The Current Situation of MDPI Publications ? Findings from the EU-27 Member States

Anna, Urbanovics
University of Public Service
urbanovics.anna@uni-nke.hu

Péter, Sasvári
University of Public Service, University of Miskolc
sasvari.peter@uni-nke.hu

ABSTRACT

The aim of this paper is to review the situation of mega-journal publishers in the 27 Member States of the EU, with a special focus on the case study of the Multidisciplinary Digital Publishing Institute (MDPI). Today's evolving higher education sector requires a research-oriented and competitive approach from universities, which puts increasing pressure on researchers to publish in internationally recognised journals. However, due to various barriers, traditional publishers, especially in the Big Five, are not equally accessible to researchers in the core and periphery regions, and it leads to a higher proportion of MDPI publications in the periphery countries. The analysis is based on an empirical comparative methodology using scientometric data. The results show a dynamic increase in the share of MDPI publications in the periphery countries, particularly in the Central and Eastern European region of the EU-27 Member State. The analysis discusses MDPI issues from a Hungarian perspective. However, the scientific value and credibility of MDPI in these countries is also a controversial issue from the perspective of higher education and research policy. The paper discusses some of the arguments, including the role of MDPI publications in maintaining competitiveness in international university rankings, APC charges, and recent changes in higher education in Hungary.

CCS CONCEPTS

• ; • **Social and professional topics**;

KEYWORDS

Scopus, Web of Science, European Union, MDPI, publication performance

ACM Reference Format:
Anna, Urbanovics and Péter, Sasvári. 2023. The Current Situation of MDPI Publications ? Findings from the EU-27 Member States. In *Central and Eastern European eDem and eGov Days 2023 (CEEeGov 2023), September 14, 15, 2023, Budapest, Hungary*. ACM, New York, NY, USA, 7 pages. https://doi.org/10.1145/3603304.3604071

1 INTRODUCTION

The communication of scientific results is essential for the development of each discipline, to summarise existing knowledge, and to explore new issues. The dominant form of scientific communication is the writing and publication of peer-reviewed, professionally reviewed, and authentic publications [9]. In parallel, these publications have become the basis for evaluating researchers' performance and their work. The number of publications, the quality of their place of publication, and their impact are closely related measurable indicators that also determine the success of researchers [6]. In parallel, scientific visibility is also coming to the fore, with the focus moving beyond the number of publications to the number of citations, and thus the scientific impact is also brought to focus. At the same time, it is also worth highlighting the emergence of the publish or perish principle [5], whereby those who do not publish in the right quantity and in the right place will fail [7]. In most cases, in international contexts, the term 'right place' is used to refer to publications that are included in the Web of Science (WoS) and Scopus databases, respectively.

Scientific visibility and competitiveness are the focus of several internationally significant processes. These include the emergence of global university rankings, which have become more important since the turn of the millennium, and the parallel emergence of a competitive approach to higher education. However, it is not enough to be ranked in international university rankings; it is necessary to maintain and improve one's position, and this has become a priority for many institutions. Most university rankings measure the performance of universities along three pillars, with research performance emerging as the most important [12]. This pillar is measured primarily in terms of publication and citation numbers along the lines of an international citation database. Among the rankings that attract the most media attention at the international level, the QS (Quacquarelli Symonds World University Rankings) and THE Times (Times Higher Education) rankings use the Scopus database (owned by Elsevier), while the ARWU (Shanghai Ranking's Academic Ranking of World Universities) ranking uses the Web of Science database (owned by Clarivate Analytics) in its methodology.

This process keeps authors under constant pressure to publish, allowing alternative publishing habits to emerge and gain prominence. One of these is the gradually expanding share of mega-journals in total publishing activity. The criteria for mega-journals are the following [3]:

- high publication volume,
- a review process that focuses only on scientific soundness,
- broad disciplinary focus or multidisciplinary focus,
- Open Access (OA) after payment of the APCs (Article Processing Charge),
- a fast review and publication process.

