Evolution of Peer Review in Scientific Communication

Dmitry Kochetkov[1,2,3]

1. Centre for Science and Technology Studies, Leiden University, Leiden (Netherlands)
2. Department of Probability Theory and Cybersecurity, RUDN University, Moscow (Russian Federation)
3. Institute for the Study of Science, Russian Academy of Sciences, Moscow (Russian Federation)

E-mail: d.kochetkov@cwts.leidenuniv.nl

Abstract. It is traditionally believed that peer review is the backbone of an academic journal and scientific communication, ensuring high quality and trust in the published materials. However, peer review only became an institutionalized practice in the second half of the 20th century, although the first scientific journals appeared three centuries earlier. By the beginning of the 21st century, there emerged an opinion that the traditional model of peer review is in deep crisis. The aim of this article is to formulate a perspective model of peer review for scientific communication. The article discusses the evolution of the institution of scientific peer review and the formation of the current crisis. The author analyzed the modern landscape of innovations in peer review and scientific communication. Based on this analysis, three main peer review models in relation to editorial workflow were identified: pre-publication peer review (traditional model), registered reports, and post-publication (peer) review (including preprints (peer) review). The author argues that the third model offers the best way to implement the main functions of scientific communication.
Keywords: scientific communication, academic journal, peer review, pre-publication peer review, prereview, post-publication review, preprints, registered reports

Introduction

Scientific peer review can be treated as feedback from other scientists (peers) regarding a particular research study. It is one of the key distinguishing features of academic journals (compared to popular and professional publications). Traditionally, the importance of peer review is explained by several reasons. Firstly, it is meant to ensure high quality of scientific research and publications, increasing the level of trust in them within the academic community and among funders. Secondly, peer review helps to identify and correct errors in scientific works that may lead to incorrect conclusions and misguided decisions. Thirdly, it encourages authors to conduct a more thorough and in-depth analysis in their research, ultimately leading to higher quality of scientific results. Traditionally, reviewers evaluate a wide range of criteria associated with the quality of scientific research. E.g., the report commissioned by the House of Commons in the UK (Peer Review in Scientific Publications: Eighth Report of Session 2010-12. Vol. 1, 2011) highlighted the following aspects:

1. Study design and rigor of methodology,
2. Soundness of results,
3. Transparency of data used in the study,
4. Interpretation of results,
5. Whether study objectives are met,
6. Completeness of the study (are the results final or preliminary),
7. Scientific novelty and significance,

8. Ethical issues related to the study and publication.

International journals often require additional assessment of the level of English. However, this is not a comprehensive list, and the list of criteria to be evaluated may vary from journal to journal.

Nevertheless, as early as the beginning of the 21st century, the opinion was expressed that the system of peer review is "broken" (McCook, 2006). The main problem noted by McCook is the increasing number of manuscripts and the burden on reviewers. However, this is just the tip of the iceberg. Allen et al. (2022) highlighted the issue of the "black box": the anonymity of traditional peer review should maintain honesty and ethical norms, but it also can stifle discussion, generate biases, and reduce the overall effectiveness of peer review. In fact, the function of being the "supreme judge" in deciding what is "good" and "bad" science is taken on by peer review, defending the dominant scientific paradigm and stifling the emergence of new ideas that always arise on the periphery. However, as academician L.I. Abalkin once remarked, "no one has the right to usurp the truth" (Sukharev, 2020, p. 44). If we do not change our approach, science will either stagnate or transition into other forms of communication. Moreover, the current system has become an "exploitation machine": publishers benefit in most cases, while reviewers work voluntarily. There is a point of view that peer review is included in the implicit contract of the researcher. Nevertheless, given that most of the research and, accordingly, research positions are funded from public funds, we nonetheless observe a tendency to "reap where they did not sow."

R. Smith (2006) strongly criticized the review while at the same time comparing it to democracy: *"a system full of problems but the least worst we have"* (P. 178). Is this really the case? And can we talk about peer review as a uniform concept, given the variety of existing models? The aim of this article is to formulate a perspective model of peer review for scientific communication. In the following section, we will attempt to demonstrate how the traditional peer review model has developed and how it has come to the current crisis. Furthermore, we will discuss possible ways to overcome the crisis and how the institution of peer review is evolving in the context of global changes in scientific publishing. The scope of this piece is limited to peer review in the context of scientific periodicals, but its findings are quite applicable to the publication of books or conference proceedings[1]. At the same time, review for other purposes, e.g., evaluation of grant applications, is a topic for a separate discussion.

Evolution and crisis of peer review

The practice of peer review emerged much later than the first academic journals. E.g., *Journal des Sçavans*, which was published from 1665 and is considered the first academic journal, printed a warning on the first page *"We aim to report the ideas of others without guaranteeing them"* (Rennie, 1999, p. 2). However, Kronick (1990), argued that peer review as feedback from peers, in the broad sense of the word, existed as soon as scientists began to exchange research results. Peer review emerged in the form of letters, reviews, and comments that appeared after publication (usually in the case of books). A narrower understanding of peer review, as an evaluation of scientific work by peers before publication (prereview), first appeared in 1731 in the first issue of *Medical Essays and Observations*, published by the Royal Society of Edinburgh. In 1752, the Royal Society of London took responsibility for publication of *Philosophical Transactions* and established the "Committee on Papers." The review process was

[1] E.g., an open science experiment during the recent Science, Technology and Innovation Indicators (STI2023) conference (Waltman, Mulati, et al., 2023).

conducted by the members of the Royal Society with the highest expertise in the topics under consideration.

