ISSN 0147-6882, Scientific and Technical Information Processing, 2014, Vol. 41, No. 4, pp. 220–229. © Allerton Press, Inc., 2014.
Original Russian Text © M.S. Galyavieva, 2014, published in Nauchno-Technicheskaya Informatsiya, Seriya I, 2014, No. 10, pp. 24–34.

Bibliometric Analysis of the Document Flow of Informetrics Based on the Russian Science Citation Index

M. S. Galyavieva

Kazan State University of Culture and Arts, Kazan, Russia

e-mail: mgaljavieva@mail.ru

Received June 26, 2014

Abstract—The results of a bibliometric analysis of the informetrics document flow are presented, based on the Russian Science Citation Index data for 2000–2013. The flow composition by subject matter and document type has been studied. The dynamics of publications has been analyzed and a time-series trend model has been constructed. The authors with the greatest number of publications on the subject matter under study have been identified. The most-frequently cited articles and their authors have been indicated. The list of journals that published most of the articles and the leading organizations in the knowledge area under consideration have been determined.

Keywords: informetrics, bibliometrics, scientometrics, Russian Science Citation Index, bibliometric analysis, document flow, bibliometric distributions

DOI: 10.3103/S0147688214040042

INTRODUCTION

In recent years, interest in the so-called "metrics" (bibliometrics, scientometrics, informetrics, and so on) has been growing throughout the world. According to the data in *Nature* [1], a "metrics explosion" has been observed, i.e., a tenfold increase in the number of publications on bibliometrics, over the past 20 years.

Among the factors that determined this process, we can mention the following: (1) advances in information and communication technologies; (2) further development of informetrics models and methods; (3) active application of bibliometrics and scientometrics in scientific policy, science financing management, and systems of assessing scientific results; (4) the use of informetric indicators in international and national ratings of higher education establishments; and (5) changes in the system of scientific communication associated with the wide spread of online information resources, Internet development, and the international movement on open access to scientific and humanities knowledge [2].

L. Egghe, one of the theoreticians of informetrics and the editor-in-chief of the *Journal of Informetrics* [3], defined the term *informetrics* as a wide notion that includes all informatics-related metric studies, such as bibliometrics (bibliographies, libraries, etc.), scientometrics (scientific policy, citation analysis, research evaluation, etc.), webometrics (the metrics of the World Wide Web, the Internet, or social networks, such as citation or collaboration networks), and so on.

In addition to this definition, let us mention a new and actively developing subfield of informetrics, altmetrics [4], which is understood as the creation and study of new "metrics" for analyzing scientific communication (scientific impacts and the communication behavior of scientists) outside of the traditional channels of the scientific communication system, namely, in social and professional networks, blogs, forums, and so on.

Informetrics can be considered as a generic concept relative to other "metrics" because, according to J. Tague-Sutcliffe's definition [5], it includes "the study of the quantitative aspects of information in any form, not just records or bibliographies, and in any social group, not just scientists."

The development and popularization of informetrics were largely prompted by the International Conferences on Scientometrics and Informetrics, which have been organized and held since 1987. In 1993, during the 4th International Conference on Scientometrics and Informetrics in Berlin, the International Society for Scientometrics and Informetrics was formally established. The international journal *Scientometrics* has been published since 1978, and the international *Journal of Informetrics* has been published since 2007. These facts testify to not only the growth and spread of studies in the field of informetrics but also the importance and recognition of its scientific status [3, 6, 7].

One of the approaches to the study of trends in the development of science is bibliometrics [8]. In world practice, bibliometric studies, as a rule, use scientific

citation databases (Web of Science, Scopus, and others). These information resources, on one hand, contain bibliographic information and, on the other hand, have special bibliometric services.

Note, however, that the coverage of the world flow of publications in international scientific citation databases is incomplete. The majority of publications by scientists from non-English-speaking countries remain "invisible" and unavailable for the world scientific community. This problem should be solved by national science citation indexes, particularly by the Russian Science Citation Index (RSCI).

The RSCI is mainly formed by processing domestic scientific journals and contains bibliographic information, abstracts, keywords, and references, as well as information about the authors and the organizations where they work. The developed large-scale bibliographic (full-text for a number of editions) system can be used for implementing various information retrieval strategies and for conducting bibliometric (scientometric) studies by individual scientists, scientific editions, and scientific organizations. In addition, the RSCI provides users with the opportunity to compile and then analyze individual selections of publications (or journals) Bibliometrically.

The objective of this study is bibliometric analysis of the informetrics document–information flow based on the RSCI data for 2000–2013 and the comparison of the obtained results with global trends.

BIBLIOMETRIC STUDIES ON TRENDS IN THE DEVELOPMENT OF INFORMETRICS (A LITERATURE REVIEW)

Studies on trends in the development of informetrics based on document-flow bibliometric analysis are presented in the works by O.I. Voverene [9], Yu.N. Klimov and Yu.V. Konovalov [10], M. Morales [11], O.V. Pen'kova and V.M. Tyutyunnik [12], J. Bar-Ilan [13], P. Mayr and W. Umstätter [7], B.C. Peritz [14, 15], C.S. Wilson [16], and others. Bibliometric studies based on an array of articles from one or several specialized journal(s) (for example, 17–27) can be distinguished in a separate group. Bar-Ilan and Peritz's study [28] of the development of informetrics in the World Wide Web over 8 years (1998–2006) is based on the analysis of web pages containing the terms *informetrics* or *informetric*.