There is extensive literature on the issues surrounding mega-journals and their publishers (Figure 1), focusing on the following topics:

CEEeGov 2023, September 14, 15, 2023, Budapest, Hungary

ACM ISBN 979-8-4007-0006-4/23/09.
https://doi.org/10.1145/3603304.3604071

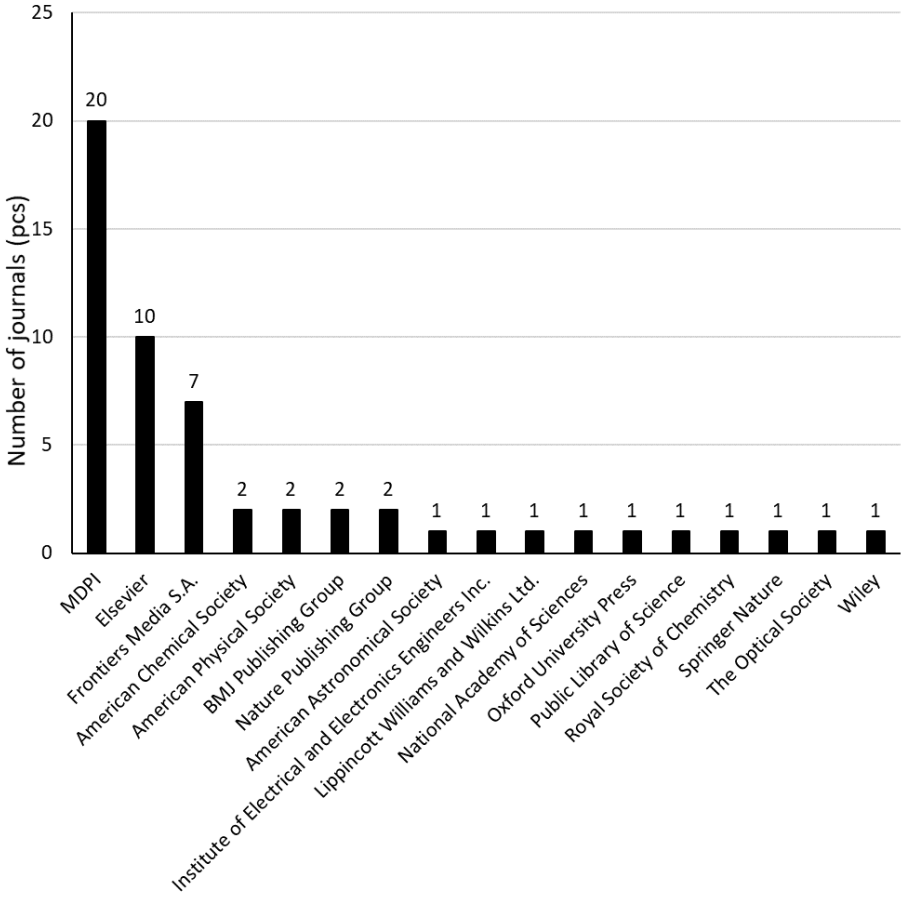

Figure 1: Breakdown of mega-journals with at least 3000 articles per year by publishers in 2021 (Own editing based on Scimagojr)

- the increasing volume of published papers [1, 2],
- the regional composition of the authors [18],
- a survey of authors' satisfaction with the publisher [13],
- publishers' and editors' perceptions of how journals are managed [16, 17],
- criteria for the review process [3, 14, 15],
- case studies focusing on specific journals [8, 16].

The aim of this study is to present the publication patterns of the EU-27 Member States, with a special focus on the situation of MDPI publishing. The study focuses especially in the Visegrad countries, choosing Hungary's case as a case study, due to the recent shift in its higher education shed light on a growing demand towards the MDPI publisher. After the introductory chapter, the methodology is presented, followed by the research results, and finally the conclusions and science policy issues are formulated.

2 THEORETICAL BACKGROUND – THE RISE OF MDPI

In Hungary, a highly controversial publisher is the Multidisciplinary Digital Publishing Institute (MDPI), a publisher of open access scientific journals. Founded by Shu-Kun Lin, MDPI currently publishes more than 390 peer-reviewed, open access, subscription-based journals. Between 2016 and 2021, the number of peer-reviewed articles published by MDPI increased significantly. The MDPI's strategy led to significant growth but also attracted criticism from the profession, alongside accusations of poor quality of publications and subordination of academic functions to commercial interests. MDPI was included in Jeffrey Beall's list of predatory open access publishers in 2014, but was removed the following year [11].

Csomós and Farkas [4] studied the rise of the MDPI publisher in the Central European region and in Hungary. Their results reveal several important aspects, some of which are worth highlighting:

- Central Europe is in a peripheral position compared to the Anglo-Saxon or more developed Western European countries of the core, which is a problem in that sense that they have a much lower chance of being published in the prestigious journals of traditional publishers,
- the scientific systems of these countries are on a similar development path, lagging far behind the core countries,
- their performance evaluation and promotion systems emphasise metrics-based assessment over prestige,
- authors are under constant pressure to publish.