In Russia, scientific periodicals emerged in the first half of the 18th century (Parafonova, 2011). In 1728, the *Monthly historical, genealogical, and geographical notes to the St. Petersburg Vedomosti* began to be published as an appendix to the government newspaper St. Petersburg Vedomosti. In the same year, the first academic journal in Russian, *A Brief Description of the Commentary of the Academy of Sciences,* which featured the works of Academy members in mathematics, natural sciences, and history, started its publication. Both publications were under the supervision of the newly established Academy of Sciences, following the European trend. The Academy was responsible for selecting materials for publication, although we have found no evidence of a systematic peer review procedure. It is interesting to note that the role of the Academy of Sciences in publishing scientific periodicals was preserved in the Soviet period of Russian history.

Despite the emergence of pre-publication peer review in the 18th century, it remained a non-institutionalized practice for a long time. In many publications, peer review was not conducted, and the decision on publication was mainly made by the editor. From this point of view, academic journals of the 17th-19th centuries more closely resembled modern newspapers or popular magazines. E.g., the well-known British medical journal *The Lancet* introduced the practice of obligatory peer review only in 1976. Peer review became a standard practice after World War II (Chapelle, 2014). The rapidly increasing flow of manuscripts played a key role in the institutionalization of peer review, prompting journals to conduct an "entry filtration" of content. Thus, by the second half of the 20th century, the traditional model of pre-publication peer review had been definitively established (Fig. 1).

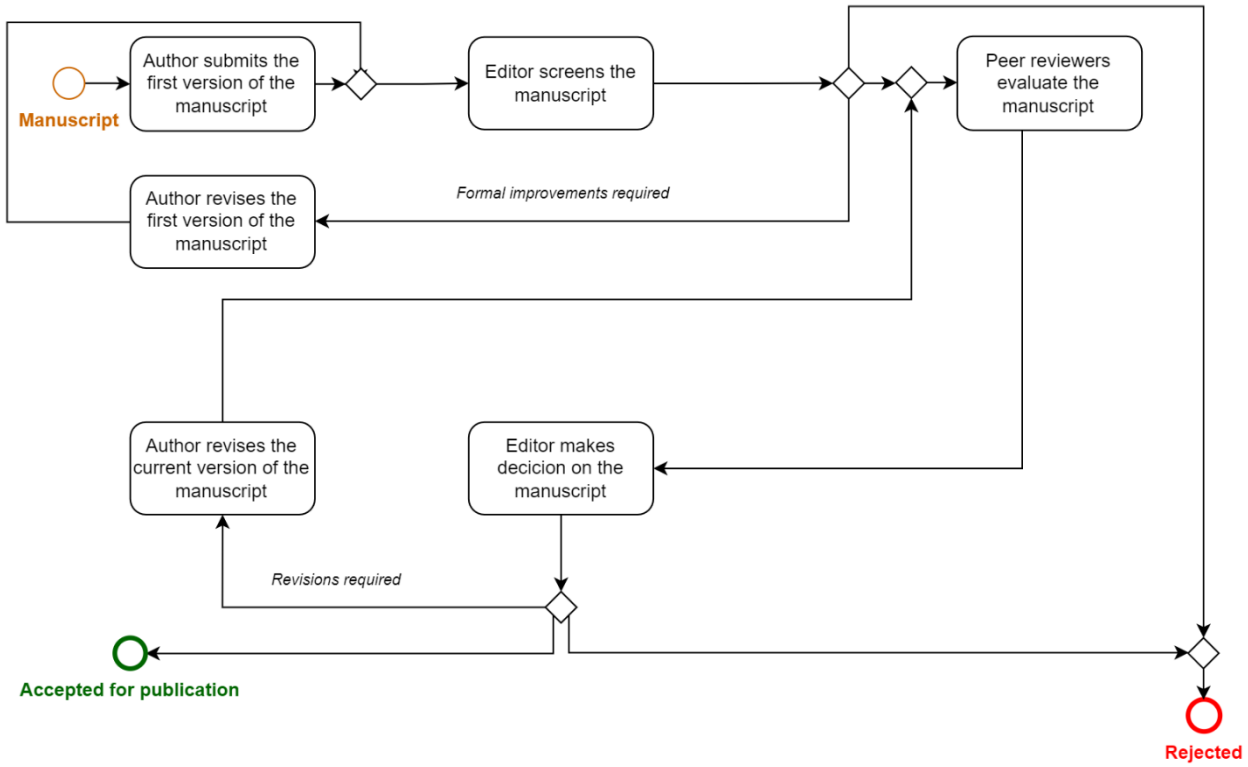

Figure 1. Model 1 - traditional publishing model.

