

The Price of Reviewing for Free: The Invisible Work That Sustains Science

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Peer review has accompanied scientific communication for centuries. Its origins can be traced back to *Philosophical Transactions*, founded in 1665, and, in medicine, to *Medical Essays and Observations*, published in Edinburgh beginning in 1731, where manuscripts were circulated among members considered particularly knowledgeable in the relevant field before a decision was made on publication. The system we know today developed progressively over the centuries that followed, eventually becoming one of the cornerstones of scientific publishing.¹

Before a manuscript reaches its readers, highly qualified professionals with recognized expertise devote their time to critically reading it, identifying its strengths and weaknesses, assessing the appropriateness of its methods, and interpreting the relevance of its findings. In doing so, they also assume a particular responsibility: their comments may determine not only whether an article is published, but also the quality with which that knowledge enters the scientific literature.

This is an intellectually demanding task that, paradoxically, remains largely invisible. A good review requires specialized knowledge, research experience, critical judgment, and the discernment to distinguish a genuine methodological problem from a mere difference of opinion. It also requires generosity. A good reviewer does more than point out errors: they strive to help improve the work. In this sense, peer review retains a deeply altruistic dimension, grounded in the idea that members of the scientific community also share a responsibility for the collective advancement of knowledge.^{2,3}

The magnitude of this contribution is difficult to grasp. It has been estimated that in 2020 alone, researchers devoted more than 130 million hours to reviewing scientific manuscripts, equivalent to nearly 15,000 years of work. The estimated economic value of that time exceeded \$1.5 billion for reviewers in the United States alone.⁴

These figures take on particular significance when considered in the context of the contemporary economics of scientific publishing. Peer review can be understood as part of the reciprocity that sustains the academic community: today we evaluate the work of others, and tomorrow others will evaluate ours. However, this explanation becomes less straightforward when we consider the economic model underlying a substantial portion of scientific publishing. Researchers produce the knowledge and write the manuscripts, while reviewers contribute their time and expertise without compensation; at the same time, depending on the publishing model, authors or their institutions may pay publication fees, while readers or their libraries may also pay to access the content.

The paradox is particularly evident in journals owned by large for-profit publishing groups: the scientific community itself contributes a substantial share of the intellectual value of the process without compensation, while that same community may have to pay either to publish the knowledge it produces or to access it once published. This does not invalidate the principle of reciprocity that has historically sustained peer review, but it does raise the question of how equitable that principle is and whether it remains sufficient to justify the current model.

If science needs competent reviewers, it must also consider how to value their time, give appropriate recognition to their work, and ensure that an activity essential to safeguarding the quality of scientific publications does not depend indefinitely on an altruistic willingness that seems to be taken for granted.

This tension is now compounded by another, more recent one: generative artificial intelligence.

Editorial recommendations call for particular caution when using generative AI during peer review, primarily

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because of the risks associated with the confidentiality of unpublished manuscripts, intellectual property, and the possibility that generative systems may produce inaccurate, incomplete, or biased information.^{5,6} However, an emerging perspective seeks to distinguish between replacing the reviewer's judgment and using artificial intelligence as a supporting tool.

The Heredia Declaration, published in Costa Rica in 2024, is particularly relevant in this regard. It recognizes artificial intelligence as a tool that can be incorporated into the editorial process but states that it should not replace the responsibilities of those involved in authorship, peer review, and editing. For peer review, it proposes a complementary use of AI, guided by the principles of transparency and human accountability.⁶

The discussion has advanced rapidly. In 2025, editors of *JAMA* and the *JAMA Network* journals explicitly raised the possibility of hybrid peer-review strategies that incorporate artificial intelligence while keeping humans accountable for the process. Potential uses included tasks such as summarizing information, checking for required elements, and identifying reporting issues, while acknowledging that dimensions such as originality, clinical relevance, and contextual interpretation still depend particularly on expert judgment.⁷ In 2026, Zavaleta-Monestel et al. revisited this proposal and cautioned that incorporating artificial intelligence into peer review should not simply aim to accelerate the process, but also to improve its quality and evaluation and to enhance reviewer training.⁸

Perhaps the relevant question is no longer simply whether reviewers should use artificial intelligence, but rather what they might use it for and under what conditions. Delegating the assessment of a manuscript's originality, relevance, or scientific rigor to a tool does not seem equivalent to using that tool to assist with limited tasks, such as organizing the reviewer's own observations, checking formal aspects, or improving the clarity of a comment. The former belong to the core of expert judgment; the latter could, under appropriate conditions, serve as supporting tools.⁵⁻⁸

This distinction does not eliminate the challenges involved. The confidentiality of an unpublished manuscript must be guaranteed, the use of these tools must comply with each journal's policies, and their use should be disclosed when appropriate. Above all, reviewers must retain intellectual control over the process: responsibility for a review cannot be attributed to an algorithm; it rests with the reviewer who signs it.^{5,6}

Artificial intelligence is already part of many activities in scientific research, writing, and editing. Peer review depends on the knowledge, experience, and, especially, the judgment of those who perform it. No tool should replace them. But preserving the human dimension of peer review does not necessarily require forgoing technology. Perhaps the challenge is not to draw a line between reviews "with AI" and "without AI," but rather between what can be assisted and what should not be delegated. Perhaps the question we should be asking is no longer whether reviewers will use artificial intelligence, but which uses we are willing to consider legitimate, transparent, and compatible with the responsibility entrusted to them.

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