An ideal solution to each of these problems is to publish in mega-journals, such as MDPI, because of the shorter turnaround time described above and the higher acceptance rate. In addition, it is difficult for institutions in these countries to find the resources to subscribe to the databases of the traditional, so-called Big Five publishers (Elsevier, SpringerNature, Taylor and Francis, Wiley and Sage), whereas in MDPI authors pay for the publication of their publications, which are then made openly available (Open Access). This is currently less costly for institutions at the system level.

At the same time, as Csomós and Farkas [4] put it, there are institutions (e.g., the University of Szeged) that have already introduced measures to reduce MDPI publications. In this case, the institutional budget has identified MDPI, among several other publishers, as a publisher whose APC costs cannot be paid from the institutional budget.

However, a concerted position from the Hungarian scientific community is still to be found, and this is ultimately a challenge for authors in developing their publication strategy.

3 METHODOLOGY

The main issue, and thus the framework of this study, is the writing of internationally indexed publications and their places of publication. However, in order to examine the world-renowned scientific publishers, it is necessary to be familiar with the Scopus and Web of Science databases, which are the basis of today's scientific performance measurement and their quality assurance processes.

Scopus is Elsevier's abstract and reference database, launched in 2004. In particular, it collects journals, books, conference papers and patents and creates a reference and abstract database for them. Scopus contains bibliographic data and abstracts of more than 75 million articles from over 25,000 peer-reviewed journals. Scopus considers publications from more than 7000 international publishers and maps 1.7 billion citations between documents.

Web of Science (WoS) is the world's most trusted publisher-independent global reference database. WoS (formerly known as the Web of Knowledge) is a site that provides subscription-based access to multiple databases that provide comprehensive reference data across a wide range of disciplines. Originally created by the Institute for Scientific Information, it is now owned by Clarivate (formerly Thomson Reuters Intellectual Property and Science). WoS contains more than 171 million records and 1.9 billion references.

In the case of WoS and Scopus, data is automatically uploaded for specific journal articles, books, book chapters, and conference proceedings, with only the possibility for the author to correct the data. Scientific publishers can have their products indexed in the two citation databases as part of a complex quality assurance process, and the scientific impact of a given product (e.g., a journal) (number of publications and citations to publications) determines the rating. In both systems, indexed journals are divided into quartiles (Q). The journals in the top quartile (Q1; top 25%) are the most valuable in both institutional and individual performance measures. This is followed by journals in the Q2 (25-50%), Q3 (50-75%) and Q4 (bottom 25%) quartile. A given journal may be indexed across multiple disciplines and disciplines, and its quality classification may vary. In general, the leading journals in a given discipline will fall into the Q1 category.

In this study, we look at publishing activity in the EU Member States based on two groups of publishers, Big Five and MDPI. This, as discussed in the theoretical chapter, essentially defines two distinct paths of scholarly publishing today. While Big Five is a group of internationally recognised publishers providing the leading scientific platforms in most disciplines, MDPI is a publisher with a different business policy, expanding, and becoming increasingly important today.

We also examine the research and innovation performance of the EU and European countries, based on the annual European and Regional Innovation Scoreboards (EIS). This scoring system allows policy makers to assess the relative strengths and weaknesses of national research and innovation systems, monitor progress, and identify priority areas for improving innovation performance. Publication data can be seen as a measure of research and innovation performance.

4 RESEARCH RESULTS

Before analysing publication activity by publisher, it is worth looking at the evolution of indexed publications in each EU Member State, both based on Scopus and WoS databases. Countries can be ranked according to these data, as shown in the graph. Due to the different sizes of the countries, we look at the specific indicator (number of publications per million persons).

The WoS indexed publications per 1 million persons show Denmark (5545), Sweden (4372) and the Netherlands (3977) in first place (Figure 2). The abbreviations in the figure are: Austria (AT), Belgium (BE), Bulgaria (BG), Cyprus (CY), Czech Republic (CZ), Denmark (DK), Estonia (EE), Finland (FI), France (FR), Greece (GR), Netherlands (NL), Croatia (HR), Ireland (IE), Poland (PL), Latvia (LV), Lithuania (LT), Luxembourg (LU), Hungary (HU), Malta (MT), Germany (DE), Italy (IT), Portugal (PT), Romania (RO), Spain (ES), Sweden (SE), Slovakia (SK), Slovenia (SI).It shows that the countries of Central and Eastern Europe are at the end of the ranking. Hungary is only 24th on this list (1240 pieces per million persons). 12,123 publications indexed by WoS by Hungarian authors were published in 2020. Of which 82% were journal articles and 68% were open access publications.

