

SHORT REPORT

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The MDPIization of chilean science: a wake-up call about how we are conducting research and using public resources

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Abstract

MDPI, a rapidly growing mega-publisher, has significantly impacted scientific publishing with a large number of open-access journals covering all areas of knowledge. Fast publication times, numerous special issues, hundreds of guest editors, and incentives for reviewers contribute to its success. However, concerns have arisen about the quality of its peer-review process and the overall quality of its publications; these practices have led some countries to question the validity of MDPI publications for academic evaluations. MDPI's influence has surged in Chile, with publications rising from 1 to 13% between 2017 and 2023. While offering a solution to the “publish or perish” pressure, this growth has sparked a debate over the quality and sustainability of such publications. Public funding plays a significant role, with approximately 36% of MDPI papers in Chile financed by public funds through national research programs. This situation has raised concerns about the optimal use of these resources. Chilean science, renowned in South America, faces the challenge of maintaining high standards in the open-access era. The focus should be on quality over quantity to ensure impactful and innovative research contributions.

Keywords Chilean science, Open-access publishing, Peer review process, Scientific productivity

Overview

Most of us have published at least one paper in an MDPI journal. Due to the exponential growth of this Switzerland-based Chinese mega-publisher, exponentially increasing the number of active journals and published papers in a few years, it is just a matter of chance that

we have authored or co-authored at least one paper with them within the last decade. So far, MDPI has a portfolio of 457 journals covering almost every aspect of human knowledge, all published under the gold open access standard (i.e., authors must pay to publish while readers can freely read those articles). Of those, 236 journals have impact factors and are indexed in Web of Science, and many of them ranked in the first two quartiles (Q1 / Q2) with impact factors between 4.4 and 7.0 in its top 10%. Many of those newly arrived MDPI journals now have similar impact factors (IF) to well-respected journals with a long publication history (e.g., *Plants* reached an IF of 4.0 after being launched by MDPI in 2012, while *Plant Biology* has an IF of 4.2 despite being active since 1844). But what explains the success of MDPI journals? There are many possible answers to this question, but we name the main four: (1) fast publication times, given the

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workflow that MDPI has through their submission system and the very short deadlines for authors and reviewers, most papers are published within a month from submission; (2) Special issues (lots of them) that gather people working on similar subjects, which also increases citations and therefore their impact factors; (3) An army of guest editors (recruited in exchange of a free paper); and (4) Incentives to reviewers, this is one of the few publishers that give reviewers a monetary compensation for their work (delivered as vouchers that can be used for paying for their own MDPI papers, instead of real money).

Currently, researchers are under strong pressure from universities, research centers, and funders to publish their research due to a misinterpretation of the popularly known motto “publish or perish” [1]. Career promotions, project funding, and economic benefits (and sometimes salary) depend on evaluations in which publications are a critical aspect (frequently prioritizing quantity over quality). In this context, hyper-prolific researchers, who have an astonishing rate of production (particularly in MDPI journals), have emerged. However, not all that glitter is gold. Criticism regarding MDPI practices has increased over the last years, as serious doubts are cast upon the quality of the revision process because reviewers are recruited by non-academic editors (mainly based on previous turnaround times rather than by expertise or pertinence to the field). Also, editing that many special issues with external guest editors makes it difficult to maintain quality control of what is being published. Furthermore, paying (sort of) reviewers also generates interest conflicts, as it is not uncommon that some reviewers accept many papers per month with no or very few comments to harvest tens of vouchers to cover the article processing charges (APC hereafter) of their own papers. Additionally, as most papers published in MDPI journals are part of special issues, they have higher self-citation rates than other journals or than expected by chance, artificially increasing impact factors.