The institutionalization of peer review is manifested in the development of ethical principles, which have been adopted by the majority of the academic community. One of the most well-known documents, *Ethical Guidelines for Peer Reviewers (*2013), was developed by the

Committee on Publication Ethics (COPE). This document contains basic principles for reviewers, which have become common practice in the workflow of academic publishers worldwide. Furthermore, most academic journals have a section on their websites that describes the peer review policy applied by the publication.
Despite the progress in editorial policies, which we observe in the formalization of requirements for the peer review process, opinions have been expressed since the end of the 20th century about a crisis in peer review as an institution. In the Introduction, we have already mentioned some of the existing issues, and now we will consider them in more detail. In particular, the following issues can be highlighted.

1. The rapidly growing volume of manuscripts, coupled with an increasing workload for researchers and faculty, leads to a *shortage of reviewers*. The primary reason for declining to review is the simple lack of time (Tite & Schroter, 2007; Willis, 2016). This issue causes extension of review periods and frustration of authors.
2. The shortage of reviewers forces journals to expand their search. Sometimes, this results in manuscripts being reviewed by researchers who do not possess sufficient expertise in the subject. Several studies have noted a low level of consensus among reviewers (Bornmann, 2011), leading some research to refer to peer review as a "game of chance" (Neff & Olden, 2006). The low level of peer review contributes to the *crisis of reproducibility* in scientific research (Stoddart, 2016). Reviewers should bear shared responsibility for this crisis with authors and editors.
3. The current peer review system exacerbates *inequality* in science. Bias often hides behind anonymity, creating a *"black box"* problem. Despite constant calls for equality and inclusivity in science (COPE, 2021), a few groups still dominate scientific periodicals, such as male authors from the United States and the United Kingdom. Researchers from Michigan State University analyzed 300,000 manuscripts in biological sciences and concluded that authors from historically excluded communities face worse outcomes in peer review, and journal efforts to eliminate reviewer bias have not yet been successful (O. M. Smith et al., 2023).
4. Continuing from point 3, we would like to highlight the fact that in the current model, peer review is often seen to protect widely accepted approaches and concepts to the detriment of novelty. Peer review can inadvertently stifle innovation and radical new ideas (Steinhauser et al., 2012). The process tends to favor established concepts and discourage the publication of unusual or disparate discoveries (Hess, 1975). As a result, it may limit opportunities for game-changing scientific discoveries (Braben & Dowler, 2017)[2]. The neoclassical school in economics may be seen as an example of this phenomenon. The crisis of the neoclassical school began in the early 21st century (Williams & McNeill, 2005), partly due to the inability to explain the global financial crisis of 2008 (Keen, 2015). However, a paradigm shift has still not occurred - the neoclassical school still occupies a central position in the economic science (and the policies of many countries).
5. Finally, the current form of peer review is *simply inefficient*. On the one hand, long peer review slows down the process of disseminating new knowledge (see point 1 for timeframes), and on the other hand, often more than two reviews are required for a single

[2] Here, we must acknowledge that this effect varies significantly across fields. In some disciplines, critical observers worry that journals on the contrary tend to give incentives for inflated claims prioritizing the publication of novel positive results (Nosek et al., 2012). This often forces authors to place scientific novelty over the reproducibility of the results. For instance, such debates have been ongoing in psychology for a long time (Open Science Collaboration, 2015).

article. The reason for this is that when authors receive a rejection from one journal, they often submit the same article to another journal, starting the entire process anew. Aczel et al. (2021) found that in 2021, reviewers worldwide spent over 100 million hours, equivalent to more than 15,000 years. If we evaluate this time in terms of money, the cost for reviewers in the USA amounted to over $1.5 billion, in China over $600 million, and in the UK around $400 million. Therefore, peer review is a quite costly activity, and currently, doubts arise regarding the efficiency of its utilization.

Innovations in peer review

We have demonstrated the current crisis of the traditional peer review model. In this regard, the question arises about the possible ways to overcome the crisis. Recently, a lot of literature has been published on innovations in the field of peer review (see reviews Kaltenbrunner et al., 2022; Woods et al., 2022). Waltman et al. (2023) classified innovations in peer review into four "schools of thought." We propose adding a parameter to this typology that will characterize innovations relative to the currently dominant publication workflow (incremental / radical). It enables creation of a two-factor matrix (Table 1).

Table 1 – Matrix of innovations in peer review.

Course of changes	Character of innovations	
	Incremental	Radical
Quality and reproducibility	- Training of reviewers - Software for "automatic" reviewing - Reviewing of data/code	- Registered reports
Democracy and transparency	- Review of methodological quality and rigor only - Open peer review	- Post-publication (peer) review (including preprints (peer) review)
Equity and inclusion	- Diversity of editorial boards - Reducing biases - Double blind peer review	
Efficiency and incentives	- Recognition of the reviewer's work - “Portable” peer review	- Journal-independent peer review

Source: compiled by the author based on Waltman et al. (2023).

We should acknowledge that the above-mentioned innovations can simultaneously be placed in different groups. For example, registered reports not only aim to improve the quality of peer review, but also aim to contribute to its efficiency. Now, let's consider each of the directions in detail.