A similar picture to WoS emerges for the publications indexed by Scopus (Figure 3). Denmark and Sweden still lead the ranking, with Finland in third place. We can see that the Central and Eastern European countries are also at the end of the list, with Hungary ranked 25th out of the 27 countries with 1347 publications per million persons. In 2020, Hungarian authors contributed to 13,168 Scopus-indexed publications, of which 76% were journal articles.

When comparing the EIS and the specific WoS data, it quickly becomes apparent that there is a strong relationship (R^2=0.7122) between the two indicators (Figure 4). Again, it can be seen that the Central and Eastern European countries have a weaker EIS score, while Denmark, Sweden, Finland, and the Netherlands lead the EU Member States with a particularly strong EIS score. So, the innovation potential of a given country and its internationally ranked publication activity are closely related.

When examining publication trends by publisher, we focus in particular on the dynamics of MDPI and Big Five publishers. It is worth pointing out that, as discussed in the theoretical chapter, the

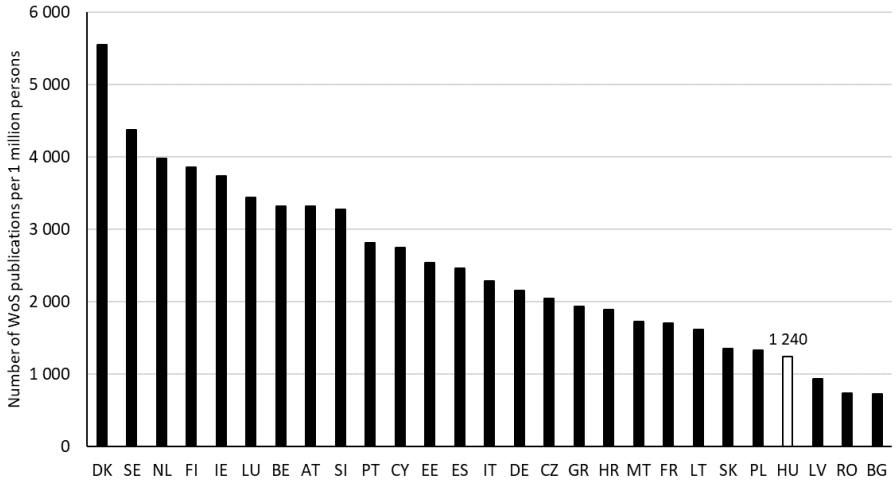

Figure 2: Population share of publications indexed by Web of Science in the European Union countries in 2020 (Own editing based on Web of Science data)

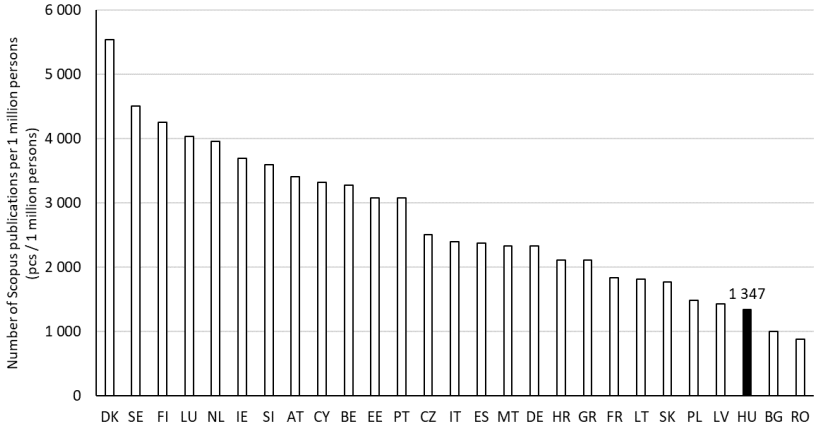

Figure 3: Population share of publications indexed by Web of Science in the European Union countries in 2020 (Own editing based on Scopus data)

countries of the Central and Eastern European region in particular are under strong pressure to catch up with international trends. This provides a breeding ground for the MDPI, whose role is becoming increasingly important.

*MDPI is the market leader among Scopus publishers.

