TransInformação

ORIGINAL

Editor
Valéria dos Santos Gouveia Martins

Support
Conselho Nacional de Desenvolvimento Científico e Tecnológico (CNPq)
Edital 4/2021.

Conflict of interest
The authors declare that there is no conflicts of interest.

Data Availability
The research data are available within the body of the document.

Recebido
March 1, 2025

Versão Final
June 5, 2025

Aprovado
July 8, 2025

Read and publish agreements: A study of the physics field in Brazil and the Springer/Nature Publisher

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How to cite this article: Brito, C. C. *et al*. Read and publish agreements: a study of the physics field in Brazil and the Springer/Nature Publisher *Transinformação*, v. 37, e2515115, 2025. https://doi.org/10.1590/2318-0889202537e2515115en

Abstract

Changes in publishers' business models challenge both the economics and open access to literature within the scientific communication system. To identify the reading and publishing behaviors of Brazilian researchers in the field of Physics in Springer/Nature journals, the following objectives were established: (a) to categorize the journals in which the authors publish; (b) to record the authors' institutional affiliations; (c) to identify the research funders; and (d) to indicate the journals most frequently cited in the articles' reference lists. The research follows an exploratory design with bibliometric techniques, and data were collected from the Web of Science using Physics articles published in 2023 and their references. The results show a high concentration of publications in a few titles: 730 articles (73% of the total) were distributed across 13 Springer/Nature journals with high impact factors, 40% of which were published in two open-access titles with no processing fees. The authors are concentrated in five Brazilian institutions with ten or more records and exhibit strong international collaboration with authors from 64 institutions across 27 countries. The articles identified 226 funding agencies from 27 countries, including nine from Brazil. A total of 22,894 references were analyzed, with the most frequent titles belonging to the American Physical Society. The findings indicate that a potential agreement with Springer/Nature would not include the journals in which Physics authors most frequently publish or cite. Agreements with a single publisher are insufficient to meet the demands of a field that also involves diamond journals, Article Processing Charges, and subscription-based contracts.

Keywords: Open access. Reading and publishing contracts. Scientific publishing. Transformative agreements.

Introduction

Changes in publishers' business models have challenged funding agencies, researchers, libraries, research institutions, and countries. With the expansion of commercialization alternatives for scholarly articles, the various types of access have added layers of complexity to the scientific communication system. Technological advances, pressures from evaluation agencies for publication in high Impact Factor

(IF) journals, and demands for transparency and access to publicly funded research have fueled debates on the economic sustainability of the publishing market and the equity of access to scientific results.

A central issue in the discussion on access to scholarly publications is economic. Major commercial publishers have adapted to increase and/or maintain their profits by creating new packages and services, offering: (a) the still-prevalent journal subscription packages, known as big deals[5]; (b) hybrid journals, which include both open-access and subscription-based articles, resulting in double charges for authors and readers; (c) new bigger deals, which combine open-access publication packages, subscription access, and publisher-owned metrics visualization tools; and (d) read and publish agreements that bundle journal access and open-access publishing (Aspesi *et al.*, 2019; Delgado-López-Cózar & Martín-Martín, 2024). Besides strategies adopted by major publishers to sustain their profits include the rising costs of Article Processing Charges (APCs).

The configuration of read and publish agreements combines two essential scientific practices in a single package: the ongoing need for reading and staying updated, and the demand for publishing research results. Just as big deals influence which journals researchers can access – and thus tend to use and cite more frequently (Rodríguez-Bravo *et al.*, 2021) – the set of journals included in read and publish agreements can influence authors' choices of publication venues. Implementing read and publish agreements requires studies that consider the publication behavior of authors by field of knowledge, country or institution, and publisher, since these analyses provide the foundation for contractual negotiations. Mapping publication and reading behavior helps identify the interests of key stakeholders (funders, authors, institutions, and publishers), thereby supporting decision-making.

The Efficiency and Standards for Article Charges (ESAC) initiative of the Max Planck Digital Library recommends best practices for establishing publishing agreements, including the responsibilities institutions should require from publishers. These recommendations aim to ensure that agreements align with the goals of open access, particularly the promotion of equitable and democratic access to scientific knowledge (Efficiency and Standards for Open Access Article Charges, 2017).