In the opinion of W. Glänzel [29], the fact that bibliometric methods are already applied directly to bibliometrics (additionally, to scientometrics and informetrics) also indicates the rapid development of this discipline. Let us consider the results of some studies in detail.

Voverene's study (1985) [9] of 1000 publications for 1911–1982, in which she employed bibliometric methods, showed the following: (1) most of the articles under analysis were published in the literature on informatics (258 articles, or 37.8%); (2) bibliometric methods were most frequently used in studies on the problems of informatics and scientific–information activities; and (3) only informatics used bibliometric methods to study the subject of scientific information, owing to which the main regularities of the aging, growth, and dissipation of documents (Bradford's law) were discovered. The author concluded that bibliometrics in itself is closest to informatics and is a structural part of informatics methodology.

An article by Morales [11] analyzed the distribution of publications for 1917–1980 (more than 2500 records), based on two bibliographies by R. Hjerppe (1980, 1982) on bibliometrics and citation analysis. It follows from the growth-curve analysis that, starting from the 1960s, the number of publications grew consistently and reached its maximum in 1977. The slight decrease in the number of works in the subsequent 3 years can be explained by the fact that the literature of the past several years was not fully reflected in the bibliography that was used. The distribution by language shows that 79.3% of the articles were published in English; 10.2%, in Russian; 3.1%, in German; 1.1%, in Spanish; and 6.3%, in other languages. Among the most productive informetrics journals (out of the 145 that were found in the array under study) were the *Journal of the American Society for Information Science* (JASIS),[1] and the *Journal of Documentation, Science, College & Research Libraries, Information Processing & Management*. The conclusion is that, along with bibliometrics and scientometrics, it is necessary to develop an independent interdisciplinary science, informetrics, which, proceeding from the theoretical provisions of informatics, can analyze and generalize the metric aspects of other sciences. It is stated that informetrics as a scientific–information activity is a component of informatics and studies various metric aspects of its subject of inquiry, including the quantitative growth of scientific literature, the aging and dissipation of information, the roles of different documents as a means of scientific communication, and the role of scientific communication channels.

In 1990, Peritz [15] studied the correspondence of the above-mentioned Hjerppe bibliographies to the Bradford distribution. The selections of documents cover two periods, namely, from 1960 through 1978 and from 1979 through 1983, and contain 1496 and 942 publications, respectively. As a result, a good agreement of the experimental arrays with Bradford's law was revealed, especially for the second period. For

[1] The title of this journal changed several times. It was published from 1950 (vol. 1) under the title *American Documentation*. From 1970 (vol. 21), its title was *Journal of the American Society for Information Science* (JASIS); from 2001 (vol. 52), *Journal of the American Society for Information Science and Technology* (JASIST); and from 2014 (vol. 65), *Journal of the Association for Information Science and Technology* (JASIST).

both periods, the "core" of the journals comprises seven journals for each period, which cover 28 and 30% of the articles, respectively. It is noted that the list of the 15 most "productive" journals primarily includes publications from the subject areas "informatics" and "documentation." The list for 1960–1978 is headed by *JASIS*, the *Journal of Documentation*. The third and fourth places are occupied by *Nauchno-tekhnicheskaya informatsiya. Ser. 1* (*Scientific and Technical Information Processing* in the English-language version) and *Nauchno-tekhnicheskaya informatsiya. Ser. 2* (*Automatic Documentation and Mathematical Linguistics* in the English-language version). They are followed by *Science, Nature, Information Processing & Management*, and others. In the second period (1979–1983), the first place was occupied by *Scientometrics*, which was followed by *JASIS*, the *Journal of Information Science*, the *Czechoslovakian Journal of Physics*, *Nauchno-tekhnicheskaya informatsiya. Ser. 1* (Scientific and Technical Information Processing) the *Journal of Documentation*, and others. The journal *Nauchno-tekhnicheskaya informatsiya. Ser. 2* (*Automatic Documentation and Mathematical Linguistics*) was in the 15th place on that list.

Wilson's review [16] presents bibliometric indicators of the document flow in informetrics for 1990–1999. The documents were selected on the basis of the DIALOG system in accordance with the query "bibliometric? OR informetric?" (the symbol "?" was used to specify the shortened forms of the keywords). The search yielded 1318 documents, including 1170 journal articles. The total number of journals was 290. The list of the top 20 journals (covering 64% of the array of articles under study) was again headed by *Scientometrics* and *JASIS*. The sixth line on that list was occupied by the Russian journal *Mezhdunarodnyi forum po informatsii i dokumentatsii (International Forum on Information and Documentation)*.

