



## SOCIAL SCIENCES

# Integration of the elements involved in scientific publication

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**Abstract:** The issue of publication of articles by researchers in the universe of scientific publications, has become over the last decades, increasingly asymmetrical among the parties involved (author, Author's institution, Development agencies, Magazine / Publisher, and referees). Here, I analyzed to what extent are all the parts involved in the process of scientific publication equally balanced, and the gains and losses among parts involved during the process. The analysis points that the gains and losses among parts involved are quite asymmetric. I conclude that there are advantages, disadvantages and costs that should be addressed at a global level to better balance the process of publication and that should have some adjustments to better balance of the parts involved in the process. All parts involved should search for a more equilibrated system of publishing, since, now, the system is strongly asymmetric among the parts involved in scientific publication. It is clear is that this is not a simple subject, but possible changes are quite simple and desirable.

**Key words:** author, publisher, referees, scientific agencies, scientific publication, universities.

## INTRODUCTION

It has been 355 years since the appearance of the first scientific journals: the French Journal des Savants (originally Journal des Sçavants, created in 5 January 1665) and the British Philosophical Transactions (created in 6 March 1665), the latter formatted in a form similar to present-day scientific journals (Vittu 2002). Before them, scientific news was usually disseminated through correspondence among scientists and through Letters or Memories sent to scientific societies with which they were affiliated, to be read in scientific sessions or published by the societies as Letters. Over the subsequent centuries, the number of scientific journals increased markedly, the peer review process was introduced and, since most journals belonged to scientific societies or other institutions (e.g. Universities), they acted as source to disseminate

the outcome of the advances of the research in specific areas of knowledge (Larsen & von Ins 2010). After the middle of the 20th century, several journals were published by independent publishers to contribute to the dissemination of scientific advances. Journals of scientific societies and some other institutions were less restricted by costs of publication because such institutions usually took on the costs for their affiliated scientists. This changed as several publishers needed resources for funding the publication of the articles included the volumes of their journals.

The process of creation of a scientific product and its subsequent publication involve five elements: 1) the University to which the researcher belongs; 2) the scientific agency, (or NGOs or any other sponsors from a particular country or set of countries) that subsidize the

scientific study; 3) the author(s) that conceived the idea and produced the study; 4) the journal that publishes the accepted study, and 5) the referees who evaluate the merit of the study. This process starts with the researcher, who belongs to a particular University, Research Center or Scientific Institute having an idea on a certain question to be investigated and further formatting the idea as a project, followed by submitting it to a scientific agency (or to any other sponsor) in search for funds. After competing with many other scientists to obtain the funding, the scientist develops the project, with the results becoming an intellectual product. The next step involves the publishing of the results in a qualified peer-reviewed journal, which in turn involves a set of referees to judge the merit of the results, interpretation of the data and the potential of the scientific findings to contribute to scientific advance. This process involves academic intellectual creation, commercial interests, academic prestige, and the circulation of research (Fyfe et al. 2017). However, to what extent are all the parts involved in the process equally balanced? How much does each win or lose during the process? Here, I analyze the issue of publication of articles by researchers in the universe of scientific publications and evaluated to what extent are all the parts involved in the process equally balanced and how much does each win or lose during the process.

## METHODS

Specifically, I considered the parts involved in the process of creation of a scientific product and its subsequent publication pointing gains and losses among the basically five more prominent parts involved: The University or equivalent to what the researcher belongs; the scientific agency or equivalent that subsidize

the scientific study; the author(s) that conceived the idea and produced the study; the journal that publishes the study, and the referees who evaluate the merit of the study.