This trend is also shown in Table 1, which shows that between 2016 and 2021 MDPI expanded significantly in most European countries, especially in Central and Eastern European countries. While in Western European countries, the share of publication published by MPDI does not even reach 10% of publications indexed by Scopus, in Romania this percentage is 32.1%. The share of MDPI publications is lowest in Denmark (5.7%) and the Netherlands (5.8%), which countries dominated both in terms of the share of internationally indexed publications per population and in terms of EIS values. In terms of the share of MDPI publications, the highest values are found in Romania (32.1%), Poland (26%), and Lithuania (24.9%). Regarding Visegrad countries, Poland (26%), Slovakia (22.5%), Hungary (16.2%), and the Czech Republic (15.1%) have the highest share of MDPI publications, indicating the quite important role of the publisher.

It is also worth looking at the relationship between Big Five and MDPI (Figure 5), which basically shows that the more developed Western European countries continue to publish in Big Five publishers, while MDPI has become more significant in the academic life of the Central and Eastern European countries. Although the share of Big Five is the lowest in Romania and Bulgaria, the share of MDPI is the highest in Romania.

5 CONCLUSIONS

The growing trend of publishing with MDPI publisher has made it a controversial issue. Experts have different views on the publisher's commercial policy and, most importantly, on its scientific impact

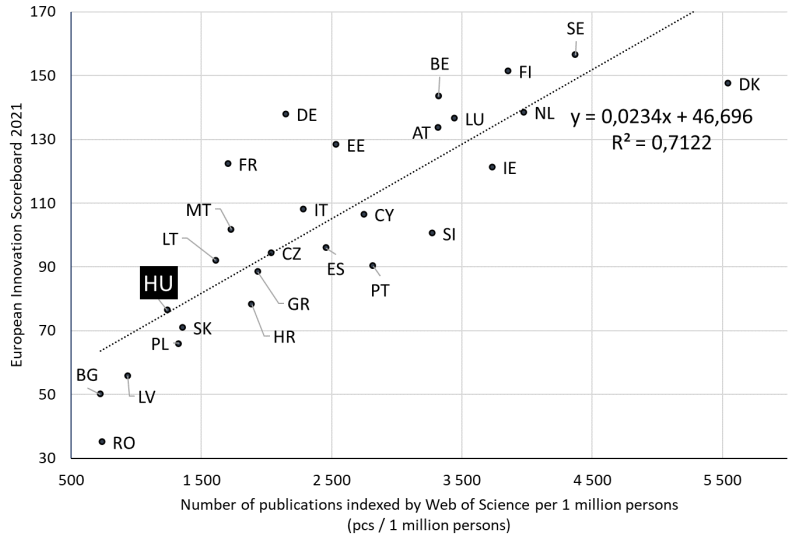

Figure 4: Relationship between the European Innovation Scoreboards and the population share of publications indexed by Web of Science (Own editing based on Web of Science data)

Table 1: Change in the share of MDPI journal articles by year in relation to total journal articles indexed by Scopus between 2016 and 2021 (Own editing based on Scopus data)

Number	CountryYear	Percentage of journal articles in MDPI					
		2016	2017	2018	2019	2020	2021
1	Denmark	0.8%	1.4%	2.3%	3.5%	5.3%	5.7%
2	Sweden	1.1%	1.5%	2.4%	4.0%	5.7%	6.6%
3	Netherlands	0.9%	1.3%	2.2%	3.4%	4.8%	5.8%
4	Finland	1.1%	1.7%	3.2%	4.8%	6.7%	7.8%
5	Ireland	1.1%	1.5%	2.6%	4.2%	5.7%	6.8%
6	Luxembourg	1.2%	1.9%	3.1%	4.0%	7.3%	8.9%
7	Belgium	1.1%	1.6%	2.7%	4.0%	6.1%	7.6%
8	Austria	1.3%	1.8%	3.4%	5.1%	7.6%	9.3%
9	Slovenia	1.2%	1.3%	3.1%	6.2%	12.3%	18.0%
10	Portugal	1.5%	2.2%	4.2%	7.3%	12.2%	16.2%
11	Cyprus	1.0%	1.9%	3.5%	5.3%	9.6%	11.1%
12	Estonia	1.1%	1.4%	3.7%	5.6%	10.5%	13.5%
13	Spain	1.5%	2.5%	4.4%	7.4%	12.4%	14.6%
14	Italy	1.6%	2.7%	4.3%	7.6%	12.3%	15.1%
15	Germany	1.0%	1.5%	2.6%	3.9%	cellcol-orD5D5D56.0	7.5%
16	Czech Republic	0.9%	1.5%	3.1%	6.1%	11.0%	15.1%
17	Greece	1.2%	2.2%	4.7%	7.6%	12.2%	16.5%
18	Croatia	0.8%	1.3%	2.4%	4.9%	9.9%	17.8%
19	Malta	1.5%	1.1%	2.1%	4.5%	8.1%	13.7%
20	France	0.8%	1.1%	2.0%	3.2%	5.2%	6.7%
21	Lithuania*	1.2%	2.5%	4.9%	9.3%	15.6%	24.9%
22	Slovakia*	1.0%	1.8%	3.6%	7.3%	14.7%	22.5%
23	Poland*	1.1%	1.9%	4.5%	9.1%	18.3%	26.0%
24	Hungary	1.0%	1.3%	3.1%	6.5%	11.5%	16.2%
25	Latvia	1.1%	1.4%	2.7%	4.6%	10.6%	20.5%
26	Romania*	1.4%	2.2%	4.2%	8.4%	17.1%	32.1%
27	Bulgaria	0.5%	0.8%	1.5%	3.6%	6.6%	12.7%