The review article by W.W. Hood and Wilson [30] analyzed the distribution of the frequency of the occurrence of the terms *bibliometrics?, scientometric?*, and *informetric?* in the array of publications on bibliometrics, scientometrics, and informetrics, on the basis of the DIALOG system for the period from 1968 through 1999. It was found that the frequency of occurrence of the term *bibliometric?* had been constantly growing from 1970 through 1990. The frequency of this term the gradually decreased and leveled off. The term *scientometric?* demonstrated a slow increase in the number of occurrences from 1975 through 1989. Then this number almost doubled in 1990 and has been growing ever since. The term *informetric* originated in the 1980s, and the frequency of its use has been approximately the same since the 1990s. Overall, in the period under study, the frequency of the use of the term *bibliometric?* has been significantly higher than that of *scientometric?* and *informetric?*. The authors presented a list of the top 20 journals covering 61% of publications from 1950 through August 2000. The "core" was determined, consisting of seven journals and covering 39% of the articles. The list was headed by the journals *Scientometrics, JASIS*, and *Nauchno-tekhnicheskaya informatsiya. Ser. 1* and *Nauchno-tekhnicheskaya informatsiya. Ser. 2*. It was indicated that, since the journal *Nauchno-tekhnicheskaya informatsiya* had not been divided into series prior to 1966, the data for five journals (three in Russian and two (the translated versions of both series, *Scientific and Technical Information Processing* and *Automatic Documentation and Mathematical Linguistics*) in English) were taken into account. It was established that the growth rate of the literature for the "united" area under study (bibliometrics, scientometrics, and informetrics) had stabilized over the past 5 years and amounted to about 300 publications per year. The search by the keywords *webometr?* and *cibermetr?* revealed a low frequency of the occurrence of these terms, viz., 9 and 14 times, respectively.

In [10], Klimov and Konovalov described the processes of modeling, predicting, and assessing the outlook for scientific trends in scientometrics, bibliometrics, and informetrics. The authors formed experimental arrays based on the lists of references to the articles and bibliographic indexes. The chronological framework of the integral flow of publications is the period from 1940 through 1990. The modeling and forecasting of the growth of the microflows were based on the linear, power, and composite models. The conclusions were that the scientific trend "bibliometrics, scientometrics, and informetrics" was quite promising and that constant interest of scientists in scientometrics and bibliometrics was observable.

In 2001, Pen'kova and Tyutyunnik [12] performed the scientometric analysis of the document flow in informetrics, scientometrics, and bibliometrics based on the abstract journal *Informatics* over 1988–1999. The total number of publications in the array under study was 1029. The obvious dominance of journal articles was revealed (945, or 93%), with 855 (90%) of them being in foreign languages. It was noted that the development of informetrics, scientometrics, and bibliometrics in the period under study was the domain of foreign scientists.

An article by Mayr and Umstätter [7], based on the bibliometric analysis of the document flow, substantiated the need for and the timeliness of the new *Journal of Informetrics*, which has been published since 2007. The experimental array of 3889 documents for 1976–2004 was formed on the basis of the LISA (Library and Information Science Abstracts) database, the CD-ROM version. The frequency of occurrence of the terms *bibliomet*, scientomet*, informet*, webomet*, infomet**, and *cibermet** in this selection was 2851, 1631, 292, 18,

15, and 7 times, respectively. The symbol * was used to specify the shortened form of the keywords. According the Bradford distribution, the "core" journals were determined, including *Scientometrics* (1413 articles), JASIS (218), *Nauchno-tekhnicheskaya informatsiya*[2] (110), and others. Egghe (64), Glänzel (61), and R. Rousseau (54) were indicated as being among the most "productive" authors. The distribution of publications by language showed that 81.6% of the documents were published in English; 4.5%, in Russian; 3.3%, in Spanish; and 10.6%, in other languages. It was noted that the period in which the number of publications on informetrics doubled was about 10 years.

In 2008, Bar-Ilan prepared a review of trends in the development of informetrics in the early 21st century [13]. On the basis of the WoS, Scopus, Google Scholar, LISA, and LISTA databases, the author compiled a selection of 598 English-language publications for 2000–2006. To search for and select documents, a multiaspect query by keywords and keyword combinations was used, employing the logical operator OR and several additional techniques. The studies revealed the most frequently cited scientific publications and their authors formed a list of core journals, determined topical research trends, and so on. In particular, it was established that the top list of authors included M. Thelwall, Rousseau, Egghe, Glänzel, L. Leydesdorff, A.F.J. van Raan, L. Vaughan, Bar-Ilan, and H. Moed (overall, the sampling comprised 683 authors). The list of leading journals was headed by *Scientometrics*, *JASIST*, *Research Policy, Information Processing & Management, Journal of Information Science*, and *Journal of Documentation*. Note that the *Journal of Informetrics* (which has been published since 2007) was not covered by this study. It was emphasized that the first two lines of the rating, as in Wilson's study [16], were occupied by the journals *Scientometrics* and *JASIST* (let us specify, starting from 1979; see [15]). The author of the review [13] concluded that new research trends were being formed in informetrics (webometrics, *h*-index, and open and electronic access) and the previous trends (cartography and visualization and data collection) were strengthening; a major influence on the development of informetrics was noted on the part of two newly created citation databases (Scopus and Google Scholar), as well as the growing number of regional databases, for example, in China, Latin America, Taiwan, and Japan (and, let us add, in Russia).