The Scholarly Publishing and Academic Resources Coalition (SPARC, c2007-2025) highlights that such agreements should consider financial data and the impact on equitable access to scholarly knowledge. Beyond evaluating whether a publisher's open access (OA) model aligns with institutional values, SPARC stresses the importance of data such as downloads and citations of the publisher's works by the institution and the number of institutional publications involving the publisher, including access type and APC expenditures. Providing information on publication distribution metrics reveals gaps and trends that can guide sustainable open access policies and help understand the publication behavior of authors within specific fields of knowledge when selecting journals for reading and publishing. Accordingly, the Web of Science (WoS) was selected as the data source for this study due to its reliability, relevance, and data availability for bibliometric analyses, as well as its accessibility through the portal of the *Coordenação de Aperfeiçoamento de Pessoal de Nível Superior* (Capes, Coordination for the Improvement of Higher Education Personnel). The Physics field was chosen because of its pioneering role in providing open-access scientific literature through the green route, represented by arXiv, which is the first and most established subject-based

[5] Model of subscription-based scientific journals that emerged at the turn of the millennium, aimed primarily at library consortia, which were offered the opportunity to exponentially expand their access to scientific information, thus breaking the previous trend of continuous cuts in journal collections available in libraries (Rodríguez-Bravo *et al.*, 2021).

preprint repository, widely used by researchers in the field. This makes it reasonable to assume that at least one version of all published articles is available in open access (Björk *et al.*, 2014; Larivière *et al.*, 2024).

The read and publish model calls for research that can address the scope and limitations of publishers' proposals prior to contract signing. The overall goal of this study is to identify the potential reading and publishing interests of Physics researchers affiliated with Brazilian institutions in Springer titles. Specifically, the objectives are: (a) to categorize the journals in which the authors publish; (b) to identify the authors' institutional affiliations; (c) to indicate the research funders; and (d) to determine which journals are most frequently cited in the articles' reference lists.

The Springer/Nature publisher was selected due to its pilot read and publish project with the Capes Journal Portal, announced on Springer's website in December 2023 but not yet made available at the time of this article's submission. Springer stands out as the second most frequent publisher of articles by authors affiliated with Brazilian institutions in 2020, ranking just behind Elsevier (Anselmo, 2022).

Literature Review

Publishing in a prestigious journal remains the most established way to demonstrate the originality of a study and to confirm that its results were robust enough to withstand peer skepticism. Published articles enable access to certified research findings, document negotiation and critique processes, and establish languages and methodologies that are accepted and validated by scientific communities (Merton, 1979; Whitley, c2007; Ziman, 1981). Changes in technological resources, evaluation systems, and funders' pressures regarding where articles should be published influence researchers' choices (Guédon *et al.*, 2019; Merton, 1979; Whitley, c2007; Ziman, 1981). Matthias, Jahn and Laakso (2019, p. 5) highlight that:

> [...] journals do not exist in a vacuum, but within a dynamic environment characterized by competition for high-quality manuscripts. Since peer-reviewed publications are still the key to academic career progression, a journal's value is closely connected to the prestige it brings to authors [...].

It is important to recognize the values of science as an essential part of the academic institution, since "the origin of scientific publication lies in the requirement of the scientific method that knowledge be publicly disseminated so that the scientific community can use and verify its validity" (Delgado-López-Cózar; Martín-Martín, 2024, p. 3). Evaluation systems and the criteria used to classify productivity, impact, and scientific relevance are central to scientific communication, as they record researchers' work and are essential for identifying scientific capital. The pursuit of prestige determines researchers' choices, guided by strategies that aim at academic recognition, career advancement, and professional status (Bourdieu, 2013; Gingras, 2020).

The expansion of open access has brought greater transparency and introduced new variables into multiple stages of scientific communication (Cronin, 2014), requiring constant updates in studies addressing this topic. Open access has advanced due to: (a) the growing number of access alternatives to scholarly articles; (b) the increasing pressure from funding agencies to publish in open access; (c) the rising costs of gold-route APCs; and (d) the worldwide growth in the number of researchers (Abadal *et al.*, 2019; Borrego, 2023; Guédon *et al.*, 2019). Consequently, read and publish or transformative agreements have been discussed from multiple perspectives, employing various approaches and critical analyses regarding the advantages, limitations, and operational challenges of their implementation (Borrego; Anglada; Abadal, 2021; Borrego, 2023; Schmal, 2024).

