The Perspective for the Emergence of the Overlay Journals in Russia

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Abstract. More and more scientists are becoming adherents of the "Fair open access" movement, which offers a new organizational solution. The journal's founder must be an independent non-profit organization that hires a group of performers to provide editorial and publishing services. Editors and publishers should not have their own commercial interests. Funding for a scientific journal should be provided by the general contribution of universities, research organizations, and other sponsors. The overlay journal as a modern type of a scientific journal is discussed. The cost of publishing for the overlay journal is so low that the journal can implement the "free for the author, free for the reader" scheme. The overlay journal relies on Open preprint repositories (servers). The online overlay journal reviews the article received from the repository. If the article is accepted for publication, a journal publishes the article metadata on its website, and the article itself (its full text) is again placed in the repository. This working way does not overload the repository functionality, but it allows you to reduce the overlay journal's financial burden. The developed infrastructure of Open access and preprint servers in Russia will be a good basis for the mass appearance of overlay journals offering free services to authors and readers.

Keywords: Scientific journal, Online scientific publication, Fair Open access, Preprints archive, Overlay journal.

1 Introduction

The author discussed overlay journals at the conference "Scientific service on the Internet" [1]. The discussion showed that this topic could be covered from different projections. It is particularly interesting to compare the practice of publishing scientific journals in Russia and Western countries, where there are more favorable conditions for overlay journals.

Scientific journals in Russia and the West developed in different ways. In Russia, the publisher did not consider the publication of a scientific journal as a commercial project aimed at making a profit. Funding for scientific journals was provided by budget structures [2]. Editorial and publishing preparation of academic journals was often carried out in institutes by employees. Journals were printed based on state

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printing plants. University journals were produced by publishing departments of universities. Scientific journals were distributed by subscription to institutes and universities' scientific libraries within budget funding. Simultaneously, the subscription price was low since there was no commercial component in the subscription price. Some of the print editions were distributed through bookstores. Any researcher could afford to buy an exemplar of a journal: it cost barely covered the printing costs.

In the West, publishing scientific journals has become a profitable business. In this market in the 60–80 years of the last century, several large publishing houses appeared, which built successful financial and organizational schemes that allow getting high profits on the publication of scientific journals. The publishing industry's development was dictated primarily by commercial interests, not by the interests of scientific development. The well-known journalist S. Buranyi wrote in detail about the West's scientific journalism history in the Guardian [3].

2 The history of the development of Western scientific journals

Stephen Buranyi compared two business models: publishing a journal aimed at the General public and publishing a scientific journal aimed at researchers. These two types of publishing activities differ significantly in financial costs. The publisher of a socio-political journal must consider many expenses, concerning payment of royalties to authors, artistic design of the publication, organization of subscription and retail sales of the journal, etc. The scheme for making money on scientific journals is different. The work of the authors of articles is financed from the budget or scientific funds. Authors submit their articles to the journal for free. The publisher of the scientific journal pays for the editorial and publishing preparation of the article. But the main editorial burden is reviewing. Only an experienced scientist can conduct a review. In scientific journals, peer review is usually performed voluntarily.

The scientific journal is then transferred by paid subscription to institutes and universities' libraries, and this subscription is guaranteed to be paid from the budgets of scientific and educational institutions. Thus, the state pays for scientific articles three times: the state finances research, pays the salaries of most of those who review articles and then buys the product produced by researchers through paying for subscriptions to journals. In this scheme, the publisher's profit of a scientific journal reaches 30–50%, which significantly exceeds the publishers' profit of journals for the General public.

It is not surprising that the publication of scientific journals has become a large and very profitable business. Powerful global giants that have entered this business are doing everything possible to ensure that scientific journals' publishing business continues to develop successfully. Commercial publishers are still actively creating new scientific journals, responding to the global trend of increasing the number of scientific publications in the world. The more journals are produced, the greater the profit of publishers.