In the opinion of S. Milojević and Leydesdorff [27], bibliometrics, scientometrics, informetrics, and webometrics, taking into account their fundamental similarities and focus on documents as analysis units, may be regarded as examples of the same scientific sphere with the same objectives and methods, which it is proposed should be called *information metrics*, or iMetrics for short. On the basis of an array of documents obtained from three core journals (*Scientometrics*, *JASIST*, and *Journal of Informetrics*) for 2007–2011, the authors studied the cognitive and social identity of iMetrics and its difference from general informatics. It was confirmed that the volume of publications on this area had been rapidly growing over the past decade. The authors compiled lists of the most characteristic keywords for each journal. The analysis based on these lists showed that, in addition to common topics, each journal had a special focus of its own. For example, *JASIST* focused on scientific communication; *Scientometrics*, on studies on individual geographical areas; and *Journal of Informetrics*, on efficiency indicators. However, the scientists emphasized that the differences were much fewer than the similarities. A comparison of the names of the ten most-frequently cited authors in the three arrays under study was performed. Among the scientists whose names were observed in all the three arrays were Egghe, E. Garfield, Glänzel, J.E. Hirsch, Leydesdorff, and Moed. Therefore, the core of the researchers who initially were focused on iMetrics-related topics was determined. The core group of scientists was characterized by the development of a joint vocabulary, a high degree of similarity in the terms used, and the use of a single intelligence base. It was concluded that iMetrics authors who published their papers in various journals had similar citation practices and that the very area as a set of references was apparently developing more rapidly than informatics. Namely, the majority of the references in iMetrics-related articles were recent; they reached the peak at the age of 2 years for all three experimental arrays of documents. It was stated that iMetrics is a scientific field with related social and cognitive identities and is different from general informatics.

Thus, bibliometric studies on the document flow in informetrics have made it possible to trace not only the dynamics of the main subjects of inquiry (publications, keywords, authors, and scientific journals) but also the genesis of informetrics as a scientific discipline.

RESULTS AND DISCUSSION

The Search for and Selection of Publications

The experimental array of documents for this study was formed on the basis of the data of the Scientific Electronic Library (elibrary.ru). To search for publications, the "Advanced Search" option was used (the "Search Queries" section). The search was conducted in accordance with the composite query using the logical operator *ILI* [OR, *Tr.*]: informetrics OR bibliometrics OR scientometrics OR webometriya OR webometrics OR altmetriya OR altmetrics OR cibermetrics OR citation index OR scientific citation index OR impact factor OR Hirsch index OR bibliometric analysis OR scientometric analysis OR citation analy-

[2] No series of the journal were specified.

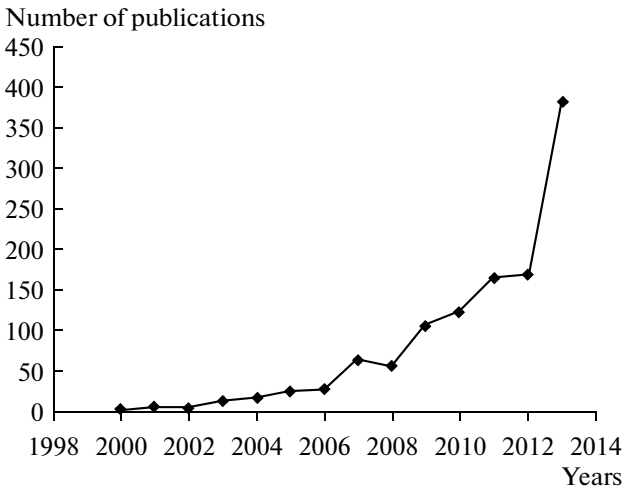

Fig. 1. Distribution of publications on informetrics for 2000–2013.

sis OR bibliometric methods OR scientometric methods OR bibliometric indexes OR scientometric indexes OR Bradford's distribution OR Zipf's distribution OR Lotka's distribution. The chronological framework was from 2000 through 2013. The search was conducted in the fields "publication title," "abstract," and "keywords," taking into account the morphology of the Russian language. The selection did not include patents.

Moreover, to ensure the representativeness of the sampling (since not all the RSCI-indexed documents have a list of keywords and an abstract), additional techniques were used, for example, the search for documents by the last names of Russian authors who are well known in informetrics and the inclusion of the publications found into the selection under formation. Note that the RSCI system carries out automatic checking and duplicate publications were not included into the selection. Articles by Russian scientists from foreign journals and from the translated versions of Russian journals were also not included.

This search strategy yielded 1247 documents. Then, as a result of manual verification (in questionable cases) by looking through abstracts (extended abstracts) and reference lists, the data were adjusted to exclude irrelevant documents. For example, documents with the titles "Information for the System of the Russian Science Citation Index (RSCI)" from the journals *Zakonnost'* (Legitimacy) and *Ugolovnoe pravo* (Criminal Law) were removed from the selection. Some collections of conference proceedings and materials that had appeared in the selection under study only because their abstracts contained sentences such as "The materials of this collection are included in the RSCI," were also excluded. Ultimately, 1158 publications were included into the experimental selection (the data of June 19, 2014).

General Indicators for the Selection of Publications

For a user-formed selection of publications, the RSCI makes it possible to obtain automatically calculated statistical indicators. They include the total number of publications (1158) and their authors (1321), the average number of publications per author (0.88), the total number of citations (1616), the average number of citations per publication (1.40), the number of articles cited at least once (442), the number of self-citations in articles from the same selection (934), and the Hirsch index (14). The RSCI envisages the possibility to form different statistical distributions of publications by thematic rubrics, keywords, journals, authors, organizations, years, the number of coauthors, and the number of citations. In addition, it is possible to form similar distributions of citing and cited publications.

The Distribution of Publications by Type

Our selection represents the following types of documents (the typology of the documents corresponds to the RSCI): articles from scientific journals (1057, or 91.2%), books or collections of articles (21), articles form conference proceedings (24), articles in collections or chapters in books (19), preprints (17), dissertations and/or their extended abstracts (16), reports (3), and collections of conference proceedings (1). Therefore, the majority of the documents in the selection under analysis are articles from scientific journals.