The resources allocated by each institution and/or country to journal subscriptions (big deals or individual titles), article purchases, read and publish agreements, national journal funding, and APC payments determine how financial resources are distributed across the different access and publishing models within the scientific literature (Abadal *et al.*, 2019; Anglada; Abadal, 2023; Borrego, 2023).

Methodological Procedures

This exploratory, quantitative study employs bibliometric techniques to identify the behavior of Brazilian authors publishing in journals classified under the Physics category in WoS and belonging to Springer. The study fits within what Alencar and Barbosa (2022) describe as the pre-agreement stage, as analyzing the publication behavior of a given country and field prior to the signing of read and publish contracts can offer valuable insights for evaluating the suitability of proposed agreements.

Physics journals are distributed among different publishers, but it is reasonable to assume that most articles are available in arXiv (https://info.arxiv.org/about/index.html), a well-established subject repository moderated by volunteers and operated by Cornell University (Larivière *et al.*, 2014). Studies using a single database as a data source face limitations regarding the number of titles indexed per field of knowledge. Moreover, it is challenging to compare disciplinary classifications across different databases, national systems, and the United Nations Educational, Scientific and Cultural Organization (Unesco) taxonomy. However, WoS privileges journals published by major commercial publishers (Melo; Trinca; Maricato, 2021), including Springer, which ensures representative coverage of the research object.

To understand the reading behavior of authors in a given field, as recommended by SPARC (Scholarly Publishing and Academic Resources Coalition, c2007-2025), the study analyzed the main journals (from all publishers) cited in the reference lists of Physics articles. These journals were then cross-checked against those offered by Springer to estimate researchers' potential interest in citing the titles included in the contract. The use of references as data is justified by the certainty that the cited articles were indeed read, the unavailability of access data, and the assurance that such access can occur via arXiv.

To identify where Physics authors publish, an advanced search was conducted in June 2024 in WoS using the query: CU = (Brazil) AND PUBL = (Springer) AND PY = (2023),and filtered by document type (article and review article) and research area (physics). To identify the references used by the authors, data were exported using the options tab-delimited file and full record and cited references, extracting 500 records at a time as text files. The data were then manually organized in spreadsheets, including information on each journal, authorship, institutional affiliation, and funding agencies. Filters were applied to identify journals and publishers with the highest number of articles.

To analyze and validate the type of access, whether hybrid or open, the Directory of Open Access Journals (DOAJ) was consulted, since WoS provides information about articles but not about journals. The Qualis Capes classification (2017-2020) was also collected to identify each journal's rank, assuming that these data may influence graduate program evaluations and, consequently, the distribution of institutional resources. The use of bibliometric indicators allows the estimation of authors' behavioral patterns within a given field (Cronin, 2014; Gingras, 2020). However, it is important to emphasize the limitations of area-specific studies, which prevent generalization to other fields, as well as the limitations inherent to the database itself.

Results and Discussion

Given the growing debate on open access and transformative agreements, or Read and Publish, it is relevant to analyze the specificities of an increasingly commercial scenario in the context of scientific communication, in which science itself has become a business. This market adapts to cope with transformations arising from the open access movement while maintaining its financial profitability, as pointed out by Delgado-López-Cózar and Martín-Martín (2024, p. 5, own translation)[6]: "[...] the constant mutation of commercial publishers so that their business remains profitable: now moving from the journal business to the business of journals". Therefore, it is important to study researchers' needs in order to optimize the allocation of resources.

Journals in which authors affiliated with Brazilian institutions publish in titles classified as Physics by Springer

In 2023, authors in the field of Physics affiliated with Brazilian institutions published 3,349 articles in titles indexed in WoS, considering all publishers. Within the journals published by Springer, which is the focus of this study, 730 articles were published across 71 journals (representing 21.8% of the total publications in the field within the database), accounting for 451 authorships (Table 1). The concentration is evident: 295 articles were published in only two titles (Journal of High Energy Physics (JHEP) and European Physical Journal C (EPJ C) with 165 and 130 publications, respectively, representing 40.41% of the publisher's total number of articles. These were followed by 11 titles with 10 or more articles each. The remaining 58 journals collectively published 191 articles, each contributing up to three articles in the analyzed year.

