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Russian Scientific Periodicals in the Directory of Open-Access Journals

T. N. Domnina*

All-Russian Institute for Scientific and Technical Information, Russian Academy of Sciences, Moscow, 125190 Russia

**e-mail: domnina@viniti.ru*

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Abstract—The current state of the Directory of Open Access Journals (DOAJ) is characterized and the quality criteria of its periodicals are discussed. Russian scientific journals included in the Directory, their topics, publishers, language, and licenses are comprehensively considered. Journal ratings based on generally accepted international scientometric indicators used by the Russian Science Citation Index, Scopus, and Web of Science are analyzed. Periodicals are ranked using bibliometric indicators.

Keywords: Russian Open Access scientific periodicals, DOAJ, Creative Commons licenses, bibliometric indicators, RSCI, Scopus and Web of Science

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INTRODUCTION

The emergence of new information technologies, such as the Internet, and the transformation of scientific publications into a criterion for evaluating the efficiency of activities of scientists and researchers led to changes in the process of publishing scientific journals. One such change is the emergence of open-access journals. In 2017, the 15th anniversary occurred of the Budapest Open Access Conference[1], which was held in 2002 and marked the beginning of the movement for open access to the results of scientific research. It was followed by a statement in Bethesda[2] made in June 2003 and the Berlin Declaration on Open Access to Knowledge in the Sciences and Humanities[3] in October 2003. These three events laid the theoretical and methodological foundations of open access. In the English sources, the documents adopted at these conferences are often called BBB declarations [1]. The existing definition of open access, introduced in 2012 by Peter Saber, a researcher and activist of this phenomenon in the field of publishing, implies the following characteristics of open-access literature: it is digital, online, free, and without most of the limitations associated with copyright and licensing [2]. The essence of this concept has not changed since then: open access is defined as free, immediate, permanent, full-text, online access to scientific publications.

The open-access movement has been actively supported by the European Union, which officially declared open science to be one of the key instruments for the development of the EU [3]. The eighth framework program of the European Union for research and innovation Horizon 2020 [4] provides a series of measures to implement a policy of openness to research. Great attention is paid to the open-science infrastructure, which will allow to post research results and publish the data on which they are based, openly discuss the results of scientific activities and ensure free access to them for representatives of the scientific community. One of the elements of this infrastructure is the Directory of Open Access Journals (DOAJ[4]).

THE HISTORY OF THE CREATION AND OBJECTIVES OF THE DIRECTORY

The Directory of Open Access Journals was founded in 2002. The idea of creating an information resource that aggregates all of the world's open-access periodicals was proposed at the first Nordic Conference on Scientific Communication (NCSC) held in October 2002 in the city of Lund (Sweden) [5]. A small grant from the Scholarly Publishing and Academic

[1] The Budapest Open Access Initiative. http://www.budapestopenaccessinitiative.org/boai15-1.

[2] Bethesda Statement on Open Access Publishing. http://osc.universityofcalifornia.edu/2003/04/bethesda-statement-on-open-access-publishing/.

[3] Berlin Declaration on Open Access to Knowledge in the Sciences and Humanities. https://openaccess.mpg.de/Berlin-Declaration.

[4] Directory of Open Access Journals. http//doaj.org.

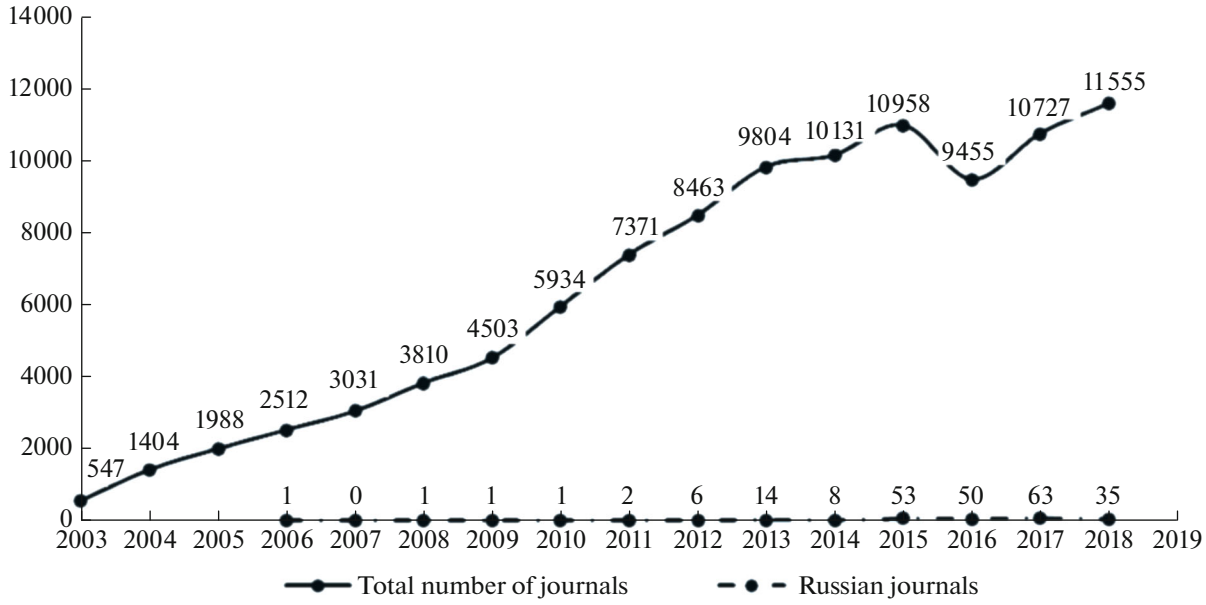

Fig. 1. The growth rates of the number of journals reflected in the Directory (DOAJ). The indicators were tracked using a copy of the DOAJ home page stored in the Internet archive (Internet Archive: Wayback Macine. https://web.archive.org). Statistical data are taken from the screen images of the home page for December 31 or the date nearest to it each year.

Resources Coalition (SPARC)[5] and the Open Society Institute provided initial capital for the development of DOAJ [6]. It was originally hosted on the servers of Lund University in Sweden, and is currently managed by the independent Community Interest Company, Infrastructure Services for Open Access (IS4OA) located in the UK [7]. The DOAJ is a non-profit edition funded by a community of approximately 200 university libraries and 15 library consortia[6] that pay an annual membership fee to support the organization of its operation. Many publishers also sponsor the DOAJ, including: EBSCO (gold sponsor), De Gruyter Open, IOP Publishing, SAGE Publications, Springer Nature, Wiley, and several others.

The main objective of the DOAJ is to maintain and improve the source of reliable information about peer-reviewed open-access journals on the Internet, monitor compliance of the journals presented on the website to adequate quality standards, increase accessibility, assist in distributing and detecting the content of open-access journals, notify the scientific community, and provide access to these journals. The Directory sees its objective in supporting publishers and their journals in meeting the high quality standards of open-access electronic scientific journals and thus helping to transform the scientific communication system into a model that would serve science, education, development of technologies and innovations, and society as a whole [8]. Since 2014, in connection with the development and ubiquity of the open-access movement, its functions have expanded. The Directory began to provide detailed information about publishers and journals, authors' expenses for publishing papers, types of reviews, copyrights, used licenses, etc.