Let us give the details on dissertations. Among the authors of dissertations, we will mention A.N. Ezhov, I.V. Zibareva, A.A. Ivushkin, E.V. Karikova, V.A. Markusova, Yu.V. Mokhnacheva, Pen'kova, A.A. Pechnikov, V.V. Pislyakov, and N.S. Red'kina. Our analysis of the specialties in which the dissertations were defended has revealed the following. Seven dissertations, including one doctoral dissertation (Markusova), relate to the specialty "05.25.03. Library Science, Bibliography Science, and Book Science." Two dissertations, including one doctoral dissertation (Pechnikov), are within the specialty "05.13.18. Mathematical Modeling, Numerical Methods, and Program Complexes." One dissertation, which was devoted to the scientometric analysis of the state of scientific studies on psychiatry, was in the specialty "14.01.06. Psychiatry."

The Distribution of Publications by Thematic Rubric

The selection embraces publications from the following thematic rubrics: informatics (231), science of science (167), people's education and pedagogy (87), economics and economic sciences (79), medicine and healthcare (76), culture and culturology (53), sociology (38), philosophy (30), history and historical sciences (25), physics (22), and others.

Thus, we may state that the majority of publications are attributed to informatics and science of science.

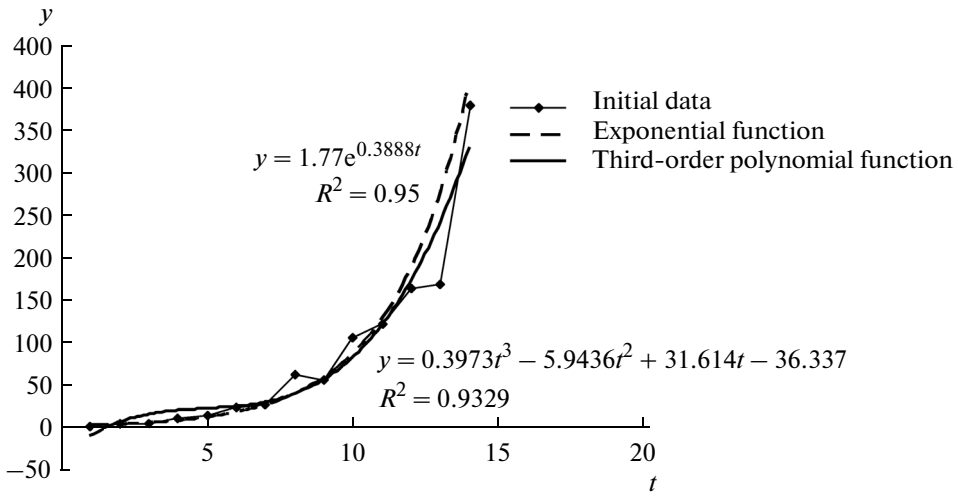

Fig. 2. Modeling the growth of the data time series.

The Distribution of Publications by Year

Proceeding from the RSCI data, we plotted a graph of the distribution of the number of publications by year (Fig. 1). The growth-curve analysis shows that the number of publications (note, Russian-language publications) on this topic continues to grow steadily and, for example, it increased by more than two times from 2012 through 2013.

Modeling and Predicting Data Time Series

A trend model of the data time series was constructed using MS Excel (Fig. 2). On the basis of the method of increment characteristics [31], an exponential function (the dashed line) and a third-order polynomial (the solid line) were chosen as growth functions. To evaluate the accuracy of the model, the coefficient of determination, R^2, was used. As is known, the more accurate the model is, the closer to unity the R^2 value is. Thus, the exponent gives the best approximation to the initial data. Prediction based on the obtained equation of the exponential trend made it possible to forecast the number of publications for the next 2 years. The volume of the flow is expected to be 596 publications in 2014 and 879 publications in 2015.

The Distribution of Publications by Keyword

Note that the title of a publication, the keywords, and the abstract are usually included in the RSCI in two languages (Russian and English). Respectively, both spelling variants are automatically taken into account during the formation of distribution by keyword. The analysis of the obtained distribution of documents by keywords (overall, 1000 different keywords and keyword combinations were identified) shows that the number of keywords in Russian differs from that in English (Table 1), with a larger number of publications corresponding to Russian keywords. The words *scientometrics, citation index, impact factor, publishing activity*, and *bibliometrics* occur are the most frequent in the publications. Note that the keyword *informetrics* is mentioned only eight times, and the new terms *altmetriya* (in the Russian version) and *altmetrics* are used one time each.

The Distribution of Publications by Journal

In analyzing the results of the distribution of publications by scientific journals, we may note that the articles are presented in a rather wide circle of scientific publications. The total number of journals in the selection under study is 465. The top 20 scientific journals, which are the leaders according to the number of articles published in them and contain about 30% of all articles from the array under analysis, are the journals that are presented in Table 2.

The Most-Cited Publications

The most frequently cited publications (having 15 or more citations in the RSCI) in the selection of documents on informetrics for 2000–2013 are presented in Table 3.

The Distribution of Publications by Author

The leading authors with the largest number of publications in the array under study are presented in Table 4. As a result of analyzing the data from Tables 3 and 4, we can note that the names of the authors of the most cited works and those of the authors with the largest number of publications in this selection are similar, with six names present in both lists.