The classification of journals according to the Qualis Capes evaluation system indicates that all titles fall into stratum A. A direct relationship was observed between IF, quartile ranking, and Qualis classification, highlighting that these titles have high citation rates and are influential

Table 1 – Categorization of Springer Journals indexed in the Web of Science in which authors affiliated with Brazilian institutions published 10 or more articles in 2023.

Title	Qualis	Impact Factor	Quartile	Access	Articles (N)
Journal of High Energy Physics	A1	5.4	Q2	Diamond	165
European Physical Journal C	A2	4.4	Q1	Diamond	130
Brazilian Journal of Physics	A3	1.6	Q4	Subscription	47
European Physical Journal Plus	A2	3.4	Q2	Subscription	40
Journal of Molecular Modeling	A4	2.2	Q3	Subscription	40
International Journal of Biometeorology	A2	3.2	Q1	Subscription	23
Journal of Materials Science: Materials in Electronics	A3	2.8	Q2	Subscription	18
Quantum Information Processing	A3	2.5	Q2	Subscription	17
European Physical Journal A	A2	2.6	Q1	Subscription	14
Applied Physics A	A3	2.7	Q2	Subscription	12
Journal of Statistical Physics	A3	1.6	Q2	Subscription	12
European Physical Journal B	A4	1.6	Q3	Subscription	11
Photochemical & Photobiological Sciences	A4	3.1	Q2	Subscription	10
Partial total					539
Other 58 titles					191
Grand total					730

Source: Prepared by the authors (2024).

[6] In the original: [...] *la mutación constante de las editoriales comerciales para que su negocio siga siendo rentable: ahora pasando del negocio de las revistas a las revistas negócio* (Delgado-López-Cózar Martín-Martín, 2024, p. 5).

within their area. In Table 1, the 13 titles that published 10 or more articles represent 18.3% of the 71 Springer journals but account for 73.83% of the 730 articles analyzed. The two titles with the largest number of publications operate under a diamond open access model, with no publication fees due to full funding from the Sponsoring Consortium for Open Access Publishing in Particle Physics (SCOAP^3). The journal websites of the Journal of High Energy Physics and the European Physical Journal C state that:

> The Journal of High Energy Physics (JHEP) is a full open-access single-blind peer-reviewed journal, fully sponsored by SCOAP3 and owned by the International School for Advanced Studies (SISSA, Trieste, Italy). JHEP capitalises on the innovative advantages of the new media: rapidity of communication, broad diffusion and the ability to run and distribute a journal solely by electronic means (Springer, 2025a).
>
> [...] The European Physical Journal C (EPJ C) is a full open-access single-blind peer-reviewed journal, fully sponsored by SCOAP3. EPJ C presents new and original research results in experimental, theoretical and computational high-energy physics, in a variety of formats, including Reviews and Letters (Springer, 2025).

Abadal (2012) identifies the SCOAP^3 initiative as a case of good practice in the development of science and research policies promoting open access models. The concentration of publications, reaching 40% of articles in only 2.5% of the titles, is greater than that predicted by Bradford's Law and "makes it possible to estimate the degree of relevance of journals in a given area of knowledge, since journals that produce the largest number of articles on a given subject form a core of journals supposedly of higher quality or relevance to that area" (Guedes; Borschiver, 2005, p. 3). This concentration can be justified, at least in part, by the SCOAP^3 policy, which funds journals within the disciplinary consortium led by the *Conseil Européen pour la Recherche Nucléaire* (CERN, European Organization for Nuclear Research). This organization acts as the host institution of SCOAP^3 and is fully responsible for publishing services, that publishers eliminate or reduce subscription costs for all customers, even those whose institutions are not covered by the consortium – as is the case for Brazil (Sponsoring Consortium for Open Access Publishing in Particle Physics, 2024).

The articles in the two titles with the highest concentration of publications are registered in WoS as gold, although these titles charge no publication fees these articles should technically be classified as diamond; however, the diamond option is not available in WoS classification categories. Within the logic of the scientific area, this open access model can be seen as an attempt to balance scientific capital by reducing economic barriers that hinder access to and publication in prestigious journals. Furthermore, the high IFs of the journals, their Qualis classification, the publisher's credibility, and the high concentration of publications explain the authors' preference for these titles.