Quality and reproducibility

Training of reviewers through seminars and online courses is part of the strategies of many publishers[3]. At the same time, we have not been able to find statistical data or research to assess the effectiveness of such training. Software for automatic evaluation of scientific papers based on

[3] E.g., Certified Peer Reviewer Course by Elsevier. URL: https://researcheracademy.elsevier.com/navigating-peer-review/certified-peer-reviewer-course (date of access: 22.01.2024).

artificial intelligence (AI) has emerged relatively recently (StatReviewer[4], UNSILO[5])[6]. We can also allocate here the package for checking statistical analysis *statcheck*[7]. Currently, these are just auxiliary tools that cannot replace human labor (Baker, 2015; Heaven, 2018), but considering the pace of development of generative AI technologies, these tools have a great future. The increasing role of data in scientific research has led some publishers to recognize the need for review of datasets (e.g., PLOS (*A Reviewer's Quick Guide to Assessing Open Datasets*, n.d.). This also applies to review of code in research papers[8].

We have identified registered reports as a radical innovation because it changes the view of the publication workflow and the object of peer review (*Registered Reports: Peer Review before Results Are Known to Align Scientific Values and Practices.*, n.d.). Registered reports are a special type of empirical publication that reflects a hypothetico-deductive approach in science (Fig. 2). Studies are registered and undergo the first stage of review at the early stages of research process. In this case, the research question and methodological approach are evaluated directly. If the peer review results are positive, the study is provisionally accepted for publication, after which data collection, analysis, and interpretation are carried out. These steps are followed by the second stage of peer review, during which the conducted study is compared to the previously registered methodological approach (study protocol).

[4] StatReviewer. URL: http://statreviewer.com/ (date of access: 22.01.2024).
[5] UNSILO. URL: https://site.unsilo.com/site/ (date of access: 22.01.2024).
[6] At the same time, plagiarism detection systems have existed much longer, for example, "Antiplagiat," a well-known system in Russia, originated in 2005.
[7] statcheck. URL: https://michelenuijten.shinyapps.io/statcheck-web/ (date of access: 22.01.2024), also R package.
[8] Among recent initiatives, we can mention CODECHECK. URL: https://codecheck.org.uk/process/ (date of access: 22.01.2024).