Table 1. Distribution of publications on informetrics by keyword

Keyword/keyword combination		Number of documents	
russian	english	russian	english
Naukometriya	Scientometrics	146	90
Indeks tsitirovaniya	Citation index (citing index)	101	66 (6)
Impakt-faktor	Impact factor (impact-factor)	97	43 (21)
Publikatsionnaya aktivnost'	Publication activity (publishing activity)	94	42 (8)
Bibliometriya	Bibliometrics (bibliometry)	78	25 (11)
Tsitiruemost'	Citation	58	37
Bibliometricheskii analiz	Bibliometric analysis	57	37
Indeks Khirsha	Hirsch index (h-index)	53	19 (13)
–	Scopus	–	36
–	Web of Science	–	35
Rossiiskii indeks nauchnogo tsitirovaniya	Russian science citation index	32	13
RINTs		31	
Rossiiskii indeks nauchnogo tsitirovaniya (RINTs)		16	
Tsitirovanie	Citing	30	4
Vebometrika (vebometriya)	Webometrics	29 (7)	19
Bibliometricheskie pokazateli (bibliometricheskie indikatory)	Bibliometric indicators	28 (10)	15
Naukometricheskii analiz	Scientometric analysis	28	10
Nauka	Science	26	18
Naukovedenie	Science of science	21	15

Table 2. Twenty most productive scientific journals that reflect the subject matter of informetrics

Journal	Number of articles	Rank
Nauchno-tekhnicheskaya informatsiya. Ser. 1 (Scientific and Technical Information Processing)	68	1
Upravlenie bol'shimi sistemami: sbornik trudov (Large-Scale Systems Control)	34	2
Mezhotraslevaya informatsionnaya sluzhba (Interindustry Information Service)	28	3
Bibliosfera	25	4
Mezhdunarodnyi forum po informatsii (International Forum on Information)	22	5
Vestnik Rossiiskoi Akademii Nauk (Herald of the Russian Academy of Sciences)	18	6–7
Informatsionnye resursy Rossii	18	6–7
Vestnik Kazanskogo tekhnologicheskogo universiteta	14	8
Naukovedcheskie issledovaniya	12	9–10
Sotsiologiya nauki i tekhnologii (Sociology of Science and Technology	12	9–10
Vysshee obrazovanie v Rossii	11	11
Foresight. Russia	10	12
Informatsionnye tekhnologii	9	13–16
Nauka. Innovatsii. Obrazovanie	9	13–16
Nauchnye i tekhnicheskie biblioteki	9	13–16
Oboronnyi kompleks - nauchnomu i tekhnicheskomu progressu Rossii (Defense Industry Achievements—Russian Scientific and Technological Progress)	9	13–16
Universitetskoe upravlenie: praktika i analiz (University Management: Practice and Analysis)	8	17
Bibliotekovedenie	7	18–20
Mezhdunarodnyi zhurnal prikladnikh i fundamental'nykh issledovanii	7	18–20
Universitetskaya kniga	7	18–20

Table 3. The most cited publications in the selection of materials on informetrics

Authors	Article's title	Journal	Year	Number of citations in the RSCI
V.A. Markusova	Tsitiruemost' rossiiskikh publikatsii v mirovoi nauchnoi literature [Citation of Russian Publications in World Scientific Literature—Tr.]	Vestnik Rossiiskoi Akademii Nauk	2003	44
O.V. Mikhailov	Blesk i nishcheta "indeksa tsitirovaniya" (Splendors and Miseries of the "Citation Index")	Vestnik Rossiiskoi Akademii Nauk	2004	28
V.V. Pislyakov	Metody otsenki nauchnogo znaniya po pokazatelyam tsitirovaniya (Evaluation of scientific knowledge based on citation indexes)	Sotsiologicheskii zhurnal (Sociological Journal)	2007	26
L.M. Gokhberg and G.S. Sagieva	Rossiiskaya nauka: bibliometricheskie indikatory [Russian Science: Bibliometric Indicators—Tr.]	Forsait (Foresight)	2007	25
V.A. Markusova, V.V. Ivanov, and A.E. Varshavskii	Bibliometricheskie pokazateli rossiiskoi nauki i RAN (1997–2007) (Bibliometric Indicators of Russian Science and of the Russian Academy of Sciences (1997–2007)	Vestnik Rossiiskoi Akademii Nauk	2009	24
V.A. Markusova	Information resources for monitoring Russian science	Vestn. Ross. Akad. Nauk	2005	24
I.V. Zibareva, A.V. Zibarev, and V.M. Buznik	Rossiiskaya nanonauka: bibliometricheskii analiz na osnove baz dannykh STN International (Russian Nanoscience: Bibliometric Analysis Relying on the STN International Database)	Khimiya v interesakh ustoichivogo razvitiya (Chemistry for Sustainable Development)	2010	20
M.A. Nazarenko	Indeks Khirsha kak klyuchevoe slovo v sovrenennykh nauchnykh issledovaniyakh [The Hirsch Index as a Keyword in Modern Scientific Studies—Tr.]	Sovremennye naukoemkie tekhnologii	2013	19
V.M. Buznik, I.V. Zibareva, N.I. Sorokin, and L.S. Filatova	Naukometricheskie pokazateli khimicheskikh institutov Novosibirskogo nauchnogo tsenra SO RAN v 1995 - 2003 po dannym Science Citation Index i Chemical Abstracts (Scientometric Indices of Chemical Institutes of the Novosibirsk Scientific Centre of SB RAS during the Years 1995–2003 according to the Data of Science Citation Index and Chemical Abstracts)	Khimiya v interesakh ustoichivogo razvitiya (Chemistry for Sustainable Development)	2005	15
Yu.N. Klimov	Naukometricheskie issledovaniya informatsionnykh potokov v oblasti nanonauki, nanomaterialov, nanostruktury i nanotekhnologii na osnove zarubezhnoi i otechestvennoi bibliografii [Scientometric Studies of Information Flows in the Sphere of Nanoscience, Nanomaterials, Nanostructure, and Nanotechnology on the Basis of Foreign and Domestic Bibliography—Tr.]	Mezhotraslevaya informatsionnaya sluzhba (Interindustry Information Service)	2005	15
V.A. Markusova	Publikatsionnaya aktivnost' rossiiskikh uchenykh po BD SCI i Scopus (Publishing Activity of Russian Scientists according to SCI and Scopus Databases)	Nauchno-tekhnicheskaya informatsiya. Ser. 1 (Scientific and Technical Information Processing)	2008	15
E.D. Sverdlov	Mirazhi tsitiruemosti. Bibliometricheskaya otsenka znachimosti nauchnykh publikatsii otdel'nykh issledovatelei (Citation Mirages (Bibliometric Evaluation of the Significance of Individual Authors' Publications))	Vestnik Rossiiskoi Akademii Nauk	2006	15
M.M. Sokolov	Rossiiskie sotsiologi na mezhdunarodnom i natsional'nom rynke idei (naukometricheskii analiz) [Russian Sociologists in the International and National Markets of Ideas (Scientometric Analysis)—Tr.]	Sotsiologicheskie issledovaniya (Sociological Studies)	2009	15