Institutional affiliation of articles with at least one Brazilian author published in titles classified as Physics by Springer and indexed in WoS in 2023

The identification of institutional affiliations of authors in the field of Physics reveals a significant number of international institutions collaborating in these articles, confirming the need for studies that analyze scientific production by specific fields of knowledge to account for their distinct characteristics. Identifying corresponding authors helps to determine the main institutions and countries funding the research. In this regard, Zhang *et al.* (2022), drawing on studies by Bruns, Rimmert, and Taubert (2020); Dotson *et al.* (2011); Larivière *et al.* (2014); Rahman *et al.* (2021); and

Taubert *et al.* (2021), concluded that, in general, the first author, corresponding author, or their institution is most likely to be responsible for paying publication fees.

International collaboration in Physics is evidenced by the 9,278 institutions recorded as authors' affiliations (Table 2). The table lists the 10 institutions with the largest number of articles by Brazilian authors, totaling 412 corresponding authorships. Due to the collaborative nature of these publications, an article may be counted more than once, being associated with multiple institutions. It is estimated that, on average, each article includes 16 authors affiliated with at least three different institutions. Interest in publishing in open access will depend on the degree of internationalization of the field, researchers' evaluation criteria, the financial resources of the author(s), particularly the corresponding author, and their institutional affiliation, reflecting the globalization of knowledge. According to Katz and Martin (1997, p. 7), scientific collaboration can be defined as "[...] the working together of researchers to achieve the common goal of producing new scientific knowledge".

Table 2 – Institutional affiliations of authors of articles with at least one Brazilian author in titles classified as physics by Springer and indexed in the Web of Science in 2023*.

Institutional Affiliation	Country	Affiliations	Corresponding Authors
University of São Paulo	Brazil	204	49
Centre National de la Recherche Scientifique (CNRS)	France	200	1
Istituto Nazionale di Fisica Nucleare (INFN)	Italy	196	5
Chinese Academy of Sciences	China	190	0
Paris Cité University	France	187	1
CNRS National Institute of Nuclear and Particle Physics (IN2P3)	France	184	3
Paris-Sarclay University	France	184	1
U.S. Department of Energy (DOE)	United States	183	0
University System of Ohio	United States	183	1
Helmholtz Association	Germany	180	1
Partial total	–	1,891	62
Other countries	21	7,387	74
Total of affiliations	9,278		198

Note: *The 10 Brazilian institutions with the largest number of corresponding authors are: University of São Paulo (USP, 49); Federal University of Rio de Janeiro (UFRJ, 32); São Paulo State University (UNIFESP, 16); Federal University of Santa Catarina (UFSC, 13); Federal University of Paraíba (UFPB, 12); University of Campinas (UNICAMP, 10); Federal University of Ceará (UFCE, 9); Fluminense Federal University (UFF, 9); University of the State of São Paulo (UNESP, 8); and Federal University of Pará (UFPA, 8). Source: Web of Science (2024).

In Physics, the diversity of both authors and institutions reflects a high level of international collaboration. In this context, one of the challenges that arises concerns which institution (or institutions) would be charged for the article's publication in the event of APCs. The diamond open access model eliminates this issue, as publication costs are covered by the consortium or the publisher.

Funding institutions for research in articles with at least one Brazilian author published in titles classified as Physics by Springer

The funding institutions for these studies reflect the diversity of the authors' institutional affiliations. Notably, only nine Brazilian institutions were identified among the 226 funding organizations mentioned across the 730 articles analyzed in this study. Three of these institutions account for 756 funding acknowledgments, or 4% of the total 9,414 funding records: the *Conselho Nacional de Desenvolvimento Científico e Tecnológico* (CNPq, National Council for Scientific and Technological Development), with 476 funded publications; Capes, with 280; and the *Fundação*

de Amparo à Pesquisa do Estado de São Paulo (Fapesp, São Paulo Research Foundation), with 262. The number of authors per article suggests that the research linked to these publications is often funded by more than one institution. Table 3 lists the 10 institutions with the highest number of funding records, representing 23.27% of all funding organizations. These data indicate a significant concentration of financial resources within a small group of institutions, highlighting the central role of institutional support for research.

Table 3 – Funding institutions for research in articles by authors affiliated with Brazilian institutions in titles classified as physics by Springer and indexed in the Web of Science in 2023.