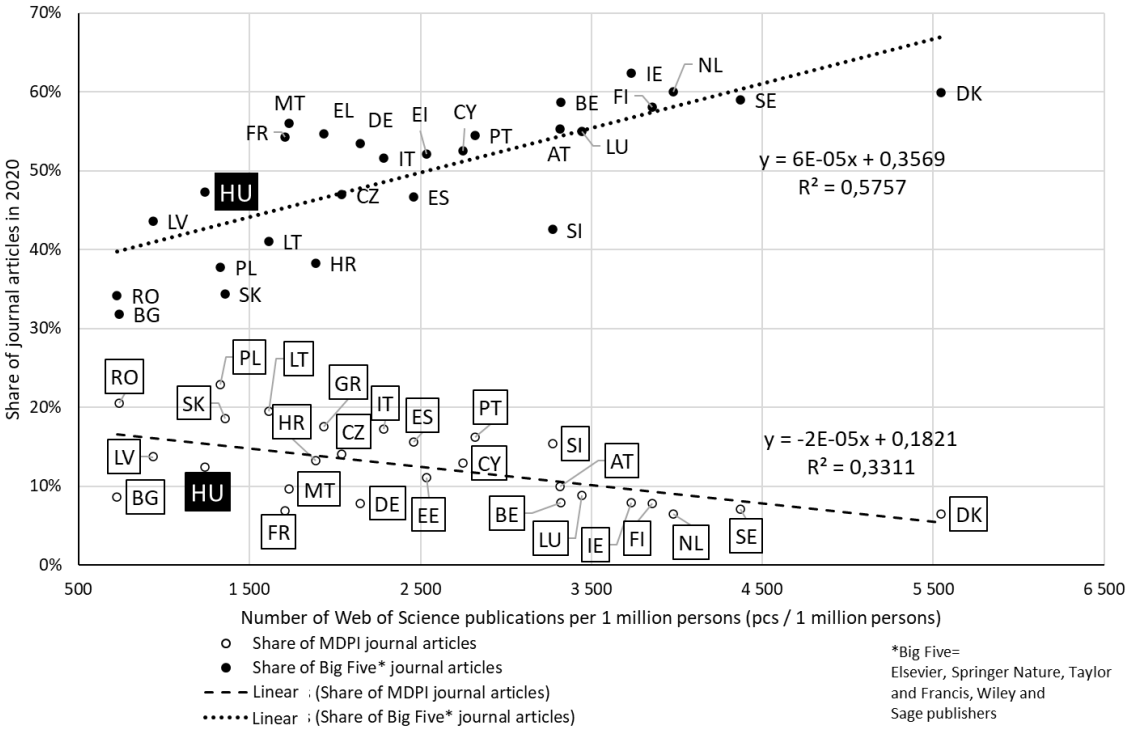

Figure 5: Share of journal articles of Big Five and MDPI publishers by country in 2020 (Source: Own editing based on Web of Science data)

and credibility. The results of the analysis show that two scientific communication channels have been split in recent years among EU Member States. While the Western European countries continue to publish in Big Five traditional publishers, the closing-up regions, in particular the Central and Eastern European countries, rely heavily on MDPI journals as a platform for publication. This trend raises important science policy issues, some of which we will try to highlight from the Hungarian perspective.