CURRENT STATE OF THE DIRECTORY

Over the 16 years of its existence, the DOAJ has grown significantly: while in 2003 it included 300 journals, now (as of May 5, 2018) it contains 11555 journals from 126 countries. The emergence of such an electronic resource met the needs of the open-access movement and the growth of its volume reflects the worldwide trend of development of the movement for open science. The annual average increase in open-access journals is approximately 18%, while paid access journals make up 3.5% [9]. Journals included in the DOAJ cover scientific and technical issues, technology, medicine, social sciences and the humanities, and contain 3 061 097 published articles. The DOAJ includes only the so-called "golden-model" journals, which means that their papers are available in real time, almost immediately after publication. The growth rates of the DOAJ are shown in Fig. 1. In terms of the number of journals presented in the DOAJ, the UK ranks first (12%), followed by Indonesia (11%), Brazil (10%), Spain (5%), and United States (5%). Russia ranks 15th (2%). The distribution of periodicals by geographic regions is shown in Fig. 2.

[5] Scholarly Publishing and Academic Resources Coalition (SPARC) is an organization of library communities that advocate for the expansion of free access to knowledge. https://sparcopen.org/.

[6] DOAJ Members. https://doaj.org/members.

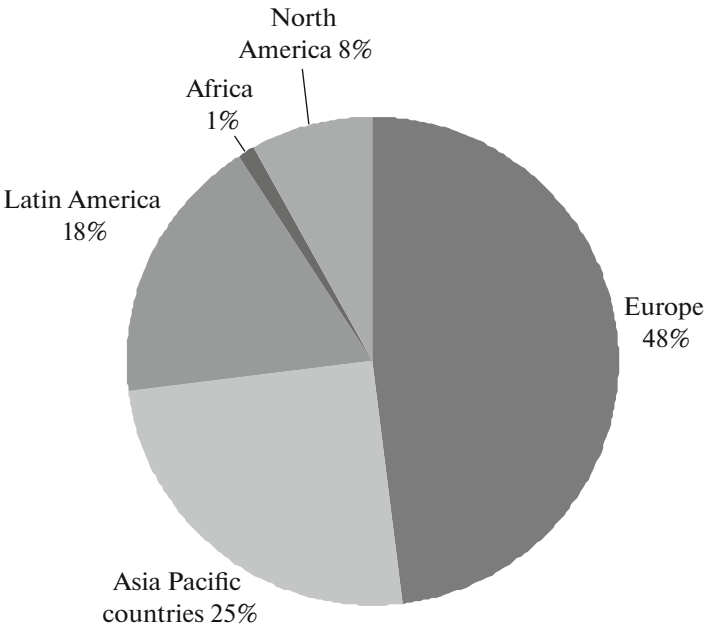

Fig. 2. The distribution of the number of periodicals presented in the DOAJ by geographic region.

In terms of thematic content, the DOAJ refers to polythematic databases, publishing scientific full-text periodicals and covering almost all areas of knowledge (Fig. 3).

Journals included in the DOAJ publish papers in 60 languages, mainly in English, which makes up more than 50% of publications, as well as in Spanish (13%), Portuguese (9%), Indonesian (6%), French (5%), Russian (2.5%), Italian (2.3%), German (1.8%), and Turkish (1.2%). The Directory includes publications of universities, professional commercial publishing houses, and government and public organizations.

Each journal in the DOAJ has a brief description of publishing data, a link to its website and/or to the website where the full text of the journal is located, information on the subject, language of articles, the license used and the type of review, and the date of inclusion in the Directory.

In 2012, 10 years after the publication of the Budapest Declaration on Open Access to Scientific Data, a new phenomenon emerged in the open-access movement that could have devalued all of its results at that time: the phenomenon of predatory journals or scam journals appeared in the field of the scientific publishing process [10]. Using the open-access business model, when the author pays the costs of publication, publishers of such journals began to publish counterfeit articles, posing as reputable publishers with established reputations, which they actually were not. Unscrupulous publishers misuse open-access opportunities by creating fake, unscientific, and misleading publications. Such journals publish articles for a fee, have a vague indication of the thematic focus of the journal, they do not clearly state the criteria for reviewing articles, and often the review is replaced by a fee for publication. They have a fabricated editorial board and an extremely short time from the moment the article is received by the editor until the moment it is published. The main purpose of such a journal is to make a profit from the authors' fees. A list of such journals and publishers was compiled by librarian Jeffrey Beall (Beall's List) working at the Auraria Library at the University of Colorado in Denver. From 2012 to January 2017, in his blog he was publishing and maintaining a "black list" of 700 "predatory" publishers and 500 individual journals. There is a debate in the literature about the characteristic features of such journals [11, 12], but the fact that they are ready to publish any article without reviewing if the author pays the costs of publication is recognized by the majority [13]. In 2013, John Bohannon, a staff member of the journal Science [14], published an article where he criticized open-access publications, including the article quality control standards employed by the DOAJ. As an experiment, he sent a deliberately poor-quality article that looked like a serious scientific work, which in fact it was not, to open-access journals. As a result, out of 304 journals, 157 (over 50%) approved the article and agreed to print it: the overwhelming number of journals that accepted the article (82%) turned out to be from Jeffrey Beall's list, including those that are reflected in the DOAJ.

The scientific and library community does not have a unified opinion on J. Beall's list and has repeatedly criticized it. Some believed that J. Beall did not contact directly with publishers but evaluated the

results of their work based only on the content of their websites [13]. Others believed that he unjustly identified the poor quality of a journal and the poor design of a site with the phenomenon of the predatory journal. It was argued that J. Beall was not a supporter of the open-access movement [15] but preferred commercial publishers [16]. Finally, some have the opinion that the "black lists" were not complete and reliable because J. Beall was critical of open-access publications and biased and even hostile to publishers experimenting with new forms of reviewing articles [17].

Despite this criticism, J. Beall maintained and saved lists of unscrupulous publishers and predatory journals on his blog for several years, but in January 2017 the content of the blog http://scholarlyoa.com was deleted [18]. J. Beall later explained that he had to remove the lists under pressure from the leadership of the University of Colorado in Denver, because he was afraid of losing his job. However, a copy of J. Beall's blog (https://beallslist.weebly.com) is currently maintained on the Internet by an anonymous user.

Taking the above into account, the management company of the Directory, IS4OA, decided to develop and implement more stringent selection criteria for journals that claim to be included in it.

CRITERIA FOR THE SELECTION OF JOURNALS FOR THE DIRECTORY

New criteria for the selection of journals for the Directory were developed in accordance with the Principles of informational openness and their practical application in the field of scientific publishing [19], which take the standards of international publishing practice into account. They were taken as the basis for the criteria of selecting journals in the DOAJ, expanded, updated, and practically applied starting from March 2014. Since that time, an editorial team of a journal that claims to be included in the DOAJ must fill out an application for registration, which contains more than 50 questions, not 7, as previously. These questions reflect the various characteristics of a journal in detail and consist of five parts.

(1) Basic information about the journal: the website address (a link to the website where the full texts of the articles are located is mandatory), the name of the journal (which must be unique so as not to confuse it with other journals or mislead readers and potential authors); ISSN; data about the publisher; the editors' contact information; information on the number of articles published in the previous year (this must be at least five); whether the journal metadata is free to use and reuse and it is open to spiders and crawlers; the year of foundation of the journal; the format of providing full texts; full text language; journal topics; the authors' fee for publication; and the journal business model (questions 1–35).