Table 4. Authors with the largest number of publications in the selection of materials on informetrics

Author	Number of publications	Author	Number of publications
Yu.I. Klimov	41	A.I. Terekhov	15
I.V. Zibareva	40	V.N. Gureev	13
V.A. Markusova	39	N.G. Kurakova	13
O.V. Mikhailov	19	N.A. Mazov	13
L.A. Tsvetkova	19	I.V. Marshakova-Shaikevich	13
V.M. Buznik	17	A.A. Pechnikov	13
V.I. Evdokimov	17	V.V. Pislyakov	13
Yu.V. Mokhnacheva	16	A.A. Pronin	13
A.N. Libkind	15	T.N. Kharybina	13

Table 5. Distribution of publications in the sphere of informetrics by the organizations representing their authors

Organization	Number of publications
All-Russia Institute of Scientific and Technical Information, RAS	60
National Research University "Higher School of Economics"	40
State Public Scientific Technical Library, Siberian Branch, RAS	27
Boreskov Institute of Catalysis, Siberian Branch, RAS	24
Moscow State University	24
Kazan National Research Technological University	19
RAS Library of Natural Sciences	18
All-Russian Research Institute for Interindustry Information	18
RAS Central Institute of Mathematical Economics	18
Nikiforov Russian Center of Emergency and Radiation Medicine	16

The Distribution of Publications by Organization

Ten leading organizations (overall, there are 289 organizations in this selection) according to the total number of publications in the sphere of informetrics are presented in Table 5.

CONCLUSIONS

Scientific publications of domestic scholars can be divided into two flows: internal (in Russian) and external (in English). This article presents some results of the bibliometric analysis of the internal (Russian-language) document–information flow in informetrics, based on the RSCI data for 2000–2013. The study made it possible to investigate the dynamics of publications on this subject; to compile frequency distributions of the publications by keywords, authors, scientific editions, and scientific organizations; to identify authors with the largest numbers of publications; to determine the most-cited articles and their authors; to compile a list of journals that published most of the articles; and to specify the leading organizations in this field.

The dynamics of publishing activity in the sphere of informetrics is characterized by a high growth rate, which testifies to the growing number of studies and researchers and correlates with the worldwide trend. Most of the publications in this selection are dedicated to problems of scientometrics, the publishing activities of scientists, and so on. In our opinion, this is primarily connected with the fact that the projected values of scientometric indicators are fixed in the Strategy of the Innovation Development of the Russian Federation until 2020 and in Decree of the President of the Russian Federation no. 599 of May 7, 2012, On Measures for the Implementation of State Policy in the Field of Education and Science.

We emphasize that this array of publications is merely a selection of the document–information flow in informetrics. The main methodological problems were connected with determining the criteria for the inclusion of publications into the selection, as well as with ensuring its completeness and relevance. In a number of cases, the obtained RSCI-based bibliometric indicators and distributions require additional, as a rule manual, verification.

An unbiased evaluation of the contribution of domestic scientists to the world flow of scientific pub-

lications on informetrics requires a bibliometric analysis of publications of Russian scientists (the external information flow) based on the Web of Science and Scopus databases.

ACKNOWLEDGMENTS

This work was supported by the Russian Humanitarian Scientific Foundation, project no. 14-03-12004. The author is also grateful to A.M. Elizarov, a professor at the Kazan (Volga) Federal University, for his valuable remarks and suggestions during the preparation of this article.