Institution			Country	Mentions
National Council for Scientific and Technological Development (CNPq)			BRA	476
Coordination for the Improvement of Higher Education Personnel (Capes)			BRA	280
São Paulo Research Foundation (Fapesp)			BRA	262
European Union (EU)			EU	176
National Natural Science Foundation of China (NSFC)			CHI	176
Federal Ministry of Education and Research (BMBF)			ITA	168
Istituto Nazionale di Fisica Nucleare (INFN, National Institute for Nuclear Physics)			ITA	168
European Research Council (ERC)			BEL	165
Centre National de la Recherche Scientifique (CNRS, National Center for Scientific Research)			FRA	163
National Science Foundation (NSF)			USA	157
Other institutions*	216	Other countries	20	9,414
Average articles per institution				51

Note: *"Other institutions" refers to those included in the study with fewer than 150 mentions. These total 216 institutions across 20 countries, accounting for 9,414 mentions.
Source: Prepared by the authors using data from the Web of Science (2024).

The 730 articles analyzed include references to 226 funding institutions from 27 countries, with an average of seven institutional funding records per article. This reflects both the dispersion of authors and the international collaboration involved in these publications, making the field subject to international standards and criteria in selecting the journals where articles are published.

References used by articles authored by researchers affiliated with Brazilian institutions in titles classified as physics published by Springer

Comparing the journals in which authors publish with those they reference helps to evaluate the extent to which the contracts meet the two key dimensions of agreements with a given publisher: reading and publishing within each field of knowledge. Table 4 presents the most frequently cited references among the 730 articles that comprise the corpus of this study. Analyzing references is important for identifying which journals are most cited by authors, as these citations influence the construction of bibliometric indicators such as impact factor and quartile rankings, especially in Physics, which has the largest and most established thematic repository (arXiv). In this repository, at least one version of every published article should be available in open access for reading. Although institutional and thematic repositories (known as the green route) are considered by some in the literature as alternatives to access barriers, the data for Physics indicate that the field still relies on journals for registering references.

The data reveal the diversity of journals and publishers cited in the sampled articles, even when the works were published exclusively in Springer titles. This finding indicates that it would be impossible to make all the journals cited by authors available under a single read-and-publish

Table 4 – Description of journals and publishers indexed in the web of science that were cited more than 100 times in 2023 by authors affiliated with Brazilian institutions.

Title	Publisher	Qualis	IF	Quartile	Access	Citations (N)
Physical Review D	APS	A1	4.6	Q1	Subscription	1,736
Physical Review Letters	APS	A1	8.1	Q1	Subscription	713
Physical Review A	APS	A1	2.6	Q1	Subscription	318
Physical Review B	APS	A1	3.2	Q1	Subscription	269
Physical Review C	APS	A1	3.2	Q1	Subscription	138
Physical Review E	APS	A1	2.2	Q1	Subscription	182
Physical Review *	APS	–	–	–	–	163
Reviews of Modern Physics	APS	A1	45.9	Q1	Subscription	150
Total American Physical Society						3,669
Journal of High Energy Physics	Springer	A1	5.0	Q2	Diamond	641
The European Physical Journal *C*	Springer	A2	4.2	Q1	Diamond	465
Nature	Springer	A1	69.504	Q1	Subscription	194
Scientific Reports	Springer	A1	4.997	Q1	Gold	121
Total Springer						1,421
Physics Letters B	Elsevier	A2	4.3	Q1	Diamond	549
Nuclear Physics B	Elsevier	A3	2.5	Q1	Diamond	286
Physics Reports	Elsevier	A1	23.9	Q1	Gold	182
Annals of Physics	Elsevier	A2	3.0	Q1	Gold	110
Journal of Alloys and Compounds	Elsevier	A1	5.8	Q1	Gold	103
Physics Letters A	Elsevier	A3	2.3	Q2	Gold	102
Total Elsevier						1,332
Classical and Quantum Gravity	IOPScience	A1	3.6	Q1	Subscription	193
The Astrophysical Journal	IOPScience	A1	4.8	Q1	Subscription	182
Journal of Cosmology and Astroparticle Physics	IOPScience	A1	5.3	Q2	Subscription	166
Total IOPScience						541
Science	AAAS	A1	63.83	Q1	Subscription	138
Total AAAS						138
Monthly Notices of the Royal Astronomical Society	Wiley	A1	4.8	Q1	Subscription	190
Total Wiley						190
The Journal of Chemical Physics	AIP	A2	3.6	Q1	Subscription	270
Total American Institute of Physics						270
arXiv	Cornell University	–	–	–	Green	251
Total Cornell University						251
Other titles* 15,082		Grand total				22,894