(2) The quality and information openness of the editorial process. Members of the editorial board of the journal should be recognized experts in the covered subject areas. The type of review, peer-review methods, information about the professional qualifications of editors and mechanisms for detecting plagiarism, and the publication schedule (questions 36–43) should be indicated.

(3) The information openness of the journal should fully comply with the principles set forth in the Budapest Open Access Declaration: to be open means not only to be available for reading, free of charge, but also to be used without any restrictions. Journals that publish open articles after an embargo for a certain period are not considered open. The content of the open journal should be available immediately after publication (question 44).

(4) Licensing: licensing information should be clearly described on the website, and licensing terms should be listed on all published articles, both in HTML and PDF formats (questions 45–51).

(5) Copyright: Authors should be provided with clearly worded information about the copyright holder of all materials they published (questions 52–54).

A number of additional criteria were also developed, whose fulfillment gives the journal the opportunity to receive a special DOAJ Seal. It should be emphasized that this sign does not evaluate the scholarly quality and content of the article, it only confirms the exceptional and strict observance of the principles of information transparency. These criteria include:

—compulsory archiving of a journal using a generally accepted national or global system;

—assigning to each article of the journal a permanent digital object identifier (DOI), which remains unchanged forever;

—provision of article metadata containing embedded machine-readable information about the license that is used;

—permission to read, download, and copy articles and refer to their full texts with attribution without any restrictions in accordance with the Creative Commons license used: *CC BY*, *CC BY-SA*, or *CC BY-NC*;

—preservation of copyright without any restrictions.

This seal has been given to 1281 journals (11% of the total number of publications included in the DOAJ), of which three are Russian (information as of May 31, 2018).

All journals accepted before March 2014 underwent a repeated admission procedure with more stringent requirements. The dataset of the Directory, which included (from 2003 to May 15, 2016) 12595 journals, was revised. The number of excluded publications was 3776 titles, most of which (2851) did not submit a new application for re-registration, 450 ceased to exist, 375 were excluded for ethical reasons, 53 were no longer

open or imposed an access embargo, and 158 of the excluded titles were part of J. Beall's list of predatory journals. A multi-level system for monitoring the compliance of journals with the criteria, in which applications are initially reviewed by experts at the national level and then transferred to the managing editor of the DOAJ for final decision, ensures high quality standards for publications reflected in the Directory [20].

Efforts to update and improve the quality of the Directory were acknowledged by the European Union, which recognizes the Directory as a reputable source for publishing papers funded by the Seventh Framework Program of the European Union (FP7 Post-Grant Open Access Pilot) created to support and encourage research in the European research space. In accordance with this program, funding is received by those authors who publish articles in journals included in the DOAJ [21]. Moreover, economic support is provided to those open-access journals and platforms that do not charge authors for publishing articles.

RESEARCH METHODOLOGY

The purpose of this paper is to characterize Russian open-access scientific periodicals included in the DOAJ and to identify how fully they are represented in terms of quantity and bibliometric indicators. The analysis of these publications will be useful and relevant since it will provide information about the most-accessible part of the national scientific periodicals, which can be freely read and freely used without any restrictions not only by Russian scientists and researchers but also their colleagues around the world.

Information about journals (title, ISSN, date of inclusion in the DOAJ, type of reviewing, license used, subject, article language, and publisher) was downloaded from the Directory on May 31, 2018 using: *Advanced Search*; the option *Journals vs Articles* was limited to searching for journals using the field *Country of Publication*. The obtained information was exported to the Excel program for content and statistical analysis.

To assess the quality level of the studied journals, the scientometric indicators of the following information-analytical resources were used: Russian Science Citation Index (RSCI), Scopus, SciMago, and Web of Science. For this purpose, every Russian journal included in the DOAJ was checked for its presence in the indicated databases, and scientometric indicators were selected for all the journals present there.

For scientometric analysis of journals, the following indicators were used:

—the RSCI Impact Factor[7]: the main bibliometric indicator for scientific journals, a quantitative indicator of the importance, relevance, and recognition of the journal in the scientific community, showing the ratio of the number of links that the journal received in the current year to articles published in it in 2 years or 5 previous years to the number of articles published in this journal within the same period;

—the RSCI Science Index[8]: an integral indicator that allows leveling thematic differences and conduct cross-disciplinary comparison and ranking of journals;

—the SJR (Scimago Journal Rank) indicators and the quartile used by the SciMago resource[9], which analyzes data from the Scopus database. The SJR rating is a weighted estimate of the journal prestige. It takes into account the total number of citations of articles published in the journal being evaluated; weighted indices of these citations over the years and the quality and reputation of the links, that is, a link to an article from a journal with high citation rates will be of greater value than a link from a journal with a low citation. The SJR is often referred to as the Scopus Impact Factor. Its distinguishing feature is a wider range of journals and a completely open character.

The quartile[10], the simplest and most visual indicator of the status of a journal, is determined by the SJR (Scimago Journal Rank) value for a particular subject area. As a result of ranking, each journal falls into one of four quartiles: from Q1 (highest) to Q4 (lowest).

RESULTS OF RESEARCH

Number and Thematic Distribution of Periodicals

The DOAJ contains 234 Russian journals; the first journal was included in 2006; the annual increase in the number of journals is shown in Fig. 1. The global massif includes 11 555 journals (as of May 30, 2018), Russia accounts for 2%; the representativeness of Russian open-access scientific periodicals in the international Directory is rather low: the global array is 49 times bigger than the Russian one. The list of Russian scientific journals hosted on the platform eLIBRARY.RU (https://elibrary.ru/projects/subscription/rus_titles_free.asp), which have full-text

[7] The criteria for calculating the impact factor RSCI can be found at http://elibrary.ru/titles_compare.asp in the section How Is the Impact Factor in the RSCI calculated?

[8] The criteria for calculating the Science Index can be found at http://elibrary.ru/titles_compare.asp in the section How Is a Journal Indicator Calculated in the SCIENCE INDEX rating?

[9] Scimago Journal & Country Rank (SCImago). http://www.scimagojr.com.

[10] Quartile (Q) is a quarter of the observed values of the variable, in this case index value, in an empirical static distribution: Q1 is the highest quarter of the distribution of values, Q2 is the quarter between the top 25 and 50%, Q3 is the quarter between the top 50 and 75%, and Q4 is the lowest quarter of the distribution.