REFERENCES

1. van Noorden, R., A profusion of measures, *Nature*, 2010, vol. 465, pp. 864–866.
2. Galyavieva, M.S., On the formation of the concept of informetrics (review), Sci. Tech. Inf. Process., 2013, vol. 40, no. 2, pp. 89–96.
3. Egghe, L., Expansion of the field of informetrics: Origins and consequences, *Information Processing Management*, 2005, vol. 41, no. 6, pp. 1311–1316.
4. Priem, J., Taborelli, D., Groth, P., and Neylon, C., Altmetrics: A manifesto. http://altmetrics.org/manifesto. Cited June 19, 2014.
5. Tague-Sutcliffe, J.M., An introduction to informetrics, *Information Processing Management*, 1992, vol. 28, no. 1, pp. 1–3.
6. Egghe, L., Welcome to the journal of informetrics, *J. Informetrics*, 2007, vol. 1, no. 1, p. 1.
7. Mayr, P. and Umstätter, W., Why is a new Journal of Informetrics needed?, *Cybermetrics*, 2007, vol. 11, no. 1, pp. 1–6. http://cybermetrics.cindoc.csic.es/articles/v11i1p1.pdf. Cited June 19, 2014.
8. Marshakova-Shaikevich, I.V., *Rossiya v mirovoi nauke: bibliometricheskii analiz* (Russia in World Science: A Bibliometric Analysis), Moscow: Institute of Philosophy, Russian Academy of Sciences, 2008.
9. Voverene, O.I., Bibliometrics as a structural part of the methodology of informatics, *Sci. Tech. Inf. Process.,* 1985, no. 7, pp. 1–5.
10. Klimov, Yu.N. and Konovalov, Yu.V., Modeling, predicting the growth of documentary information flows and assessing the potential of scientific trends in scientometrics, bibliometrics, and informetrics, *Nauchn.-Tekhn. Inform. Ser. 2*, 1997, no. 4, pp. 32–35.
11. Morales, M., Informetrics and its importance, *Mezhdunar. Forum Inform. Dokumentatsii*, 1985, vol. 10, no. 2, pp. 16–21.
12. Pen'kova, O.V. and Tyutyunnik, V.M., Informetrics, scientometrics, and bibliometrics: A scientometric analysis of the current state, *Vestn. Tambov. Univer. Ser.: Estestv. Tekhn. Nauki*, 2001, vol. 6, no. 1, pp. 86–88.
13. Bar-Ilan, J., Informetrics at the beginning of the 21st century - a review, *J. Informetrics*, 2008, vol. 2, no. 1, pp. 1–52.
14. Peritz, B.C., Bibliometric literature: A quantitative analysis, in *Informetrics 87/88. Select Proceedings of the First International Conference on Bibliometrics and Theoretical Aspects of Information Retrieval*, Egghe, L. and Rousseau, R., Eds., Amsterdam: Elsevier Science, 1988, pp. 165–173.
15. Peritz, B.C., A Bradford distribution for bibliometrics, *Scientometrics*, 1990, vol. 18, no. 5–6, pp. 323–329.
16. Wilson, C.S., Informetrics, *Annual Review of Information Science and Technology*, 1999, vol. 34, pp. 107–247.
17. Wouters, P. and Leydesdorff, L., Has Price's dream come true: Is scientometrics a hard science?, *Scientometrics*, 1994, vol. 31, no. 2, pp. 193–222.
18. Schoepflin, U. and Glänzel, W., Two decades of "scientometrics." An interdisciplinary field represented by its leading journal, *Scientometrics*, 2001, vol. 50, no. 2, pp. 301–312.
19. Schubert, A., The web of scientometrics, *Scientometrics*, 2002, vol. 53, no. 1, pp. 3–20.
20. Peritz, B.C. and Bar-Ilan, J., The sources used by bibliometrics–scientometrics as reflected in references, *Scientometrics*, 2002, vol. 54, no. 2, pp. 269–284.
21. Glenisson, P., Glänzel, W., and Persson, O., Combining full-text analysis and bibliometric indicators: A pilot study, *Scientometrics*, 2005, vol. 63, no. 1, pp. 163–180.
22. Persson, O., A Bibliometric View of Scientometrics. http://www.umu.se/inforsk/scientometrics/index.html. Cited June 19, 2014.
23. Mukherjee, B., Journal of the American Society for Information Science and Technology (2000–2007): A bibliometric study, *IFLA J.*, 2009, vol. 35, no. 4, pp. 341–358.
24. Bar-Ilan, J., JASIST 2001–2010, *Bull. Am. Soc. Inf. Sci. Technol.*, 2012, vol. 38, no. 6, pp. 24–28.
25. Egghe, L., Five years "Journal of Informetrics," *J. Informetrics*, 2012, vol. 6, no. 3, pp. 422–426.
26. Das, P.K., Journal of informetrics: A bibliometric profile, *DESIDOC J. Lib. Inf. Technol.*, 2013, vol. 33, no. 3, pp. 243–252.
27. Milojević, S. and Leydesdorff, L., Information metrics (iMetrics): A research specialty with a socio-cognitive identity?, *Scientometrics*, 2013, vol. 95, no. 1, pp. 141–157.
28. Bar-Ilan, J. and Peritz, B.C., The lifespan of "informetrics" on the Web: An eight year study (1998–2006), *Scientometrics*, 2009, vol. 79, no. 1, pp. 7–25.
29. Glänzel, W., Bibliometrics as a research field: A course on theory and application of bibliometric indicators: Course Handouts. http://nsdl.niscair.res.in/bitstream/123456789/968/1/Bib_Module. Cited June 19, 2014.
30. Hood, W.W. and Wilson, C.S., The literature of bibliometrics, scientometrics, and informetrics, *Scientometrics*, 2001, vol. 52, no. 2, pp. 291–314.
31. Chetyrkin, E.M., *Statisticheskie metody prognozirovaniya* (Statistical Methods of Prediction), Moscow: Statistika, 1977.

Translated by B. Alekseev