Many scientists are already aware that the publishing industry has too much influence on what scientists choose to study and what genre scientific material is presented. It is profitable for journals to sell sensationalism. This technique is successfully used by the mass media, publishes hot news from the field of politics or the life of show business stars. The publisher of a scientific journal is interested in stunning news from the world of science. And scientists choose to study such material, which can then be presented profitably as an impressive result. It doesn't matter how important this result is for science; the main thing is that the journal well receives it. Publishers know, for example, that the public is interested in apocalyptic stories. And if the author creates an article with dramatic results of the behavior of his model of the world, the journal will willingly accept this material: the journal has a chance to increase its rating and expand its subscription.

A scientific article is currently the most natural way to present the achievements of science. If scientists discuss scientific problems, correspond with colleagues, and share their observations but do not publish articles, all the information circulating in conversations and correspondence will be lost to science. Writing articles has become a necessary element of a scientist's professional activity. High publication activity began to determine the status of a scientist and influence his professional growth. Publishing has become an integral part of science.

In 1960, publishers began to use the new metric, invented by Eugene Garfield – the impact factor. The metric was invented to count the number of citations of the journal article from other articles. Later, based on the citation data, the Science Citation Index (SCI) database was formed (now it belongs to the American company Clarivate Analytics).

Garfield's invention revolutionized the world of scientific journals. Publishers saw this indicator as a way to rank journals. Journals with a high impact factor moved to the first positions in the ratings, journals with a low impact factor joined the endless struggle for a high indicator. The impact factor has become a prestigious currency. Following the appearance of a new publication currency, a field of activity for currency speculators was formed: numerous proposals to raise any journal's impact factor artificially.

The invention of the impact factor also influenced the behavior of scientists. Now it matters which journal to publish the article in. For publication in a journal with a high impact factor, the scientist received more conditional "points" that affect his career. High citation rates began to influence the academic success of the scientist, his promotion. Authors with high citation rates are more likely to be published in a prestigious journal since such authors are more likely to increase the journal's impact factor. The circle has closed: the world of scientific periodicals began to revolve around the impact factor – an artificial and crude indicator of citation, which is implemented by simple calculation of bibliographic references without any attempt to analyze the context and reasons for citation.

Note that Russian scientists who did not have active cooperation with commercial, scientific journals remained under the illusion of the importance of citation indicators and the particularly high scientific level of prestigious Western journals with a high impact factor for a long time. There is no doubt that the Russian structures that manage science have also become the object of massive propaganda from lobbyists of Western commercial journals and bibliographic databases. In recent years, the Minis-

try's reporting on institutes' research activities has made clear that Russian scientists should be published in Western journals indexed in the commercial product Web of Science. Unfortunately, such calls kill Russian scientific journals and hinder the development of scientific publications' national infrastructure.

3 Open access and preprint archives

The philosophy of Open access journals opposed to paid access. The open access movement has a long history. In the early 2000s, the Budapest Declaration on free access to research results carried out with state funding was announced. In 2003, the Berlin Declaration on Open access was adopted. These initiatives were supported by Western scientific foundations, which obliged researchers to publish the results of research they funded as Open access. Thanks to Open access advocates' efforts, the landscape of scientific publications has changed markedly over the years. Open access journals began to appear in large numbers, serious competitors to traditional commercial, scientific journals. However, the problem of open access to scientific publications has not yet been fully and definitively resolved. In 2018 The European Union adopted Plan S, which calls for making open access a reality by 2020. The plan offers concrete steps to introduce open access to a wide range of scientific journals. However, the volume of issues raised was so large that mandatory Open access was postponed to 2024.

As already noted, Open access in Russia has its own characteristics. While in the West in the 60–80s, such large commercial publishing houses as Springer, Elsevier, Wiley, and Informa were gaining strength. In Russia, scientific institutes, universities, and organizations with budget funding were engaged in publishing scientific journals. The publication of Russian scientific journals was not considered a commercial enterprise aimed at making a profit. There are no publishing houses in Russia that would risk setting up the publication of scientific journals on a commercial basis: serious business on the publication of scientific journals in Russia is hardly possible. The Academy of Sciences established the most authoritative scientific journals in conjunction with academic institutions. The editorial and publishing preparation of these journals was carried out. Unfortunately, after the collapse of the Union state and during the advent of the Internet, these journals abandoned the policy of Open access.