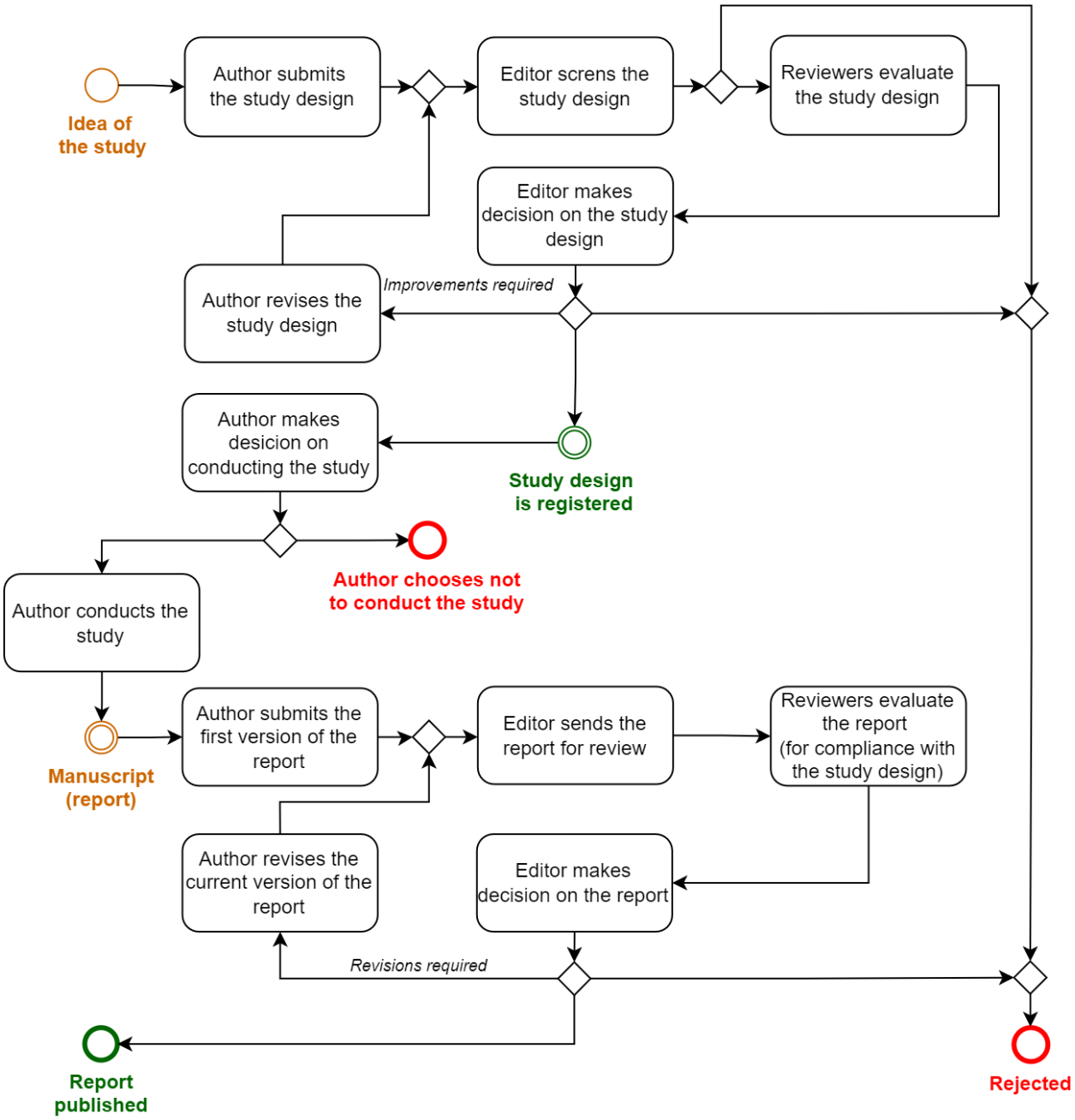

Figure 2. Registered reports - publication workflow (Model 2).

It should be noted that most initiatives aimed at improving the quality of peer review simultaneously increase the costs.

Democracy and transparency

The approach to peer review in which only the rigor and soundness of the methodology are reviewed (as applied, for example, in PLOS ONE and Scientific Reports) somewhat resembles registered reports, with the difference that the review is conducted in a single stage. This preserves the traditional publication workflow but changes the object of review. The key motivation in this case is that the broader academic community will be better able to assess the significance and contribution of the study than just editor and peer reviewers (Spezi et al., 2017). The next level of "openness" is open peer review, where the reviews are available to readers along with the published article (biomedical journals such as BMJ and BMC were pioneers in adopting this innovation). Wolfram et al. (2020) identified 617 journals that published at least

one article with open identities or open peer review reports as of 2019. Though a steady growth of open peer review adoption has been observed recently, publishers have implemented this practice in different ways, resulting in different levels of transparency. Another issue is that in the case of rejection, only authors see the reviews.

Post-publication review, which is most often implemented in the form of open review of preprints, can be considered the most transparent approach. This approach radically changes the essence of peer review. It is no longer a tool for deciding whether to publish a paper or not, but rather a platform for discussion. Publication is no longer the final stage of work; it becomes its starting point. Platforms such as eLife[9] and F1000Research[10] use a model called "Publish-Review-Curate" (PRC). The MetaROR project using this model of review is expected to launch this year (Kaltenbrunner et al., 2023). The PRC model is shown in Fig. 3. It is important to note that for each specific case it will be slightly different. E.g., in the case of MetaROR, the publication is initially hosted on preprint servers such as arXiv, MetaArXiv, SocArXiv, bioRxiv, or OSF Preprints.

[9] eLife. URL: https://elifesciences.org/ (date of access: 22.01.2024).
[10] F1000Research. URL: https://f1000research.com/ (date of access: 22.01.2024).