Note: *Discontinued title since 1912. AAAS: American Association for the Advancement of Science; APS: American Physical Society; IF: Impact Factor.
Source: Prepared by the authors using data from the Web of Science (2024).

agreement. The most frequently cited publishers were: the American Physical Society (APS), with 3,669 mentions (46.96%); Springer, with 1,421 (18.18%); Elsevier, with 1,332 (17.05%); and IOPScience, with 541 (6.92%). It is important to note that even though all the articles are presumably available on arXiv, the repository accounted for only 251 records, or 3.21% of all references cited. In addition to Springer's Journal of High Energy Physics (JHEP) and European Physical Journal C (EPJ C), fully funded by the SCOAP[3] consortium, two other diamond open access titles were identified: Physics Letters B and Nuclear Physics B, both published by Elsevier and fully funded institutionally, with no costs to authors or readers through SCOAP[3].

A relevant case among the cited titles is Physical Review, published by APS. Although it was cited 163 times in articles published in 2023, its publication began in July 1893, and it has been interrupted and resumed several times over the years until it was partially incorporated into Physical Review Letters (1958–) (*Instituto Brasileiro de Informação em Ciência e Tecnologia* (IBICT, Brazilian

Institute of Information in Science and Technology, 2007). Physical Review has all its earlier issues freely available on the APS website, which may partly explain its high number of citations, beyond its established prestige in the field. According to Delgado-López-Cózar and Martin-Martin (2024, p. 3, own translation)[7], scientific journals tend to split, as "constant specialization leads to the division and subdivision of scientific branches into disciplines, specialties, sub-specialties, and thematic domains in continuous change and acceleration". This process drives the publishing market to continuously launch new titles (Rodrigues *et al.*, 2023).

The trend is for commercial publishers to expand their business by broadening the thematic scope of their journals to meet and/or create scientific demand, thereby increasing the potential number of publishable articles (Delgado-López-Cózar; Martin-Martin, 2024). The case of Springer/Nature illustrates this expansion of thematic areas and the construction of diversified journal portfolios – such as the Nature Portfolio, which includes over 3,000 journals hosting more than seven million published articles, reflecting the publisher's efforts to consolidate its leadership position in the scientific publishing market (Nature, c2025).

Regarding the transformative agreements with Capes, available on the institution's website, the most comprehensive one is the Read and Publish Contract No. 16/2023. Its purpose is to provide access to Springer/Nature journals (yet to be officially implemented) and make them available to the Brazilian scientific community through the Capes Journal Portal. The contract covers 1,891 journals under the Springer imprint and 35 under the Nature imprint. However, among the 1,891 Springer journals, the four most frequently cited titles – Journal of High Energy Physics (JHEP), European Physical Journal C (EPJ C), Nature, and Scientific Reports-UK – are not listed. It can thus be inferred that the contract does not include all the publisher's journals, particularly those in diamond open access, which are of greater interest to Brazilian authors in the field of Physics. The first two titles are fully funded by the SCOAP^3 consortium.

Esteves (2024) criticizes the publication fees charged by Nature for open access, announced in 2020 as up to €9,500 reflecting the inequality between researchers from developed and developing countries in the scientific race. According to Nature's marketing, the fees cover production and editorial staff costs, with the justification that researchers can still publish under the traditional model, where research remains accessible only to subscribers. Publication costs affect authors' journal choices and often lead them to select lower-prestige outlets to keep up in the competitive scientific publishing environment (Hanson *et al.*, 2024). Furthermore, researchers frequently cite articles from a wide range of publishers, implying that multiple agreements are required to meet the needs of each discipline. Identifying the specific needs of each field, beyond what publishers offer, can help develop strategies that are better suited to each domain of knowledge.