In 2018, such a serious regulatory and Supervisory body as the Accounts Chamber of the Russian Federation pointed out the inadmissibility of restrictions on free access to academic journals created with budget funding [4]. After this remark, academic journals appeared in the public domain, but only for a few months. Now many academic journals are again under the embargo. Information about access to Russian scientific mathematical (some physical and natural science) journals is available on the MathNet website (http://www.mathnet.ru/ej.phtml?option_lang=rus).

The idea that the results of scientific research should be freely available is close and understandable to scientists. But scientists were held hostage by the publication policy of paid journals. Fortunately, there is such a type of scientific publication as a preprint. It is preprints that solve the problem of free access to the results of scientific research. We should recall the history of the open archive of arXiv preprints in physics, mathematics, computer science, quantitative biology, and some other natural science disciplines. The Creator of arXiv is the theoretical physicist Paul Ginsparg, who created it in 1991, a simple program for collecting preprints received by email with the possibility of other researchers accessing the collected texts. Focused on a group of specialists, the archive of preprints quickly became a popular resource for physicists and representatives of other natural science fields.

Now arXiv has become a powerful and authoritative service containing more than 1.77 million articles. Incoming materials are moderated, which classifies the materials as relevant to the subject area and scientific value. Incoming articles are not reviewed. But this fact does not prevent scientists from turning to arXiv in search of up-to-date scientific information.

The history of the emergence of arXiv shows that the community of scientists is aware of its own interests, does not agree to the passive role of consumers of products of commercial publishing structures, and has a great creative and organizational potential to implement important infrastructure projects.

Plan S developed by the European Union emphasizes the importance of selfarchiving articles and the role of Open archives and Preprint servers for hosting scientific results. It is noted that Preprint archives have great potential for editorial and publishing innovations.

4 Preprints place in the infrastructure of scientific publications

In Western scientific institutions and institutes of the Russian Academy of Sciences, scientists can place research results in the form of preprints on the Institute's websites, repositories, and electronic libraries without restrictions [5]. Placing preprints in the public domain is a natural process that widely implements the author's right to publish his scientific work results. Materials of preprints can be published in journals in the future. Let's look at how legal issues related to the publication of preprints are permitted in Russia.

The Preprint contains the author's results of scientific activities conducted at the expense of budgetary funds. From a legal point of view, a Preprint is the result of intellectual activity granted by state protection. The civil code of the Russian Federation introduced the concept of "official work". The exclusive right to use the official work (Preprint) belongs to the employer. Simultaneously, the author of the Preprint has the right to a name and other personal non-property rights.

The contract regulates all issues related to creating official works by the organization and the author that the organization must conclude with the author. For example, in a contract, an organization may allow an author to independently enter into license agreements with publishers to publish articles prepared based on a Preprint, make changes to articles based on the results of peer review conducted by journals, etc.

Where can an organization that has exclusive rights to official works created by its employees publish a Preprint? The most appropriate place to publish official works is an open repository or an organization's website. Such publication of preprints is carried out without any external agreements and approvals. By publishing preprints on its open resources, the organization demonstrates its scientific status, brings the results to an interested audience, and earns credibility in the scientific community. In legal terms, the organization exercises its exclusive right to official work.

Some publishers require an exclusive license from the author (copyright holder) when entering into a license agreement to publish an article. Some publishers believe that after signing the contract, the author will not publish the Preprint on their site. However, this is not the case. The Civil Code of the Russian Federation protects the rights of authors and copyright holders – scientific organizations. The conclusion of a license agreement with the publisher does not entail transferring the exclusive right to the publisher. If the employer instructed the author to sign a copyright agreement with a publisher under an exclusive license, the employer always retains the right to publish the original version of the article (Preprint) on its website under a simple, non-exclusive license. [6, 7].