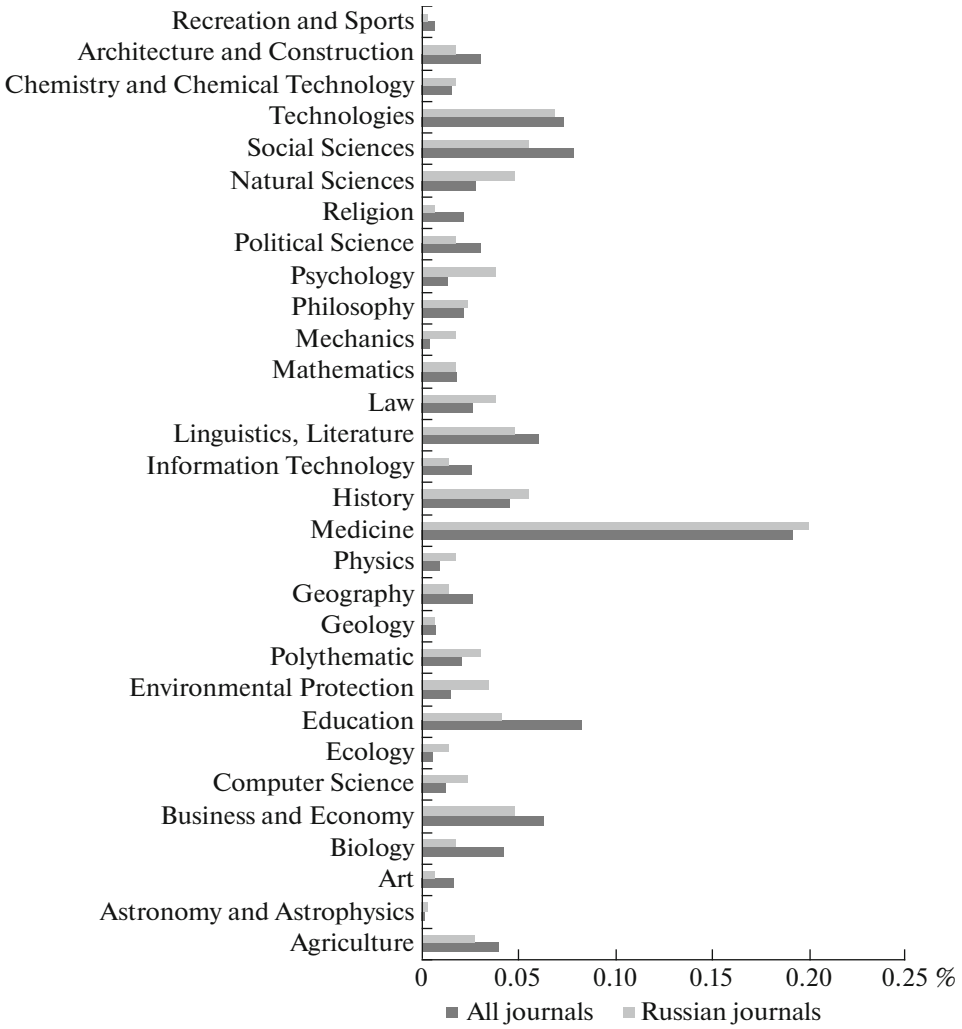

Fig. 3. The subject structure of the array of foreign and Russian periodicals presented in the DOAJ.

issues open to all, contains 3800 titles (as June 14, 2018). This makes it possible to compare the total number of currently existing Russian open-access journals with the journals included in the DOAJ: as can be seen, it includes no more than 5% of these periodicals.

The distribution of publications by subject categories gives a clear idea of the structure of the Russian segment of scientific periodicals in the DOAJ: Russian publications cover almost all areas of knowledge, dominated by medicine, natural sciences, political science, history, psychology, and philosophy; applied research is well represented, as well as business and economics (see Fig. 3).

Used Licenses

Often, the concepts of "open access" and "free access" are confused; they in fact vary considerably. The features of these two concepts are well explained in the article "The Open Access Landscape in Scientific Publishing" [22].

Free access provides an opportunity to read the work without charges, but does not allow any further actions with the text: for example, reuse graphic and other data for own purposes, translate or include in databases, etc.

Open access is provided by publishing using one of the licenses of the non-profit organization Creative Commons[11], which develops, organizes and maintains the legal and technical infrastructure that allows full or partial exemption from licensing restrictions relating to the protection of copyright and for reusing graphic and other data. The journals included in the Directory use Creative Commons licenses. Licensing is encouraged not only for the journal as a whole but also for each individual article. Upon being placed on the

[11]For Creative Commons licenses, see https://creativecommons.org/licenses.

Table 1. Licenses used by Russian open-access journals

Number of periodicals	License used	License characteristic
162	Attribution *CC BY*	You are free to distribute, edit, correct and take the work as a basis for derivatives, even on a commercial basis, under the condition of attribution. This is the most convenient of all the licenses being offered. Recommended for maximum distribution and use of licensed materials.
23	Attribution—NonCommercial—NoDerivs *CC BY-NC-ND*	The most prohibitive of the six major licenses: you may only download works and exchange them provided attribution, but the work cannot be changed in any way or used for commercial purposes.
23	Attribution + Noncommercial *CC BY-NC*	You may change, correct and take the work as a basis for derivatives for non-commercial purposes. Although new works must be posted with indication of authorship and distributed on a non-commercial basis, licensing of derivatives under the same conditions is not necessary.
8	Attribution + ShareAlike *CC BY-SA*	You may edit, correct and take the work as a basis for derivatives, even for commercial purposes, as long as authorship is indicated and new works are licensed under the same conditions.
4	Attribution + Noncommercial + ShareAlike *CC BY-NC-SA*	You may change, correct and take the work as a basis for derivatives for non-commercial purposes. Although new works must be posted with indication of authorship and distributed on a non-commercial basis, licensing of derivatives under the same conditions is not necessary.
1	Attribution + NoDerivatives *CC BY-ND*	You may distribute and use the work commercially and non-commercially provided that the work is transferred unchanged and retains its integrity, as well as under the condition of attribution.
13	Own publisher license	Conditions are indicated on the journal website

Internet in open access, an article after publication begins to exist on its own, often independently of the journal in which it was published, and the license gives readers information about their rights to use this article. In the Directory, seven types of licenses are employed, that is, seven open-access types (Table 1).

About 70% of the 234 Russian periodicals use the license Attribution *CC BY*. This most convenient of all licenses being offered is used by most publications included in the Directory (42%). Figure 4 shows how licenses are used in the DOAJ as a whole.

Publishers and Language of Publications

According to the research, 85% of open-access journals are published by three categories of publishers: professional publishing houses, scientific societies and associations, and higher-educational institutions (universities) [23]. Russian publishing organizations that placed their periodicals in the Directory are distributed as follows: 55% are higher-education institutions, 11% are scientific societies, 7% are research organizations, 13% are professional publishers, and 13% are other organizations. Leading positions among publisher organizations belong to universities that actively seek to increase publication activity and make their research open to the global scientific audience. In [24], it was noted that in recent years there has been a significant increase in publications of Russian higher-education institutions, which in terms of quantity are ahead of research organizations. Thus, with respect to publishing organizations, Russian open-access periodicals do not differ from the global ones.

For the Russian journals included in the Directory, it turned out that they are published mainly (93%) in Russian and English (7%). A number of periodicals have texts of separate articles in parallel in foreign languages, which undoubtedly expands the international readership. Journals with parallel texts in foreign languages are distributed as follows: 46% in English, 2% in German, 1.7% in French, one journal in Polish, one in Greek, and one in Croatian.