## RESULTS AND DISCUSSION

The sponsors or the supporting scientific agencies invest financial resources to subsidize those studies or projects thought to advance knowledge of that country (also, many agencies are international and finance projects in several countries). Supported authors are expected to acknowledge financial aid in the article. However, publishers usually require that the intellectual property of the scientific product (the copyright) be transferred to the publisher after the article is accepted for publication. An exception is the case of some open access journals that do not require the transfer of copyright but usually charge the author (s) a considerable amount of money to publish the article. Open Access Journals come to change part of the problem by providing open access to the published papers, although they still usually charge some significant values to publish, what is especially high to people or institutions of some countries, especially those from non-developed or developing countries. When the copyright is transferred to a journal, the author loses the intellectual property to an entity that did not invest financial, intellectual or time resources in the intellectual product. The individual value (scientific, commercial, or financial) of such scientific products (articles) is difficult to estimate in advance, but it tends to be high, especially considering the worldwide gain in terms of selling access to that scientific information. Although at an individual/personal level it is plausible that the subject of copyright can make no difference for one, or to another

researcher, this subject is less individual but, instead, is more general and there is a need of changing this culture. Nowadays, in some fields and in some countries, there is now a requirement that the copyright does not belong to the journal, or at least there is guaranteed open access. Therefore, the gains and losses among parts involved are quite asymmetric. The scientific agency and the Institution the author belong to (University, Research Center or Scientific Institute) that supported the study, loses the investment made in the generation of the scientific product after the copyright is transferred to the publisher, and its gains in this process remain only as the reference of support made in the acknowledgements section of the article and author address in the case of the Institutions. Clearly, for the funding agencies and for the author's institution the balance in this process is not favorable. Authors invest considerable time and effort intellectually conceiving the idea and developing it. They search for funds to subsidize the investigation, compete for funds in the extremely competitive calls made by agencies or sponsors, undertake the study, which may take a year or even more, they obtain and analyze the results and write the manuscript. This extensive effort usually involves no less than two or three years. Today, in most cases, authors must pay for the costs of handling and processing of the manuscripts submitted (a cost per page or per article), except in those journals that do not charge for publishing as part of their editorial policies. Some journals even charge authors a submission fee. On the other hand, authors gain prestige and visibility provided by the publication of their article. In this process, although authors benefit from the gain of the spread of their discovery (and their name), they lose their intellectual property when they transfer their copyrights to the journal or to the publisher, as

an obligatory condition for the article to be published. Also, in many cases the authors must assume the costs of publication. Lastly, the authors usually seek to publish in high quality international journals which, in general, only publish in English. However, many of these researchers come from countries that do not have English as their native language. This implies that non-native English-speaking authors must often incur additional costs for translation and editing for grammatical correctness. Overall, clearly, the intellectual and economical balance is not favorable to authors. For publishers and journals, the balance is more favorable. First, journals gain in credibility with the high-quality articles they publish. Secondly, at the moment that the copyright is transferred to them, they receive all the medium to long term investment previously made in terms of time and intellectual effort by authors and also all the total amount invested in the project by the agencies and the logistic support provided by author's institution. Thirdly, those publishers that charge to publish articles have their costs of handling and processing covered by authors, which means that investment by them to publish the article is close to zero. Publishers also gain with the zero cost of the peer review made by referees that judge the merit of the article. Journals earn large amounts of money by selling worldwide PDFs of articles (in some cases authors must themselves pay to have access to the PDFs of their own articles) on the journal's website (except in the case of open access journals). These values are widely variable, depending on the scientific journal or the power of currency of the country where the journal is being edited. Fortunately, most papers can be found somewhere as in Google Scholar and Research Gate anyway (but not all papers can be accessed) and recently, an increasing number of journals make pdf available, even to the point of