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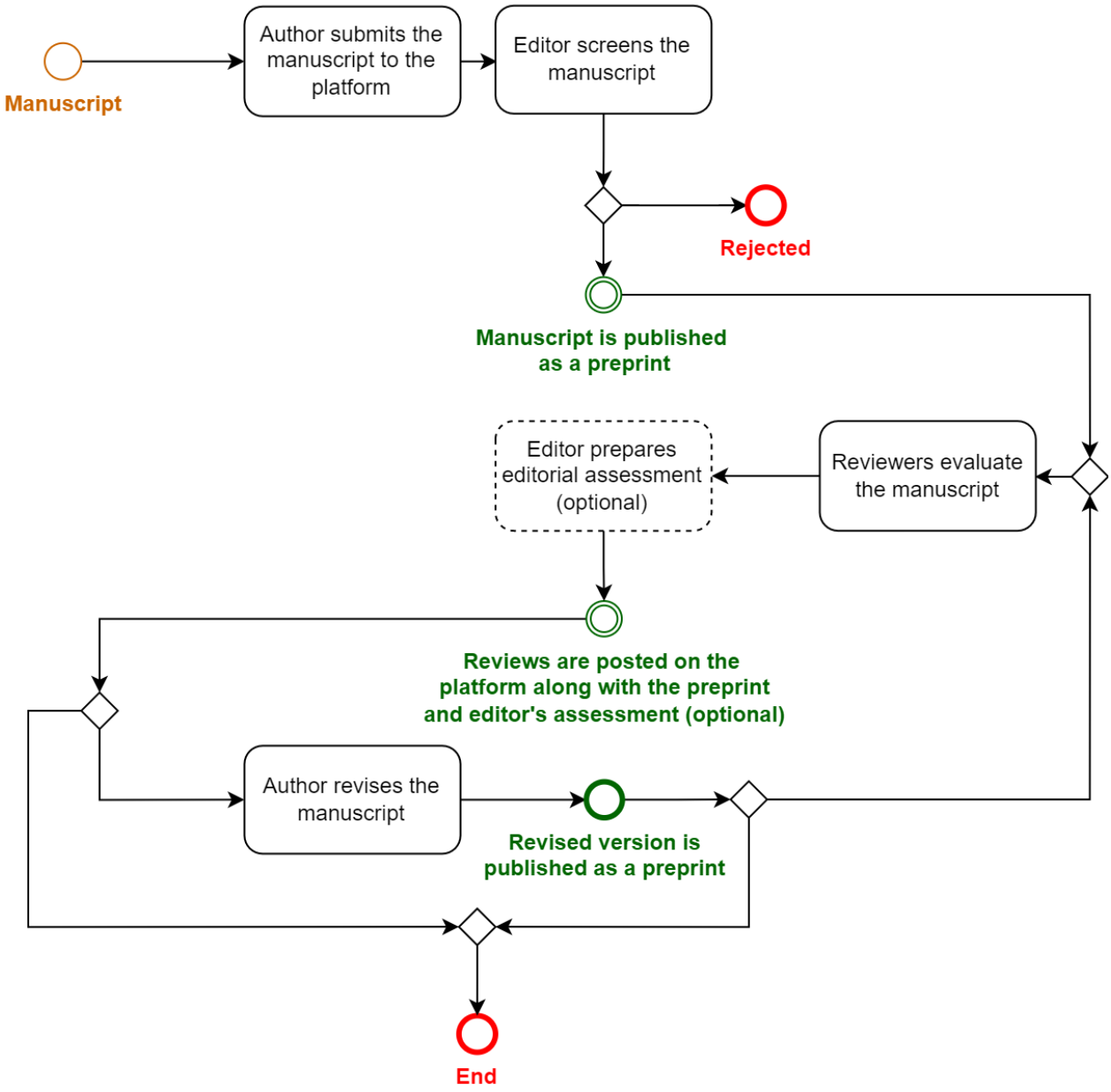
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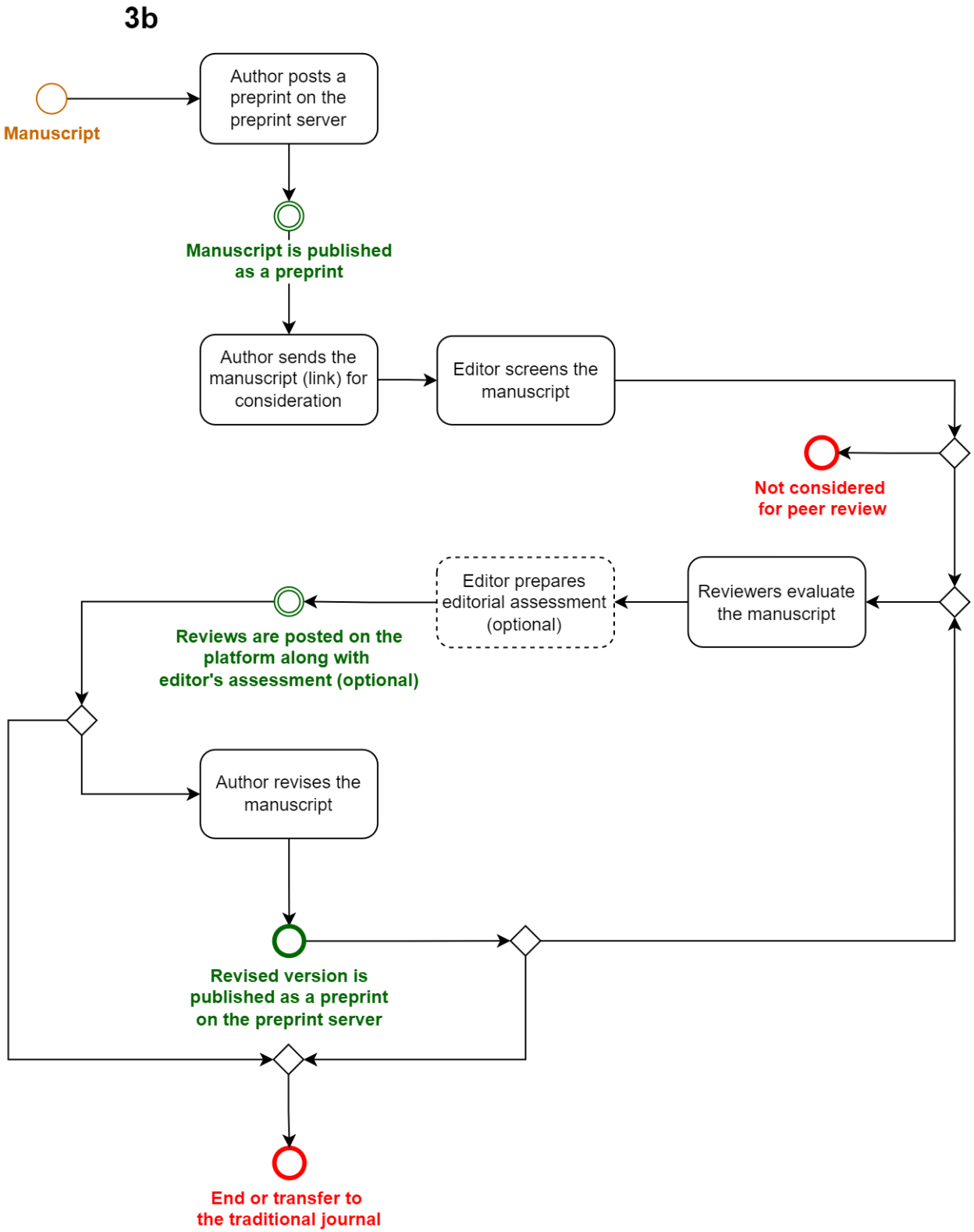

Figure 3. "Publish-Review-Curate" model (Model 3). Model 3a involves uploading the manuscript directly to a platform (e.g., F1000Research). Model 3b, on the other hand, involves initially posting a preprint on a preprint server such as MetaArXiv or OSF Preprints.