Used Types of Reviews

Open-access journals approach the selection of published materials very carefully, since their potential readership, to which publications need to prove their worth, is very large. Expert assessment guarantees the quality of research, accuracy, and reliability of materials. The DOAJ provides detailed information on the types of reviews. The following types of reviews are used in Russian periodicals:

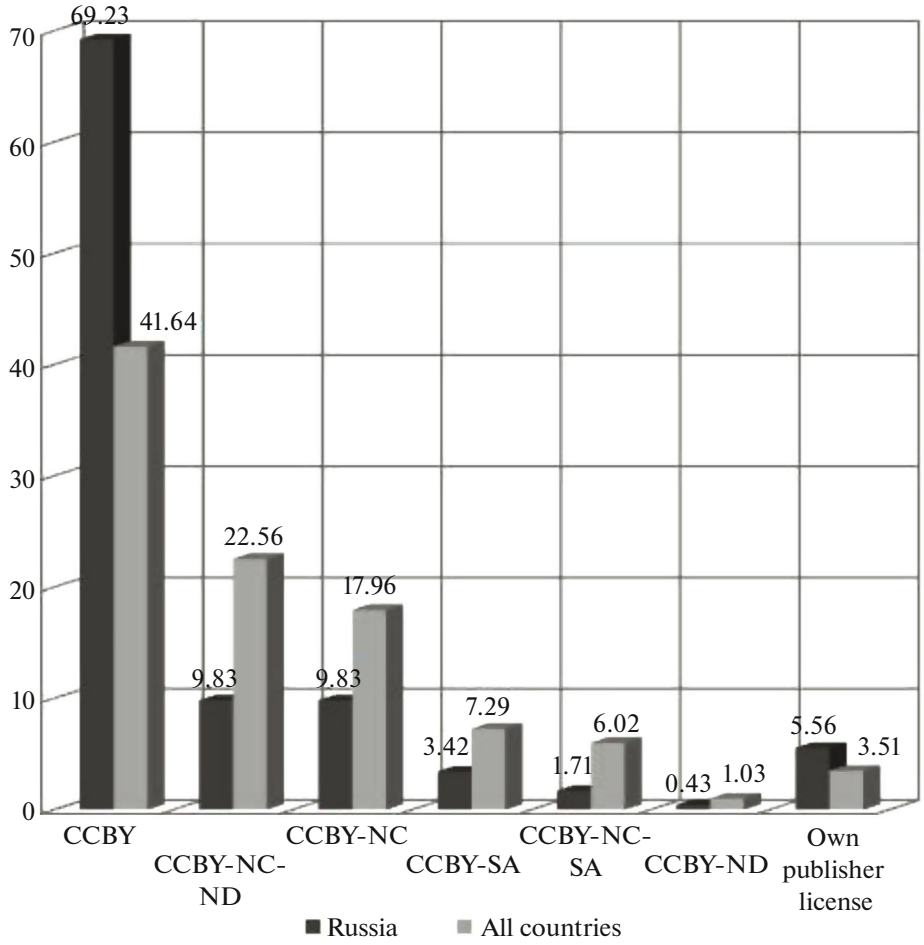

Fig. 4. The use of the Creative Commons licenses in the Directory, %

—double blind review: both the author and the reviewer remain anonymous, 61%;

—blind peer-review: the names of reviewers are hidden from the author, 21%;

—peer-review: the reviewer and the author are known to each other, 6%;

—review by the chief editor, 2%.

Analysis of Journals from the DOAJ Included in the Russian Science Citation Index (RSCI)

Of the 234 Russian journals reflected in the DOAJ, 230 titles (99%) are included in the RSCI. A total of 185 periodicals have a 5-year impact factor RSCI 2016, which varies from 2.234 to 0.021, and 45 periodicals do not have rating indicators, most often due to the fact that they have been included in the RSCI recently and have not yet accumulated statistics for calculating indicators. In total, more than 4500 titles of Russian scientific journals are rated in terms of this indicator on the RSCI platform, with the highest rates, more than 2, being characteristic of 22 Russian periodicals, including one journal from the DOAJ, *Psikhologicheskaya nauka i obrazovanie* (Psychological Science and Education) (impact factor 2.234). The ten best Russian open-access journals from the DOAJ in terms of this indicator are presented in Table 2.

The first thousand Russian journals indexed in the RSCI include 42% of the Russian open-access journals reflected in the DOAJ. The indicators here are very close to each other, therefore journals can compete for bibliometric indices. The second and third thousand include 58% of the journals with very low impact factors.

In bibliometric analysis of scientific journals, one should pay attention to the fact that because of the different citing models in different areas it is better to compare metric indicators of journals within the same discipline. To obtain a more accurate picture, journals from the DOAJ were grouped in several thematic areas; in each group the best ones in terms of the RSCI Science Index were selected, which makes it possible to make intradisciplinary comparisons.

Medical topics are covered in 24% of the total number of Russian periodicals reflected in the DOAJ. The RSCI data make it possible to estimate the total

Table 2. The ten best Russian journals from the DOAJ in terms of the 5-year impact factor RSCI 2016

No.	Journal	Five-year impact factor RSCI 2016	Subject
1	*Psikhologicheskaya nauka i obrazovanie* (Psychological Science and Education)	2. 234	Education
2	*Sakharnyi diabet* (Diabetes Mellitus)	1.735	Medicine
3	*Ekonomika regiona* (Economy of Region)	1.568	Social Sciences
4	*Prostranstvennaya ekonomika* (Spatial Economics)	1.438	Social Sciences
5	*Ekonomicheskie i sotsial'nye peremeny: Fakty, tendentsii, prognoz* (Economic and Social Changes: Facts, Trends, Forecast)	1.261	Social Sciences
6	*Natsional'nyi psikhologicheskii zhurnal* (National Psychological Journal)	1.181	Philosophy, Psychology
7	*Nauchno-prakticheskaya revmatologiya* (Scientific and Practical Rheumatology)	1.179	Medicine
8	*Arktika: Ekologiya i ekonomika* (Arctic: Ecology and Economics)	1.103	Polythematic
9	*Zhurnal institutsional'nykh issledovanii* (Journal of Institutional Research)	1.006	Social Sciences
10	*Vestnik Kamchatskoi regional'noi assotsiatsii Uchebno-nauchnyi tsentr (KRAUNTS). Fiziko-matematicheskie nauki* (Bulletin of the Kamchatka Regional Association Educational and Scientific Center (KRAUNTs). Physics and Mathematics)	0.99	Natural Sciences: Physics, Mathematics

volume of Russian scientific journals in this subject area: there are a total of 514 (as of June 21, 2018). The Science Index of these periodicals ranges from 13.036 to 0.003. The 20 best journals from the DOAJ are in the first hundred on this subject, with indexes ranging from 3.865 to 1.161, which indicates their high quality level and competitiveness with subscription periodicals. The ten best journals from this subject segment are presented in Table 3.

Among the journals on natural sciences, the following are distinguished: *Geodynamics & Tectonophysics* and *Georesursy* (Georesources), 14th and 18th, respectively, in the Science Index rating, among 69 ranked by the RSCI on the subject of Geology; *Led i sneg* (Ice and Snow), 10th in the rating among 32 on the subject of Geophysics; *Vavilovskii zhurnal genetiki i selektsii* (Russian Journal of Genetics: Applied Research), 29th among 136 on the subject of Biology; and *Geography, Environment, Sustainability,* 4th among 15 in the subject Geography. The remaining journals from this group have a Science Index of less than 1, which is a rather low value.

The Politics and Political Science section is represented in the RSCI by 85 periodicals with ratings from 3.488 to 0.009. The Russian open-access journal *Vestnik MGIMO Universiteta* (Bulletin of MGIMO University) with the index of 3.317 ranks second, the journal *Vlast'* (Power) (index 2.211) ranks fourth, and *Vestnik mezhdunarodnykh organizatsii: obrazovanie, nauka, novaya ekonomika* (International Organizations Research Journal: Education, Science, New Economy) (index 1.617) ranks fifth.