Open access journals usually do not restrict the author and employer from publishing an accepted article on the organization's website. However, paid journals may prohibit the author from publishing an Open-access version of the article edited based on the reviewers ' comments. Moreover, the agreement between the author and the publisher often unfairly restricts the author's rights to communicate the results of their work to the scientific community [8].

5 Moving towards Fair Open access

Open access journals provide their readers with free access to the journal's materials. The business model of Open access journals assumes that contributions from the authors of articles reimburse expenses. For the publication of the article, the author will be asked to pay 1–4 thousand us dollars. Simultaneously, there are other examples: the author of the preprint does not pay anything for publishing in the open archive arXiv. In arXiv each article is previewed to determine the sufficient scientific level and actuality of the preprint for the relevant scientific field. The cost of each preprint is estimated at only \$10, and the costs are borne by Cornell University (USA) [9].

The restricted access to scientific journals is implemented by well-known Western publishers Springer, Elsevier, Wiley, and Informa. Many scientists rightly believe that these major publishers' peer-reviewed journals provide high academic standards and deservedly have high ratings. According to some reports [9] the publication of one peer-reviewed article in the journal Nature costs 40 thousand dollars. If you compare this cost with the cost of publishing a single moderated preprint in arXiv, then the question arises: what stages of editorial and publishing preparation required such high costs? Perhaps everything is much simpler: the publisher of the journal Nature ensures a comfortable existence by obtaining super-profits. The journal receives this extra profit by collecting money from the reader through a paid subscription and trading individual articles.

Recently, there has been a tendency to combine two alternative policies regarding access to articles in one journal – such journals have become known as hybrid ones. Some paid journals offer the author to pay an additional fee so that his article is publicly available. If a commercial journal earns money from a subscription, then this offer means that the journal earns twice from an article: both from a subscription and an additional open access fee for individual articles.

Still, many enthusiasts in the scientific world advocate the principles of Open science. A big stir at the time was the appearance of the pirate site Sci-Hub, which allowed anyone to download scientific articles for free. Its Creator Alexandra Elbakyan is accused of hacking and copyright infringement in the United States. The Elsevier publishing house sued Elbakian for a substantial sum. However, the Creator of Sci-Hub denies the charges: in her letter to the court, she referred to article 27 of the United Nations Universal Declaration of human rights, asserting the right of everyone to participate in scientific progress and enjoy its benefits. Another indisputable thesis of Elbakyan is that science should be under the control of scientists.

In the West, the concept of Fair Open access is becoming increasingly popular. A group of scientists and library staff promoting this concept has joined the Fair Open Access Alliance (FOAA). The Alliance strongly criticizes the commercialization of scientific journals and offers a new organizational solution [10]. The journal's founder must be an independent non-profit organization that hires a group of performers to provide editorial and publishing services. Editors and publishers should not have their own commercial interests. Funding for a scientific journal should be provided by the general contribution of universities, research organizations, and other sponsors. These contributions should not be linked to individual articles or groups of authors. Contributions from authors or their sponsors are not excluded, but they must be voluntary and unobtrusive. The absence of a contribution cannot be a reason for the author's refusal to publish. Journals should also not reject the author's article if the author's organization is not a journal sponsor.

Publication fees should be small, no more than one thousand US dollars, or even lower. The entire publishing process and distributing the journal should be transparent and exclude any commercial interests at any stage. All costs should be clear to the founders and sponsors.

Journals that support the principles of Fair Open access are grouped into associations and networks. An example of such a network is the Free Journal Network [11]. The network's organizers' main goal is to help journals coordinate their efforts to promote journals and switch journals with commercial subscriptions to the Fair Open access scheme. The network coordinates its work with such divisions of FOAA as Lingua, Match, Plio, which focus on working with journals of their thematic areas. These organizations strive to demonstrate that the Fair Open access model has more merit than the subscription-based commercial journal model.