In addition to the projects mentioned, there are other platforms, for example, PREreview[11], which departs even more radically from the traditional review format due to the decentralized structure of work.

[11] PREreview. https://prereview.org/ (date of access: 22.01.2024).

Equity and inclusion

The principles of equity and inclusion, as well as the inappropriateness of biases of different origins (geographic, gender, ethnicity), are reflected in numerous recommendations (e.g., COPE, 2021; Royal Society of Chemistry, 2020) and policies of most major academic publishers. However, as mentioned above, the results of implementing these policies are still far from successful, and perhaps these processes require more time. Double-blind peer review is intended to protect the identity of the author and thereby prevent bias in the review. This practice has been used for quite a time in the social sciences and humanities (Horbach & Halffman, 2020; Karhulahti & Backe, 2021). However, anonymity is very conditional - there are still many "keys" left in the manuscript, by which one can determine, if not the identity of the author, then his country, research group, or affiliated organization. On the other hand, the reviewer's identity is much more securely protected. This issue is especially evident in localized communities: in Russia we often encounter deliberately positive or deliberately negative reviews (Sukharev, 2020). The same is true in specialized fields where reviewers may have conflicts of interest (Rühli et al., 2009). Thus, "closeness" is not a good way to address biases.

Efficiency and incentives

Any work requires not only an internal motive, but also external incentives. Peer review, as one of the key activities in science, requires appropriate recognition. This practice is implemented in the form of certificates of recognition from academic publishers, as well as records reflected in the profiles of researchers on various platforms (Web of Science, ORCID). Unfortunately, at the moment, peer review is practically not taken into account in the systems of reward and recognition of researchers and faculty adopted at universities and at the national level. Note that open review increases the visibility of reviewers' work, which should potentially affect recognition.

As mentioned, traditional peer review faces efficiency issues. This is largely due to the fact that the same article, having been rejected in one journal, is submitted to another, where peer review process begins from scratch. One way to solve this problem would be to transfer reviews between journals, also known as "portable peer review." At the moment, this model is used by large publishing houses (manuscript transfer to another journal of the same publishing house). There are also consortia of journals, such as the Neuroscience Peer Review Consortium (Saper et al., 2009), as well as Manuscript Exchange Common Approach (MECA), an initiative that supports the exchange of manuscripts and reviews between journals and platforms, including preprint servers (*NISO RP-30-2023, Manuscript Exchange Common Approach (MECA) (Version 2.0.1)*, 2023). Although review exchange reduces peer review costs, it doesn't significantly change the editorial workflow; thus, it is simply an add-on to Model 1 (the traditional model). The idea of exchanging reviews has evolved into journal-independent peer review. The Reviewer Commons[12], a consortium of 23 life sciences journals, brought this idea into practice. A manuscript is published on a preprint server and undergoes independent review, following which the author can revise the paper and submit it to one of the consortium members. Improving the quality of peer review is achieved by ensuring that reviewers focus on the manuscript itself, rather than the question whether it fits a particular journal. However, we believe that journal-independent peer review is a special case of Model 3 ("Publish-Review-Curate").

Modular Publishing

[12] Reviewer Commons. URL: https://www.reviewcommons.org/ (date of access: 22.01.2024).

Strictly speaking, modular publishing is primarily an innovative approach for the publishing workflow in general rather than specifically for peer review. This is why we have placed this innovation in a separate category. Nevertheless, modular publications can potentially have a significant impact on peer review practices. Modular publication platforms are like preprint servers, except that they publish not an entire manuscript, but individual significant fragments of it (hypotheses, methodologies, datasets, program code, etc.). These items essentially represent the different stages of a research process. This approach could potentially allow for feedback on each stage completed.

The most well-known initiatives at the moment are ResearchEquals[13] and Octopus[14]. ResearchEquals allows to upload 37 research modules, one of which is "Other". There is a separate "Review" item. The research modules can be uploaded in any order. Octopus assumes uploading eight research elements in a certain sequence (one of which is peer review), which is more consistent with empirical research. Thus, both platforms offer open post-publication review. Octopus assumes the possibility of revising previously published modules; in ResearchEquals, there is no possibility of versioning. Based on this, we can conclude that the review in the modular publishing resembles Model 3, while the idea itself may be seen as an extension of Model 2. Currently, some of the features are not being implemented due to the technical limitations of the platforms.

It should also be mentioned in this section that the Center for Open Science is going to launch a new model of scientific communication called Lifecycle Journals[15]. We have very little information about this project yet. Nevertheless, since the description mentions the simultaneous use of Registered Reports and post-publication review, we can assume that the model will have similarities with modular publishing.