The periodicals on the subject of Psychology are noteworthy. The open-access journal from the DOAJ *Psikhologicheskaya nauka i obrazovanie* (Psychological Science and Education) tops the ranking in the RSCI with an index of 7.150; *Natsional'nyi psikhologicheskii zhurnal* (National Psychological Journal) ranks 9th (index 1.246); Psychology in Russia: State of the Art ranks 10th (index 1.227); *Sovremennaya zarubezhnaya psikhologiya* (Contemporary Foreign Psychology) ranks 12th (index 1.064); and *Eksperimental'naya psikhologiya* (Experimental Psychology) ranks 15th (index 0.850). In total, the RSCI indexes 96 titles for this subject, with ratings from 7.150 to 0.002.

Among the journals on the subject of Sociology, the following should be noted: *Monitoring obshchestvennogo mneniya: Ekonomicheskie i sotsial'nye peremeny* (Monitoring Public Opinion: Economic and Social Changes) is 3rd in the ranking on this subject in the RSCI with the index of 3.339; *Sovremennye issledovaniya sotsial'nykh problem* (Contemporary Social Studies) ranks 12th with the index of 1.372; *Mir ekonomiki i upravleniya* (World of Economics and Management) ranks 13th with the index of 1.553; *Sotsiologicheskoe obozrenie* (Sociological Review) ranks 18th with the index of 0.953. In total, the RSCI indexes 97 periodicals for this subject, with ratings from 5.247 to 0.005.

Open access periodicals in the thematic areas Politics and Political Science, Psychology, and Sociology compete on equal terms for this indicator with subscription journals if not in quantity then in quality.

Russian journals in economics and economic sciences reflected in the DOAJ make up 6%. The metrics

Table 3. The best Russian journals from the DOAJ in terms of the Science Index RSCI 2016

No.	Journal	*Science Index* RSCI	Rating	Subject
	Medicine			
1	*Sakharnyi diabet* (Diabetes Mellitus)	3.865	5/513	Medicine
2	*Byulleten' sibirskoi meditsiny* (Bulletin of Siberian Medicine)	1.849	20/513	Medicine
3	*Ozhirenie i metabolizm* (Obesity and Metabolism)	1.845	21/513	Medicine
4	*Ratsional'naya farmakoterapiya v kardiologii* (Rational Pharmacotherapy in Cardiology)	1.656	31/513	Medicine
5	*Voprosy sovremennoi pediatrii* (Problems of Modern Pediatrics)	1.636	32/513	Medicine
6	*Kazanskii meditsinskii zhurnal* (Kazan Medical Journal)	1.531	36/513	Medicine
7	*Meditsinskaya immunologiya* (Medical Immunology)	1.333	42/513	Medicine
8	*Nevrologiya, neyropsikhiatriya, psikhosomatika* (Neurology, Neuropsychiatry, Psychosomatics)	1.316	43/513	Medicine
9	*Klinicheskaya i eksperimental'naya tireoidologiya* (Clinical and Experimental Thyroidology)	1.245	49/513	Medicine
10	*Zhurnal infektologii* (Journal of Infectology)	1.205	53/513	Medicine
	Natural Sciences			
11	Geodynamics & Tectonophysics	2.618	14/69	Geology
12	*Georesursy* (Georesources)	1.8	16/69	Geology
13	*Led i sneg* (Ice and Snow)	1.312	10/32	Geophysics
14	*Vavilovskii zhurnal genetiki i selektsii* (Russian Journal of Genetics: Applied Research)	1.092	29/136	Biology
15	Geography, Environment, Sustainability	2.081	4/15	Geography
	Political and Social Sciences			
16	*Vestnik MGIMO Universiteta* (Bulletin of MGIMO University)	3.317	2/85	Politics and Political Science
17	*Vlast'* (Power)	2.211	4/85	Politics and Political Science
18	*Vestnik mezhdunarodnykh organizatsii: obrazovanie, nauka, novaya ekonomika* (International Organizations Research Journal: Education, Science, New Economy)	1.617	5/85	Politics and Political Science
19	*Monitoring obshchestvennogo mneniya: Ekonomicheskie i sotsial'nye peremeny* (Monitoring Public Opinion: Economic and Social Changes)	3.339	3/97	Sociology
20	*Mir ekonomiki i upravleniya* (World of Economics and Management)	1.553	13/97	Sociology
21	*Sovremennye issledovaniya sotsial'nykh problem* (Contemporary Social Studies)	1.372	12/97	Sociology
22	*Sotsiologicheskoe obozrenie* (Sociological Review)	0.953	18/97	Sociology
23	*Psikhologicheskaya nauka i obrazovanie* (Psychological Science and Education)	7.15	1/96	Psychology
24	*Natsional'nyi psikhologicheskii zhurnal* (National Psychological Journal)	1.246	9/96	Psychology
25	Psychology in Russia: State of the Art	1.227	10/96	Psychology
26	*Eksperimental'naya psikhologiya* (Experimental Psychology)	0.85	15/96	Psychology
27	*Obrazovanie i Nauka* (Education and Science)	1.433	5/199	Public Education, Pedagogy

Table 3. (Contd.)

No.	Journal	*Science Index* RSCI	Rating	Subject
28	*Yuridicheskaya nauka i pravookhranitel'naya praktika* (Legal Science and Law Enforcement Practice)	1.153	34/284	Legal Science
	Economic Sciences			
29	*Ekonomika regiona* (Economy of Region)	4.478	4/374	Economics
30	Journal of Institutional Studies	3.939	5/374	Economics
31	*Vestnik Volgogradskogo gosudarstvennogo universiteta. Seriya 3: Ekonomika. Ekologiya* (Bulletin of the Volgograd State University. Series 3: Economy. Ecology)	2.383	14/374	Economics
32	*Prostranstvennaya ekonomika* (Spatial Economics)	1.971	20/374	Economics
33	*Mir ekonomiki i upravleniya* (World of Economics and Management)	1.553	29/374	Economics
34	*Sovremennye tekhnologii upravleniya* (Contemporary Management Technologies)	1.443	88/374	Economics
	Humanities			
35	*Sibirskie istoricheskie issledovaniya* (Siberian Historical Research)	0.931	14/110	History
36	*Bylye gody. Rossiskii istoricheskii zhurnal* (Past Years. Russian Historical Journal)	0.53	34/110	History
37	*Vestnik Pravoslavnogo Svyato-Tikhonovskogo gumanitarnogo universiteta. Seriya 1: Bogoslovie. Filosofiya. Religiovedenie* (Bulletin of the Orthodox St. Tikhon Humanities University. Series 1: Theology. Philosophy. Religious Studies)	1.109	2/8	Religion
	Technologies and Applied Research			
38	*Arkhitekton: Izvestiya vuzov* (Architecton: University News)	1.909	2/73	Construction and Architecture
39	*Mashinostroenie i komp'yuternye tekhnologii* (Mechanical Engineering and Computer Technologies)	1.282	3/19	Instrument Making
40	*Sel'skokhozyaystvennoe mashiny i tekhnologii* (Agricultural Machinery and Technology)	1.081	44/175	Agriculture and Forestry

of 374 journals indexed in the RSCI for this subject range from 24.757 to 0.004. The best journals from the DOAJ in this subject segment are presented in Table 3.