6 The overlay journal

Consider a modern type of online scientific journal – an overlay journal [9]. The overlay journal operates according to the Declaration of the Fair open access movement – it aims to reduce the cost of publication as much as possible, relying on the enthusiasm and responsibility of the scientific community. The cost of publishing an overlay journal is so insignificant that the journal can afford to implement the "free for the author, free for the reader" scheme.

The overlay journal implements an unconventional scheme for organizing interaction between the author and the Editorial Board, which consists of the following steps:

- the author sends an article to the journal, previously placed in the preprint archive,
- the journal reviews the article,
- the accepted version of the article receives a DOI and is placed in the Preprint archive,
- the journal publishes the article metadata and a link to the full text of the article in the Preprint archive.

The journal's overlay scheme can be demonstrated using the example of the Open Journal of Astrophysics [12].

The journal is peer-reviewed and has an editorial board, just like a traditional journal. The journal accepts articles published in arXiv. The thematic sections of the journal coincide with the subsections of the Astro-ph category in arXiv. Therefore, the task of determining the article's subject when submitting an article from arXiv is removed. If the author has placed the article in this preprint archive, his article fits into the journal's thematic structure without any problems.

Articles published in the journal must use the CC BY-4.0 license. This type of license allows copying, distribution, modification of the article, and the creation of derivative works based on this article, but only if the original author is indicated. In case of modification or a more serious revision of the article, the new version may be distributed under a different license. If the author's article was published in arXiv with a more limited license, this circumstance does not prevent the author from specifying a less strict CC BY-4.0 license for the journal version of the article.

After the editorial office receives the article, the article is reviewed by the editors, and then the review of the received material is carried out. Reviewers evaluate the article according to the criteria of scientific quality, originality, relevance, and the quality of presentation of the material. Reviews are sent to the author of the article with recommendations for improving the article. The author makes changes suggested by reviewers and editors, and the article is accepted for publication. What happens next? The article is equipped with metadata that reflects the review. The accepted publication of the article is again placed in the arXiv. The article is assigned a DOI, and the article is published in the journal as an abstract with a link to the full text of the article page contains links to these objects. Source data sets for performing calcula-

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tions can accompany the article: in this case, the article page contains a link to an external data store (for example, GitHub).

On the page of a journal article, you can see the name of the journal's current section, article title, links to information blocks for each author, abstract, link to the full article posted in arXiv, thematic tags. Thematic tags allow a reader to see all the journal articles related to this topic. It is indicated under which license the use of the article materials is available (we remind you that all journal articles are published with a CC by-4.0 license.). There are links to the journal's Twitter and Facebook pages, as well as an RSS feed.

The full text of the article in the Open Journal of Astrophysics is available in arXiv. The page with information about the article is designed according to the rules of this archive. The page contains the usual metadata: title of the topic section, the title of the article, authors, abstract, links to the full text in PDF or other formats, date of acceptance of the article (version 1). There is an opportunity to get acquainted with the data on the article citation. The preprint server's page indicates that the article was accepted to the Open Journal of Astrophysics and the DOI assigned by the journal, the date of receipt of the version v3 from the journal. All versions of the article are available on the page: originally uploaded to the archive version v1, sent to the journal version v2, and version v3 edited by the journal's reviewers.

Since all versions of the article are stored in arXiv, the author has the opportunity to develop his work: correct inaccuracies, add new data and make changes based on the results of reviewing and discussion. Thus, the article turns into an "alive publication" [13], which the author develops throughout his work on a particular topic.

Having accumulated a significant amount of changes, the author may want to publish the article's modified version in a new journal. In this case, it will be important for the author to get an expert assessment from the reviewers of a respected journal: a positive assessment is a kind of "quality mark" of the article. There should be no technical problems in implementing such a scheme.