1. Under the change in the higher education model in Hungary, institutions can obtain certain state subsidies based on their performance. Performance measurement also sets indicators for publication activity, of which institutions can use the following [10]:

- total number of scientific publications of the institution in HSB,
- total number of scientific publications of the institution in HSB with WoS/Scopus identifier,
- total number of scientific publications of the institution in HSB that have been published in at least one journal ranked SJR Q2,
- the number of citations received in HSB for the institution's publications with WoS/Scopus identifiers published in the 5 years preceding the year in question, up to the number of citations received for WoS/Scopus identifiers published in the year in question.

According to the Scimago Journal Ranking list, 4 of the MDPI journals are ranked Q4, 14 ranked Q3, 101 ranked Q2, and 60 ranked Q1, which means that all of the indicators related to publication only (indicators 1, 2, and 3) can be met by publishing in MDPI journals, as almost 90% of their publications are ranked Q2 or higher.

2. The international university rankings have become a top priority, especially for institutions that are changing models, because they can gain a "ranking bonus" by maintaining or moving up in the rankings. Among the international university rankings, we looked at QS, THE Times, and ARWU rankings, all of which accept publications in MDPI journals.

3. However, in the case of individual promotion (habilitation, university full professor, doctorate of the Hungarian Academy of Sciences), there are already scientific committees that have excluded publishers of mega-journals, including MDPI, in their evaluation process. Here, therefore, institutional competitiveness and individual promotion represent two opposite poles, thus fragmenting the author's capacities. A similar dilemma is also at play in the case of national scientific excellence grants (e.g., Bolyai Fellowships), because a high proportion of the scholarship holders publish in MDPI journals.

However, among the countries of the region, Hungary is not the only one to have made progress in publishing in MDPI. The Czech Republic and Slovakia, which have successfully applied the direct funding model from a competitiveness perspective, also rely on MDPI publications to a significant extent. Therefore, the results also show that these countries do not communicate more through

the publication platforms preferred by Western European countries but use MDPI as an alternative communication channel. The basic problem is that institutions in these countries are largely unable to subscribe to the products of the Big Five publishers, which would provide authors with free publication if they subscribed to their databases. At the same time, it is currently preferable for these institutions to pay the publication costs of MDPI publications.

At this point, it is difficult to tell what measures can be taken in order to reduce the share of MDPI publications for the favour of articles published in respected traditional journals. The issue, as it was mentioned in the case of the University of Szeged, can be solved at an institutional level where the management of the university discourages the lecturers to hand their papers in to a publisher that generates so much controversy in the academic world. The problem can be regulated at a higher level by the Hungarian Academy of Sciences as it is the only scientific body in Hungary that compiles officially-approved, ranked journal lists for lecturers. Another solution can be the introduction of a career assessment system that does not take MDPI publications into account in the process of academic promotions. However, as long as grants and scholarships require lecturers to place their publications within a relatively strict timeframe, the temptation to choose MDPI as an alternative will always remain there.

Therefore, the present paper does not attempt to resolve the debates surrounding the MDPI publisher, but the authors aim to collect the dilemmas that may arise in some aspect of the argument for or against MDPI and similar publishers.

ACKNOWLEDGMENTS

The research was supported by the Network Science Research Group at the University of Public. Supported by the ÚNKP-22-3-II-NKE-28 New National Excellence Program of the Ministry for Culture and Innovation from the source of the National Research, Development and Innovation Fund.

REFERENCES

[1] Björk Bo-Christer. 2015. Have the 'mega-journals' reached the limits to growth?, PeerJ, Vol. 3, p. e981, https://doi.org/10.7717/peerj.981

[2] Björk Bo-Christer. 2018. Evolution of the scholarly mega-journal, 2006-2017, PeerJ, Vol. 6, p. e4357, https://doi.org/10.7717/peerj.4357.