While MDPI has yet to be categorized as a predatory publisher, there are more and more doubts about the quality of their published papers. For example, questions

to MDPI have arisen beyond the academic sphere in Spain, highlighting some hyper-prolific researchers [2]. Thus, institutions in different countries (e.g., Norway, Finland, Denmark, or the Netherlands) do not consider MDPI papers valid for tenure-track processes and ranking researchers’ productivity, as they may not reflect work quality. Open-access journals were conceived to break down barriers to knowledge access but have also transformed into a significant revenue stream for publishers as APC values have rapidly increased (as happened with other publishers like Frontiers or PLoS that have experienced exponential growth by charging substantial fees to authors), putting pressure on researchers who must pay for them [3]. Unfortunately, researchers are also under pressure from universities and research centers to increase their productivity (to meet increasingly demanding indicators), which resulted in a very good business opportunity for publishers like MDPI, experiencing unprecedented growth by offering rapid publication times and undemanding reviews in exchange for payment. For example, in Spain, papers published in MDPI journals represented 0.9% by 2015, but it increased to 14.6% by 2021 [4, 5], with some institutions having up to 71% of all their papers published in MDPI journals [2].

The current scenario in Chile

Within this global context, we may wonder what is happening in Chile. During the late 1990s and the early 2000s, many private universities proliferated in Chile (and in other South American countries), allowing anyone to get a university degree. However, criticism of such universities raised many doubts about its quality (is it a déjà vu?). In response, an accreditation framework was created to ‘separate the wheat from the chaff’. Accreditation processes rely on several indicators used as a proxy of quality, and over time, it has led universities to put more pressure on their faculty to increase scientific production, sometimes beyond reasonable goals. On the other hand, increasing scientific production is essential to secure research funding, which becomes more competitive each year as applicants increase more rapidly than available resources. Thus, Chilean scientists are under much pressure to publish more, better, and faster, and MDPI offers a practical solution to this problem.

We searched the Web of Science database for all papers published in Chile between 2017 and 2023 to have an overview of the emergence of MDPI in Chilean science (we focused our search on large universities with accreditation granted for at least 5 years). MDPI papers published in Chile increased from 1 to 13% in seven years, becoming the third publisher with more papers, just after Elsevier and Springer-Nature (Table 1). The proportion of MDPI papers has increased over time but is variable among major universities (Table 2). This pattern

Table 1 Number of papers published in Chile between 2017 and 2023, detailing how many of those papers were published in MDPI journals and which percentage they represent per year

Year	All papers	MDPI papers	%MDPI papers
2017	11,072	126	1%
2018	13,913	432	3%
2019	15,353	713	5%
2020	17,341	1359	8%
2021	18,172	1950	11%
2022	16,433	2137	13%
2023	19,237	2018	10%

Table 2 Number of papers published by the largest Chilean universities between 2017 and 2023, detailing the percentage they represent from the overall scientific production in Chile. Also, the number of MPDI papers per university and the percentage they represent from all papers published are shown. University abbreviations: U Chile = Universidad De Chile, PUC = Pontificia Universidad Católica De Chile, UdeC = Universidad de Concepción, UNAB = Universidad Andrés Bello, UACH = Universidad Austral De Chile, USACH = Universidad De Santiago De Chile, UFRO = Universidad De La Frontera, UTalca = Universidad De Talca, PUCV = Pontificia Universidad Católica De Valparaíso, UA = Universidad Autónoma

University	All papers	% Chile	MDPI papers	%MDPI univ
U Chile	23,395	17%	1516	6%
PUC	20,500	13%	1161	6%
UdeC	10,099	11%	955	9%
UNAB	6829	7%	645	9%
UACH	5820	6%	553	10%
USACH	5701	7%	627	11%
UFRO	4918	8%	663	13%
UTalca	3669	6%	560	15%
PUCV	5751	11%	933	16%
UA	4190	9%	778	19%

has also been observed globally. For example, Delgado López-Cózar & Martín-Martín [4] analyzed the top 25 scientific publishers in 2015 and found that MDPI papers represented only 0.6% (ranking 20th) but later in 2021, publications increased to 6.7%, reaching the 4th position. Moreover, among the 56 universities and research centers analyzed in Spain (including the Spanish National Research Council, CSIC), in 37 (66%), MPDI was the publisher with the highest number of publications, and in all of them, MDPI was among the top 3 publishers [4]. In Chile, the two largest Chilean universities (Universidad de Chile and Pontificia Universidad Católica de Chile) with the highest number of published papers have the lower proportion of MDPI papers, both with 6%, followed by Universidad de Concepción and Universidad Andrés Bello with 9%. Conversely, the universities with more MDPI papers published between 2017 and 2023 were Universidad Autónoma with 19%, followed by Pontificia Universidad Católica de Valparaíso with 16%, and Universidad de Talca with 15% (Table 2, details can be found in the Appendix A).