Discussion and Conclusion

In the previous sections, we briefly examined the evolution of the peer review and its current crisis in relation to scientific communication. Next, we explored the main innovations in peer review, which can be classified according to the course of proposed changes and the degree of influence on the editorial workflow, incremental and radical. As a result, we can conclude that, at present, there are three major models of peer review and related editorial workflow:

- Model 1: traditional model (pre-publication peer review),
- Model 2: registered reports,
- Model 3: “Publish-Review-Curate” (post-publication review).

Table 2 presents comparative characteristics of these models.

Table 2 – Comparative analysis of the three review models in terms of editorial workflow

Comparison options	Model 1	Model 2	Model 3
Content available to the reader	- Final version - Peer reviews (optional) - Preprint (optional)	- Final version of the manuscript on the platform - Peer reviews (optional)	- Preprint (multiple versions) - Reviews - Editorial assessment (optional)

[13] ResearchEquals. URL: https://www.researchequals.com/ (date of access: 28.02.2024).
[14] Octopus. URL: https://www.octopus.ac/ (date of access: 28.02.2024).
[15] Managing Editor (job announcement). Center for Open Science. URL: https://jobs.lever.co/cos/1db59b80-02fc-4c5e-bedc-74cb08f0210f (date of access 19.03.2024).

		- Preprint (optional)	- Final version in traditional journal (optional)
Editor's role	Decision making	Decision making (limited)	Ensuring the quality of scientific communication (does not require making accept/reject decisions)
Aim of review	Manuscript evaluation in order to identify its strengths and weaknesses, help authors improve their work, and finally make a decision on acceptance for publication (1 stage)	Manuscript evaluation in order to identify its strengths and weaknesses, help authors improve their work, and finally make a decision on acceptance for publication (2 stages)	Manuscript evaluation aimed at identifying its strengths and weaknesses
Object of review	Manuscript as a whole (methodology, relevance, novelty, results, etc.), sometimes only the methodology	Manuscript in terms of study design and execution	Manuscript as a whole (methodology, relevance, novelty, results, etc.)
Types of research	Any	Empirical	Any

We can also compare the three models in terms of the main functions of science communication (Table 3).

Table 3 - Comparative analysis of the three models of review in terms of functions of scientific communication

Functions of scientific communication	Model 1	Model 2	Model 3
Registration	After final version is published*	After final report is published*	Immediately after publication of the preprint
Dissemination	With a time lag (editorial processes, review, production) *; in the case of a subscription distribution model, there are financial costs of accessing information	With a time lag (editorial processes, review) *; in the case of a subscription distribution model, there are financial costs of accessing information	Immediately after the publication of the preprint; with time lag, readers have access not only to the publication itself, but also to reviews and editor's assessment (optional)
Certification	Provided by the opinion of the editor and peer reviewers	Provided by the opinion of the editor and peer reviewers	The reader forms his own assessment based on open

	(most often anonymous)	(most often anonymous)	reviews and the editor's assessment (optional)
Archiving	Journal/publisher server	Digital storage, also journal/publisher server	Preprint servers, publishing platform; further, the article may also be published in a traditional journal (optional)

* Preprint is optional for Models 1 and 2.

Thus, in Model 3, all functions of scientific communication are implemented most quickly and transparently. The additional costs arising from the independent assessment of information based on open reviews are more than compensated by the emerging opportunities for scientific pluralism. Model 3 corresponds to the vision of the International Science Council (ISC) on "more efficient and effective modes of peer review that are inspired by open norms" (International Science Council, 2023, p. 12).

The traditional publication process model with a "black box" peer review inside is increasingly proving its inadequacy. Registered reports are promising but are exclusively focused on empirical research. The "Publish-Review-Curate" model is universal and is the future of scientific publishing. The transition will not happen today or tomorrow, but in the next 5-10 years, the number of projects such as eLife, F100Research, or MetaROR will rapidly increase. We should also note that the constructive elements of Model 3 can be transferred to Model 2 (in terms of openness of the review process, especially on the first stage).

At the same time, we must recognize the complexity of institutional change. The possibilities for normative regulation here are quite limited - much depends on the traditions embedded in the academic community, and it will take a lot of time to change them. Openness is a complex process that requires three conditions:

1. group of people willing to take responsibility for the quality of scientific communication in this academic community,
2. authors and reviewers willing to accept this practice,
3. appropriate infrastructure.

Avissar-Whiting et al, (2024) provided a useful toolbox of recommendations for all parties potentially involved in the preprint review process.

Post-publication review is a return to the roots of scientific communication. This model will allow all actors involved to take greater responsibility for their work, authors for their articles, reviewers for their assessments, and editors for supporting the process of scientific communication. This is the atmosphere of scientific discussion that we need very much. However, it is important to acknowledge that current peer review practices vary significantly across fields. While prepublication peer review is prevalent in almost all fields, there are numerous variations in terms of its openness or anonymity. Additionally, while some fields have successfully incorporated innovations, others continue to resist. E.g., preprint publishing has been the dominant form of publication in physics since 1990s (Ginsparg, 2011), and open peer review was introduced in biomedical journals prior to other domains (e.g., BMJ or BMC). At the same time, the social sciences and humanities (SSH), in terms of their peer review and publication process, remain relatively closed (Ross-Hellauer & Horbach, 2024).

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