[3] Björk Bo-Christer, Catani Paul. 2016. Peer review in megajournals compared with traditional scholarly journals: Does it make a difference? Learned Publishing, 29(1), 9–12. https://doi.org/10.1002/leap.1007

[4] Csomós György, Farkas Jenő Zsolt. 2023. Understanding the increasing market share of the academic publisher "Multidisciplinary Digital Publishing Institute" in the publication output of Central and Eastern European countries: a case study of Hungary. Scientometrics 128, 803–824 https://doi.org/10.1007/s11192-022-04586-1

[5] Dani Erzsébet. 2018. How "Publish or Perish" Can Become"Publish and Perish" in the Age of Objective Assessment of Scientific Quality, Systemics, Cybernetics and Ingormatics, 16 vol., 4 number, 20-25. pages, http://iiisci.org/journal/CV\protect\T1\textdollar/sci/pdfs/IP052LL18.pdf

[6] Duffy Meghan A. 2017. Last and Corresponding Authorship Practices in Ecology. Ecology and Evolution, 7, 8876−8887. DOI: 10.1002/ece3.3435, https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5677469/

[7] Juhász Attila, Alter Emese. 2021. Tudományos láthatóság és ragadozó folyóiratok a hazai felsőoktatásban, Tudományos és Műszaki Tájékoztatás, 68. évfolyam, 3-4 szám, 156-163. p. https://tmt.omikk.bme.hu/tmt/article/view/12949

[8] Krüger Dirk and Marshall Diana. 2017. Bite-size research: BMC research notes goes back to its roots, BMC Research Notes, Vol. 10 No. 95, 2pp., https://doi.org/10.1186/s13104-017-2418-y

[9] Magura Tibor. 2019. Paradigmaváltás szükségessége a tudományos teljesítmény értékelése során. Magyar Tudomány 180(2019)8, 1158–1165. https://doi.org/10.1556/2065.180.2019.8.6

[10] Sasvári Péter, Fejes Zsuzsanna. 2023. Publikációs lehetőségek Scopus által indexált folyóiratokba állam- és jogtudomány esetén Tudományos és Műszaki Tájékoztatás, 70 : 1 pp. 38-58. , 21 p. https://doi.org/10.3311/tmt.13209

[11] Sasvári Peter. 2022. A 2021-ben nyertes Bolyai János Kutatási Ösztöndíjban részesültek empirikus vizsgálata In: Koltay, András; Gellér, Balázs (szerk.) Jó kormányzás és büntetőjog : Ünnepi tanulmányok Kis Norbert egyetemi tanár 50. születésnapjára Budapest, Magyarország : Ludovika Egyetemi Kiadó, 608 p. pp. 551-567. , 17 p. http://hdl.handle.net/20.500.12944/18016

[12] Sasvári Péter, Urbanovics Anna. 2022. Négy magyar egyetem tématerület szerinti kockázatvizsgálata a QS szakterületi egyetemi rangsor szempontjából Magyar Tudomány 183 : 12 pp. 1561-1577. , 17 p. https://doi.org/10.1556/2065.183.2022.12.5

[13] Solomon David J. 2014. A survey of authors publishing in four megajournals, PeerJ, Vol. 2, p. e:365, available at: https://doi.org/10.7717/peerj.365

[14] Spezi Valerie, Wakeling Simon, Pinfield Stephen, Creaser Claire, Fry Jenny and Willett Peter. 2017. Open-access megajournals: the future of scholarly communication or academic dumping ground? A review, Journal of Documentation, Vol. 73 No. 2, pp. 263-283. p. https://doi.org/10.1108/JD-06-2016-0082

[15] Spezi Valerie, Wakeling Simon, Pinfield Stephen, Creaser Claire, Fry Jenny and Willett Peter. 2018. 'Let the community decide'? The vision and reality of soundness-only peer review in open-access mega-journals, Journal of Documentation, Vol. 74 No. 1, pp. 137-161. p. https://doi.org/10.1108/JD-06-2017-0092

[16] Wakeling Simon, Spezi Valerie, Creaser Claire, Fry Jenny, Pinfield Stephen and Willett Peter. 2017. Open access megajournals: the publisher perspective (part 2: operational realities), Learned Publishing, Vol. 30 No. 3, pp. 313-322. p. https://doi.org/10.1002/leap.1118

[17] Wakeling Simon, Spezi Valerie, Fry Jenny, Creaser Claire, Pinfield Stephen and Willett Peter. 2017. Open access megajournals: the publisher perspective' (part 1: motivations), Learned Publishing, Vol. 30 No. 3, pp. 301-311. p. https://doi.org/10.1002/leap.1117

[18] Wakeling Simon, Willett Peter, Creaser Claire, Fry Jenny, Pinfield Stephen and Spezi Valerie. 2016. Open-access mega-journals: a bibliometric profile, PLOS One, Vol. 11, p. e0165359, https://doi.org/10.1371/journal.pone.0165359