In 2017, MDPI papers represented 1–2% of what major Chilean universities published. After 2020, such percentage increased above 10% in all universities except the two largest ones (Universidad de Chile and Pontificia Universidad Católica de Chile), reaching its maximum during 2022, ranging from 10% (Pontificia Universidad Católica de Chile) to 27% (Pontificia Universidad Católica de Valparaíso). This phenomenon seems to be here to stay, as many universities have signed agreements with MDPI (to reduce fees) or have specific funds to cover APC. Now

the big question is: Is publishing many MDPI papers the best bang for the bucks? Is it really the best way to spend increasingly limited resources? Unsurprisingly, some researchers have astronomically increased their scientific production in the last five years through MDPI papers, which has probably resulted in rapid promotions in their academic careers.

The role of public funding

Another important aspect to consider in this equation is public funding (i.e., money from taxpayers to fund research). About 36% of the MDPI papers published between 2017 and 2023 acknowledged public financing of different programs of the Agencia Nacional de Investigación y Desarrollo (ANID; National Research and Development Agency in English) programs (e.g., FONDECYT, FONDEF, FONDAP, Millennium Initiative, and MSc and PhD scholarships), representing 3,111 papers. Considering an average APC of USD 2,000, those papers cost taxpayers USD 6.22 million, equivalent to CLP 5,910,900,000 (assuming an exchange rate of 950 CLP per USD). Such figure represents an annual expenditure of ~CLP 844,414,286, equivalent to 122 Master's or 80 PhD full scholarships (calculated using 2024 ANID granted amounts). Recent reports have globally estimated that over USD 1 billion of public funds have been used annually to pay open access fees. It is, therefore, an issue requiring much attention and further discussion [6].

Final thoughts

Despite the low investment in science (0.39% of GDP) among OECD countries, Chilean science is acknowledged as one of the best ones in South America, with worldwide impact and relevance. Renowned scientists in biological sciences like Humberto Maturana, Juan Armesto, Juan Carlos Castilla, and Francisco Bozinovic made remarkable contributions to their fields, putting Chilean science in the spotlight. Can we keep up with such scientific production in the open-access era? Can we revolutionize our studies fields with a bunch of MPDI papers? In this case, more is not better. Rather than publishing hundreds of low-quality papers per year at high public expense, we should focus our efforts and resources on producing a few high-quality papers bearing groundbreaking ideas [7], change our understanding of nature, and inspire others to pursue relevant scientific questions in the long run. For that to happen, universities and funders must revise their scientific productivity policies, considering that indicators should work for science and not vice versa.

Appendix A

Annual scientific production of the largest Chilean universities between 2017 and 2023 will detail the number of papers published in MPDI journals and their percentage of the total number of papers published.

University	Year	Papers	MDPI	%MDPI
U Chile	2017	2718	27	1%
	2018	2969	86	3%
	2019	3322	150	5%
	2020	3550	264	7%
	2021	3723	315	8%
	2022	3138	334	11%
	2023	3494	339	10%
PUC	2017	2320	19	1%
	2018	2691	61	2%
	2019	2842	99	3%
	2020	3144	192	6%
	2021	3285	254	8%
	2022	2839	279	10%
	2023	3337	253	8%
UdeC	2017	1026	8	1%
	2018	1273	46	4%
	2019	1391	75	5%
	2020	1537	148	10%
	2021	1644	183	11%
	2022	1491	256	17%
	2023	1593	239	15%
UACH	2017	539	7	1%
	2018	742	25	3%
	2019	804	55	7%
	2020	935	110	12%
	2021	1039	124	12%
	2022	838	118	14%
	2023	866	114	13%
USACH	2017	535	11	2%
	2018	647	31	5%
	2019	750	48	6%
	2020	876	111	13%
	2021	974	138	14%
	2022	798	156	20%
	2023	851	133	16%
PUCV	2017	506	8	2%
	2018	710	26	4%
	2019	759	53	7%
	2020	920	127	14%
	2021	894	177	20%
	2022	803	214	27%
	2023	945	230	24%

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F.E.F. and J.L.C.D. conceived the idea and wrote the manuscript.

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