Among legal science journals, only one journal has an index greater than 1, this is *Yuridicheskaya nauka i pravookhranitel'naya praktika* (Legal Science and Law Enforcement Practice), which ranks 34th out of 284 periodicals in the RSCI for this subject (index 1.153).

In the field of humanities, the journal *Vestnik Pravoslavnogo Svyato-Tikhonovskogo gumanitarnogo universiteta. Seriya 1: Bogoslovie. Filosofiya. Religiovedenie* (Bulletin of the Orthodox St. Tikhon Humanities University. Series 1: Theology. Philosophy. Religious Studies) is noteworthy, which ranks 3rd in the rating on the subject of Religion (index 1.109). The best among the history journals are *Sibirskie istoricheskie issledovaniya* (Siberian Historical Research), which ranks 14th out of 110 (index 0.931) and *Bylye gody. Rossiskii istoricheskii zhurnal* (Past Years. Russian Historical Journal), which ranks 34th (index 0.530).

Most of the journals from the section Technology and Applied Research have low ratings. It is possible to note only *Arkhitekton: Izvestiya vuzov* (Architecton: University News), which ranks 2nd on the subject of Construction and Architecture (index 1.909); *Mashinostroenie i komp'yuternye tekhnologii* (Mechanical Engineering and Computer Technologies), which ranks 3rd on the subject of Instrument Engineering (index 1.282); and *Sel'skokhozyaystvennoe mashiny i tekhnologii* (Agricultural Machinery and Technology), which ranks 44th on the subject of Agriculture and Forestry (index 1.081).

Analysis of the bibliometric ratings of Russian open-access journals from the DOAJ included in the RSCI showed that only 20% of the periodicals have high rates and can compete on equal terms with subscription periodicals. At the same time, certain jour-

nals that hold leading positions in their subject categories were identified.

Analysis of Journals from the DOAJ included in SCOPUS and WEB of SCIENCE

Open-access journals make up a significant part of databases such as Scopus and the Web of Science. Currently, Scopus includes 4150 open-access periodicals (data as of July 7, 2018), which represent approximately 17% of the total number of journals indexed in this database. A total of 18% of the Web of Science Core Collection data are open access[12]. Both the databases include high-quality journals of the international level. Material published in an indexed periodical, regardless of its scientometric indicators, is a priori considered more reputable than publication in any other periodical.

A total of 49 Russian periodicals from the DOAJ are included in the Emerging Sources Citation Index (ESCI Web of Science Database). This journal index was added to the Web of Science Core Collection at the end of 2015. It contains journals that meet the minimum requirements for the quality of published materials, timeliness, and impact and are considered as candidates for subsequent inclusion in the main journal indexes: Science Citation Index Expanded, Social Sciences Citation Index, and Arts & Humanities Citation Index. For the journals included in the ESCI, the impact factor is not calculated and the decision on their further fate is made on the basis of analysis of the citation of articles published in them. After 2 years, according to the results of the analysis, the journals are either transferred to the main Web of Science CC databases or are excluded from the ESCI. In an interview published in the Poisk newspaper, a representative of Clarivate Analytics, Managing Director for Russia and the CIS, O. Utkin noted that Emerging Sources Citation Index includes journals from rapidly growing research fields. He also said that the company's objective in selecting journals was to expand the availability of Open Access [25].

Currently (as of July 9, 2018), 7479 journals are included in the ESCI [13], of which 160 are Russian, including 49 open-access journals from the DOAJ, which account for approximately 30% of Russian periodicals. For the publications in Russian, the share is 34%, which is several times more than in the case of open-access documents in the main journal indexes, and there are no Russian-language publications of open access in the main indexes, that is, the ESCI significantly increases the openness of Russian science. The subject distribution of these periodicals is as follows: in the first place are social and political sciences (48%) followed by natural and exact sciences (20%), medicine (19%), the humanities (9%), and technology (4%). Analysis of the citation of periodicals included in the ESCI [26] indicates that several journals, especially in psychology, for example, the journal from the DOAJ *Psikhologicheskaya nauka i obrazovanie* (Psychological Science and Education), have a chance to enter the main journal indexes of the Web of Science Database.

The Scopus database includes 4150 open-access periodicals from 126 countries, which is 17% of the total number of reflected scientific periodicals. Russian periodicals represent 57 titles (less than 2%), of which 37 are included in the DOAJ. The SJR index in all open-access journals varies from 34.638 to 0.1; for Russian periodicals this index ranges from 0.838 to 0.108. Scimago conducts annual ranking of journals by quartiles on the basis of SJR values in relation to subject categories; since one periodical can qualify for several subject categories, ranking is carried out for each subject area.

The distribution of Russian open-access periodicals by quartiles and their ratings for 2017 is presented in Table 4. If the journal is ranked in several subject areas, then the highest rating of these was chosen. In the Journal column, brackets indicate the name by which the journal is indexed in the Scopus database.

Journals included in the first and second quartiles belong to reputable periodicals of the international level, which are characterized by high quality of scientific achievements and comprehensive analysis of problems, as well as a clear structure, scientific style of presentation, and the use of modern methodological apparatus. As can be seen from Table 4, the first and second quartiles include journals on humanities subjects: history, linguistics, and music. These make up approximately 20% of all journals; the remaining 80% are in the third and fourth quartiles. It is dominated by journals on medicine and natural science subjects.

The third and fourth quartiles group low-ranking journals, which, however, does not mean that these are poor-quality journals that publish anything. All publications of the third and fourth quartile journals are subject to rigorous review. Moreover, it should be borne in mind that the SJR is calculated only for those journals that are indexed for a sufficient period of time necessary for their calculation. The journals included in the databases recently (1 or 2 years ago for Scopus and approximately 4 years ago for Web of Science) do not yet have this index. For this reason, the "new" journals are in the lower quartiles: the third and fourth, or do not fall into any of them. They will be there until the SJR is calculated. If we consider the subjects of Russian open-access periodicals from the DOAJ represented in the Scopus database, they are dominated by medicine (42%), humanities (21%), social (19%), and natural and exact sciences and technologies (18%).

[12] Clarivate Analytics Open Access. http://info.clarivate.com/openaccess.

[13] The list of journals included in the ESCI. http://mjl.clarivate.com/cgi-bin/jrnlst/jlresults.cgi?PC=EX.