allowing one to send it to selected colleagues. The high financial gains involved in this process of publication has stimulated the emergence of a large number of predatory journals to explore this niche (see the extensive checklist in the Bell's list of predatory publishers and journals at <https://beallslit.weebly.com/>). It is important to highlight that the overall economic gains of Journals/Publishers were made feasible by the decreasing costs to produce a number or volume of a journal provided by the transition from printed to online journals. Clearly the balance for journals/publishers is strongly favorable. Referees are a crucial part of the process of publication because they assure the level of quality or merit of the product (manuscript). They receive no payment or financial gain in the process of reviewing papers for journals, being personally entirely deprived of economic interests, which is philosophically and ethically correct because their major interest is to contribute to the advance of the world's scientific knowledge. Referees invest great personal effort in terms of number of hours (or days) carefully revising, correcting, and evaluating each manuscript in terms of its scientific contribution. The more experienced and well-known a referee is, the more they are asked to review manuscripts. As result, during the career of a scientist, the number of articles they receive to review and the number of journals asking for their review on manuscripts increases, which impacts their time available to produce their own science. Also, because referees usually become overburdened with manuscripts to review from many different journals their time available to dedicate on any given paper diminishes, which can even decrease the quality of the review made (Hochberg et al. 2009). In essence, this time is paid for by the institution to which the referee belongs. Since time is a limiting factor, many referees no longer

have time to accept additional reviews for the journals, since they are responsible for many other educational and scientific tasks at their institution. Although referees may gain personally by feeling an important contributor for the advance in science in their field of expertise, the balance for the referees in the process is also not favorable. Therefore, it is obvious that the balance in terms of gains and losses (in terms of personal intellectual effort, economical gain, and visibility) involved are clearly asymmetric among the parts involved in the construction of a scientific product. A reflection on this issue indicates advantages, disadvantages and costs that should be addressed at a global level to better balance the process of publication. How to better adjust the balance of the parts involved in the process? It is clear that a wide debate on this issue is necessary and that many interesting suggestions may arise from it. Here are some few suggestions of potential changes that could help such necessary debate and that could bring a better balance as the costs and benefits among parts involved: 1) a change in intellectual property rights; the copyright should be shared in different parts: funding agencies that subsidized the study, the institution of the author (University, Research Center or Scientific Institute), the Journal/Publisher and the author. In this case, the scientific agencies/sponsors, and the author's institution could also sell the PDFs of the articles (and other benefits involved) in their home pages together with the journals/publishers or, alternatively, the publisher could carry out the sale of the PDFs and the profit earned be divided between the parties. This would result in additional funds for the agencies to subsidize further calls and funds for the maintenance of the institution of the author or for boosting research in that institution. The author's Institution would benefit in a similar

way in their capacity of logistic support for its Institutional research. The world market of music-rights for authors of lyrics and of the song and music-recording companies is an excellent example of how it is possible to better balance benefits among all those involved in an intellectual creation. 2) Authors should not pay to publish or to submit their manuscripts since the articles will generate funds for the journal/publisher that also will sell the PDFs of the article. Non-payment by authors appears as a practice for most journals in some areas, such as Electric engineering and others, and this should be the norm for all areas. 3) Referees, after finishing a review of an article for a particular journal, should be allowed to freely publish in that journal during a defined period of time (e.g. the next one year). Some journals have introduced the practice of providing access to contents of the journal for reviewers for a certain time, which can be considered as an advance in this subject. It is clear is that this is not a simple subject, but possible changes are quite simple and desirable. All parts involved should search for a more equilibrated system of publishing, since, now, the system is strongly asymmetric among the parts involved in scientific publication.

### Acknowledgments

I thank Bill Magnusson, J. E. Borges Andrade, E. Watanabe, H. G. Bergallo, C. N. Flynn, L. Diele-Viegas, H. B. Rocha and D. Vrcibradic for reviewing a draft of the manuscript. CFDR benefitted from grants provided by the Conselho Nacional do Desenvolvimento Científico e Tecnológico (CNPq, processes 302974/2015-6, 424473/2016-0 and 304375/2020-9) and the Fundação Carlos Chagas Filho de Amparo à Pesquisa do Estado do Rio de Janeiro (FAPERJ), through “Cientistas do Nosso Estado” Program (process E-26/202.920.2015 and E-26/202.803/2018).

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#### How to cite

ROCHA CFD. 2021. Integration of the elements involved in scientific publication. *An Acad Bras Cienc* 93: e20201948. DOI 10.1590/0001-3765202120201948.

*Manuscript received on January 7, 2021;  
accepted for publication on April 5, 2021*

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