometric indicators.

Discussion

More analyzes could answer for the question of the this paper's title. But it is clearly that the Hungarian journals need to strengthen their qualities. It is important to be indexed more international bibliographic databases. It can guarantee more visibility: the periodicals can get more citations and higher performance indicators. First of all the journals need to meet the international requirements in their form and content: e.g. abstracts in English, peer-reviewed

articles, regular appearance. The periodicals can publish on-line and in bilingual, Hungarian and English. Some Hungarian biomedical journals took this opportunity: the Hungarian medical journal, Orvosi Hetilap is published in English per month named *Clinical and Experimental Medical Journal*, or *Neuropsychopharmacologia Hungarica* has some English language articles besides the Hungarian ones. The Hungarian language journals are not easy position because many authors rather publish in international periodicals with high IF than in Hungarian journals. (16, 17) A few Hungarian indicators appeared, then disappeared. There is the so-called *Publication Points* performance indicator in Doctor Schools of some Hungarian universities, which is applied for the classification of the publications of Humanities, Sport and Social Sciences, where the IF is not considerable.

Conclusions

In Hungary the dominance of Impact Factor can be linked to two points of view. In one hand, journals can be ranked by it. On the other hand we can rate the individual performance of doctors, researchers, scientists, but even so, Eugene Garfield has stated several times that IF is not suitable to measure individual performances. In spite of Garfield's statements, it is used – also in Hungary – to rate individuals. This is the main problem. Why is IF so important? We have no answer to this question, but the other scientometric indicators can become its alternatives.

And it is important to emphasize that few of the Hungarian biomedical journals have IF, so these indicators can mean a new, alternative or the only one possibility to rate the Hungarian medical journals.

Abbreviations

AI = Article Influence
IF = Impact Factor
JCR = Journal Citation Reports
POR = Pathology & Oncology Research
SJR = SCImago Journal Rank
SNIP = Source Normalized Impact per Paper
WoS = Web of Science

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