Table 4. The list of Russian publications from the DOAJ included in Scopus (as of July 2, 2018)

No.	Journal	Quartile	SNIP*	CiteScore** rating in subject category:	Percentile*** Rating
1	***Schole***	1	0.169	Arts and Humanities, Linguistics	58% 41/97
2	***Past Years. Russian Historical Journal (Bylye Gody)***	2	1.207	Arts and Humanities, History	66% 320/983
3	***Sibirskie istoricheskie issledovaniya (Siberian Historical Research)***	2	0.642	Arts and Humanities, History	40% 576/983
4	***Ekonomika regiona (Economy of Region)***	2	1.269	Social Sciences	59% 86/123
5	Problemy muzykal'noi nauki (Music Scholarship)	2	0.000	Arts and Humanities, Music	33% 76/114
6	***Slovene***	2	0.421	Arts and Humanities, Religion	66% 127/389
7	***Peterburgskie slavyanskie i balkanskie issledovaniya (Studia Slavica et Balcanica Petropolitana)***	3	0.285	Arts and Humanities, History	16% 799/983
8	***Vestnik mezhdunarodnykh organizatsii: Obrazovanie, nauka, novaya ekonomik (International Organizations Research Journal)***	3	0.164	Social and Political Sciences	26% 755/1028
9	***Ratsional'naya farmakoterapiya v kardiologii (Rational Pharmacotherapy in Cardiology)***	3	0.502	Medicine, Cardiology	29% 228/327
10	***Bulletin of Transplantology and Artificial Organs (Vestnik Transplantologii i Iskusstvennykh Organov)***	3	0.219	Medicine, Transplantology	14% 32/28
11	Biomedical Photonics	3	0.055	Medicine, Dermatology	25% 98/130
12	Integratsiya obrazovaniya (Integration of Education)	3	1.44	Social Sciences, Education	44% 536/979
13	Psychology in Russia: State of the Art	3	0.634	Psychology	24% 143/189
14	***Sociological Review (Sotsiologicheskoe Obozrenie)***	3	0.000	Social Sciences, Sociology	17% 175/213
15	***Magnetic Resonance in Solids***	3	0.489	Nuclear and High Energy Physics	29% 47/66
16	Horizon: Phenomenological Research (Horizon, Fenomenologiceskie Issledovania)	3	0.317	Arts and Humanities, Philosophy	16% 400/489
17	***Onomastics Problems (Voprosy Onomastiki)***	3	0.000	Arts and Humanities, Linguistics	55% 272/618
18	Monitoring Public Opinion: Economic and Social Changes (Monitoring Obshchestvennogo Mneniya: Ekonomichekie i Sotsial'nye Peremeny)	3	0.000	Social Sciences, Sociology	20% 815/1028
19	***Russian Law Journal***	3	0.581	Legal Sciences	30% 368/528

Table 4. (Contd.)

No.	Journal	Quartile	SNIP*	CiteScore** rating in subject category:	Percentile*** Rating
20	Cybernetics and Physics	3	0.347	Physics	50% 33/66
21	Meditsinskaya immunologiya (Medical Immunology)	4	0.086	Medicine, Immunology, Allergology	10% 146/164
22	Turczaninowia	4	0.463	Natural Sciences, Botany	10% 349/389
23	***Geodynamics & Tectonophysics***	4	0.819	Natural Sciences, Geophysics	35% 86/132
24	***Analysis Problems (Problemy Analiza)***	4	0.000	Natural Sciences, Mathematics	8% 381/418
25	Journal of Infectology (Jurnal Infektologii)	4	0.022	Medicine, Infectious Diseases	12% 231/263
26	***Neurology, Neuropsychiatry, Psychosomatics (Nevrologiya, Neiropsikhiatriya, Psikhosomatika)***		0.019	Clinical Psychology	18% 203/249
27	Ozhireniye i metabolizm (Obesity and Metabolism)	4	0.27	Medicine, Endocrinology	15% 103/121
28	***Sakharnyi diabet (Diabetes Mellitus)***	4	0.312	General Medicine	27% 87/121
29	***Oncourology (Onkourologiya)***	4	0.00	Medicine, Surgery	19% 308/385
30	General Resuscitation (Obshchaya Reanimatologiya)	4	0.015	Medicine, Resuscitation	52% 40/84
31	Ortopediya, travmatologiya i vosstanovitel'naya khirurgiya detskogo vozrasta (Pediatric Traumatology, Orthopedics and Reconstructive Surgery)	4	0.036	Medicine, Pediatrics	15% 227/272
32	***Russian Open Medical Journal***	4	0.151	General Medicine	37% 519/841
33	Foods and Raw Materials	4	0.815	Technology, Food Industry	23% 295/255
34	***Russian Journal of Genetics: Applied Research***	No indicators, as they were included in Scopus in 2017		Natural Sciences, Biology	No indicators, as they were included in Scopus in 2017
35	Ice and Snow			Natural Sciences, Geophysics	
36	Scientific and Practical Rheumatology			Medicine	
37	***Infection and Immunity***			Medicine	

*SNIP (Source Normalized Impact Per Paper) is a normalized index of citation of the journal, which takes the citation in each scientific field into account.
**CiteScore calculates the average number of citations of all materials for a calendar year, published by the corresponding journal within the 3 previous years, and shows the rating and percentile of the place of publication in each subject category to which it belongs.
***The percentile shows the relative position of the journal in its branch of knowledge. Each branch of knowledge is divided into 100 percentiles of equal size depending on the number of journals, and each journal is assigned a specific percentile depending on its CiteScore. A journal that has a CiteScore percentile of 96%, has, according to CiteScore, a rating that is not lower than 96% of the journals in the same category, that is, the journal is in the 4% of the most reputable journals in this category. The higher the percentile is, the higher the credibility of the journal is.

It is interesting to note that 22 Russian open-access journals from the DOAJ are indexed in both Scopus and Web of Science. In Table 4, bold italics indicate the titles that are present in both the databases; mainly, these are periodicals on socio-political and humanities topics.

CONCLUSIONS

The analysis of the Russian journals included in the DOAJ shows that Russian open-access scientific periodicals are poorly represented in this electronic resource, that is, only 234 journals, which is 2% of the total number of journals reflected in the Directory and 5% of the open journals published in Russia. In terms of subjects, both the Russian and global arrays are dominated by periodicals on medicine. As a legal standard of scientific communication, 70% of Russian periodicals use the license Attribution *CC BY*. This most convenient of all offered licenses is also employed by the majority of periodicals included in the DOAJ. The leading positions among publisher organizations belong to universities.

The analysis of bibliometric ratings showed that among Russian open-access journals there are still very few leading fundamental periodicals with high scientific ratings. While the open Russian periodicals included in the RSCI have some leading journals in such subject categories as Politics and Political Sciences, Psychology, and Medicine, among foreign open-access journals reflected in Scopus there are no Russian leading journals. The Berlin Declaration on Open Access to Scientific and Humanities Knowledge states: "the mission of disseminating knowledge is only half complete if the information is not made widely and readily available to society."[14] It can be considered that Russian open-access scientific periodicals have some positive results with regard to the dissemination of information, but much work remains to be done to improve their quality.

The presence of Russian periodicals in the international DOAJ contributes to increasing the citation of Russian periodicals by the global scientific community. Scientists are able to not only more effectively obtain but also transfer scientific knowledge to each other and the general public: the audience coverage of scientific editions increases, which contributes to the development of interdisciplinary research. Scientists who published their papers in open-access journals can be sure that their research makes a significant contribution to international science and practice and their experience and work results are interesting and in demand in the world and moreover are available to a wide circle of colleagues in multiple countries. An additional positive effect is an increase in the quality of Russian electronic journals due to compliance with high standards of international publishing practice.

The development of the open-access movement in Russia is in line with the global trend. This can be traced based on the example of the Scientific Electronic Library (eLibrary.ru), the most complete base of Russian scientific electronic periodicals to date. Thus, 182 Russian scientific journals were presented on its platform in open access back in December 2007, 647 in September 2009, and 3366 in September 2014 [27], while as of June 15, 2018 their number was 3800[15]. Despite numerous problems and difficulties that can be read in detail in the article Open Access and Open Science: On the Edge of Inevitable Evolution [28], Russian open-access journals are a developing electronic information resource worthy of attention and study.

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