Someone may see certain inaccuracies in such a scheme. An article may actually receive multiple DOI from different journals. But all these DOI will refer the reader to different versions of the article. And if the reader found a link to an earlier version of the article in one of the overlay journals, then by going to read the full text in arXiv, the reader will see all the versions of the article and be able to choose the latest version.

Will, there be a conflict between the author and the publisher of the overlay journal when submitting an article previously published in the overlay journal for republication, but in our case – when submitting for re-review? The Open Journal of Astrophysics, for example, accepts articles that have not previously been published in other journals. This requirement may be outdated and not relevant to overlay journals.

Concluding the topic of "alive publications", we suggest looking at this scientific journalism genre from different positions. Older and middle-aged scientists remember that the peak of the scientist's work was a monograph. Monographs of outstanding scientists became the basis of training courses at leading universities. Tens of thousands of students studied there. Now monographs have faded into the background. They were replaced by articles and various indicators of publication activity. "Alive publication" shifts the focus from the race to publish articles imposed on the scientific community to meaningful activities. The author continues to develop the "alive article", exploring nearby problems and reflecting new turns in the research in his article's text. When sufficient material is collected, the scientist may feel the need to rework the "alive article" and turn it into a monograph. The monograph allows the scientist to summarize his long-term research experience in the scientific field, systematize the accumulated scientific baggage, and present his results in a well-thought-out and well-structured form [14].

How does the overlay journal help this process? A regular journal does not welcome changes to a published article. On the contrary, the author, placing the text of the article in the preprint archive, does not lose connection with his article: arXiv technology allows the author to create versions of the article. Through the overlay journal, the scientist can get feedback and discuss complex issues with their colleagues in blogs.

It is important to emphasize that the overlay scheme is not implemented in a single project. The growing infrastructure of open archives serves as a good basis for the mass appearance of overlay journals that offer free services to authors and readers. One example of support for creating overlay journals is the Episciences platform [15]. The project organizers adhere to three principles: open access, free publication, and unlimited reading. Currently, the platform hosts a dozen open access journals that implement the overlay scheme, and the organizers of Episciences encourage other journals to join the community.

The rapid implementation of the overlay scheme requires a reliable base – hightech servers of preprints. How many Russian organizations produce preprints? The number of Preprint publishers can be estimated using the corresponding search query in the Russian aggregator of scientific journals eLibrary.ru: the resulting list consists of 18 preprint titles. However, it should be noted that 12 items in this list belong to preprints from different HSE University series. Apparently, some organizations' preprints were not included in the list for one reason or another. Nevertheless, we can agree that there are still few open-access institutional repositories in Russia, and there are no developed thematic archives of preprints like ArXiv.

Russian academic scientific journals are currently unable to cope with the increased demand for publishing articles. New journals are required that will base their policies on the principles of Fair Open access and will use new effective editorial and publishing schemes. Here, the journal organization's overlay scheme would help organize new online journals quickly, combining modern means of communication, technological capabilities of preprint archives, and the intellectual baggage of the reviewers' body.

7 Conclusion

The overlay online journal adheres to Fair Open access principles: free for authors, free for readers. The overlay scheme allows for reducing the cost of publishing articles sharply. The overlay journal relies on Open repositories (servers) of preprints.

Academic institutions and universities support preprint repositories. The online overlay journal reviews the article received from the repository. If the article is accepted for publication, the journal publishes the article metadata on its website, and the article itself (its full text) is replaced in the repository. This working way does not overload the repository functionality, but it allows you to reduce the financial burden on the overlay journal.

An overlay journal is not only a good organizational scheme. In essence, the overlay journal returned publication activities to the control of the scientific community. The expediency of publishing articles is now determined not by financial and market considerations but by the interests of the development of scientific industries.

In Russia, the appearance of academic overlay journals would significantly expand the field of highly professional scientific journals. Let's hope that the development of Open access infrastructure and preprint repositories will lead to the emergence of new democratic Russian overlay journals that will meet the growing demand of scientists for publishing research results.

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