Final Considerations

Scientific communication is a complex system, and the units "article" and "journal" must be analyzed by considering their intrinsic variables: articles reveal the institutional affiliations of authors, while journals act as certifiers of publication and as indicators of prestige in evaluation systems. Read-and-publish agreements expand the so-called big deals, in which reading packages now have the potential to influence publishing habits as well. The concentration of access in a limited number of titles makes or turns or tends to turn other journals invisible to researchers

[7] In the original: [...] *la especialización constante conduce a la división y subdivisión de las ramas científicas en disciplinas, especialidades, subespecialidades, dominios temáticos en continuo cambio y aceleración* (Delgado-López-Cózar; Martin-Martin, 2024, p. 3).

who cannot access them. Because these agreements also include publication rights, the level of influence is even greater, as researchers tend not only to read the journals to which they have access but also to publish in the titles for which their institutions have prepaid publishing fees, according to the specific habits and reward systems of each field.

The analysis of Physics authors affiliated with Brazilian institutions highlights the importance of examining publication demand based on the established preferences of each research field, using verifiable and accessible data. This study is limited to the field of Physics and therefore cannot be generalized to other areas, for which specific studies should be conducted according to their degree of scientific internationalization.

Thus, our results reveal a remarkable concentration of 40% of the 730 analyzed articles in just two diamond open access journals published by Springer and funded by SCOAP[3]: Journal of High Energy Physics and European Physical Journal C. The remaining 191 articles were scattered across 58 other titles. This exceptional concentration in two diamond journals underscores the relevance of the diamond open access model, which should arguably have its own designation in WoS. The other journals are categorized as "subscription-based," a classification that should be reviewed to ensure publication possibilities under potential contracts, as this would make them hybrid titles. Even so, the overall relevance to scientific output in the field can be questioned, as only 10 other journals published more than 10 articles each.

The institutional diversity of authors in each article is significant, as is the overall institutional diversity within the corpus analyzed: there were 7,387 authors affiliated with 65 institutions across 27 countries, indicating a high degree of institutional collaboration. The institution with the highest number of affiliations was the *Universidade de São Paulo* (USP, University of São Paulo), with 204 affiliations and 49 corresponding authors, followed by several foreign universities and Brazilian institutions such as the *Universidade Federal do Rio de Janeiro* (UFRJ, Federal University of Rio de Janeiro), with 43 affiliations and 32 corresponding authors, and the *Universidade Federal da Paraíba* (UFPB, Federal University of Paraíba), with 12 affiliations and 3 corresponding authors. The small number of Brazilian institutions contributing to authorship in the field suggests limited institutional interest in contract subscriptions. The position of 412 Brazilian corresponding authors indicates that more than half of the evaluated publications were led by Brazil, particularly by universities.

The articles analyzed reveal overlapping funding sources from multiple countries within the same document, with an average of seven funding agencies per article. The countries with the highest number of funding records were Brazil (1,401), China (494), and Spain (365). The institutions with the most funding records were the Brazilian agencies CNPq, Capes, and Fapesp, followed by the European Union, China's National Natural Science Foundation, and the Italian Federal Ministry of Education Research, and the *Istituto Nazionale di Fisica Nucleare* (INFN, National Institute for Nuclear Physics), along with 220 other institutions from 23 countries. The diversity of funding sources across different nations confirms the field's high level of international collaboration. The presence of multiple authors and funders per article can make it difficult to determine who is responsible for paying APCs on a large scale.

The references cited by authors demonstrate a diversity that extends far beyond the focus publisher of this study. Most of the references were from the publisher American Physical Society, accounting for more than twice as many citations as those from Springer/Nature, followed by Elsevier. Beyond the limited number of references to Springer titles, the two most frequently published Springer journals are diamond open access titles funded by SCOAP[3], meaning that both access and publication are already covered, even without Brazil's participation in the consortium.

The results reveal several issues that should be examined prior to contract signing. In addition to the specificities of each field of knowledge, identifying diamond open access titles, determining which institutions are most likely to publish under the contract, evaluating the potential for co-authorship across countries to share publication costs or credits, and analyzing the most frequently cited journals can all provide valuable insights for adapting agreements to the realities of each field and country. Read-and-publish or transformative agreements require sophisticated analyses to evaluate their relevance before being signed. Publicizing the contracts and enabling detailed evaluations of their use can help improve agreements and identify alternatives that better meet researchers' needs.

These multiple modes of access for reading and publishing pose challenges for librarians and research managers, as each discipline requires distinct approaches, ranging from maintaining subscriptions, signing read-and-publish agreements, to paying APCs, joining diamond open-access consortia, acquiring individual articles, subscribing to specific journals outside publisher packages, and supporting institutional or national journals.

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