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Problems of Scientometrics and its Suitability for Management Scientific Activity in Modern Russia

A.V. Grinev
Peter the Great St. Petersburg Polytechnic University,
Saint Peterburg, Russia

ABSTRACT

The purpose of the study is a critical analysis of the Russian practice of using the main indicators of scientometrics in management activities at various levels. To achieve this goal, it was necessary to solve several problems, namely: to study the main scientometric parameters; determine the degree of accuracy and reliability of information indexed by the major bibliographic databases; to formulate a number of principles of management practice related to scientometrics; to identify and consider the shortcomings of management decisions recorded in regulatory documents; to develop recommendations aimed at resolving a number of problems related to the use of scientometric indicators. The research is based on both general scientific theoretical methods: induction and deduction, analysis and synthesis, systems approach, social modeling, comparative typological and comparative analytical methods, and practical methods: working with documents, analysis of printed and electronic sources of information, content analysis and bibliographic combination of documents. In the course of the work, it was revealed that scientometrics in its applied version still clearly lacks reliability both due to imperfections associated with both its main indicators in all databases and with the indexing of publications in them, as well as due to management miscalculations reflected in regulations. In particular, in the light of the current political events caused by the special military operation in Ukraine, and in connection with difficult access to Western bibliographic data bases, the problem of a radical reorganization of the Russian Science Citation Index (RSCI) and the transition to a new system of scientometric indicators clearly arises. The data and recommendations obtained as a result of the study will help management structures avoid obvious omissions and errors in planning and monitoring the scientific activities of university and academic research institute staff, as well as optimize scientometric reporting.

Keywords: scientometrics; scientometric indicators; management principles; bibliometric databases; Scopus; Web of Science; RSCI

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INTRODUCTION

The topic of the title of the article has repeatedly attracted the attention of domestic and foreign specialists, because in recent decades, scientometrics and its indicators have been widely used in management and science policy. The scientometrics itself, which is a field of science studies, conducts the study of its object (science) by means of various measurements and statistical processing of information, primarily related to scientific literature, concentrated in bibliographic and abstract databases (BDBs). Currently, the largest of these are the American — Web of Science (WoS) and the European — Scopus. In addition, countries with a high level of scientific development sometimes form their own national databases, for example, in Russia it is RSCI — Russian Science Citation Index (RSCI). Data from these databases and scientometric indicators are widely used in making various management decisions (including funding of universities, individual scientific teams), allocating grants, concluding, or extending labour contracts, etc.

However, it should be borne in mind that the "weight" of scientometrics is not the same in different countries. For example, in the UK, USA or Germany, its role is minimal, while in

Pakistan, China, Spain and a number of other countries it is given great importance. The use of scientometrics and its indicators is often significantly influenced by the decisions of the highest political authorities and specific ministerial structures, as can be easily seen in Russia, where the influence of the state on all spheres of society has always been particularly high. This article provides a brief analysis of the application of scientometric parameters in modern management activities at various levels.

PROBLEMS OF SCIENTOMETRICS AND ITS MAIN INDICATORS

Classical scientometrics usually deals with large arrays of statistical information, when, for example, we track certain topics in scientific periodicals in bibliographic and abstract databases or calculate the impact factor of a journal for a certain period of time. In such cases, we are dealing with anonymised metadata, usually quite reliable and relatively accurate (based on the law of large numbers). In this respect, scientometrics may well claim to be considered a full-fledged scientific discipline.

On the other hand, when it comes to the scientometric indicators of an individual scientist or scientific team, we sometimes have to face big problems caused by the human factor. This can manifest itself in incomplete raw data, the use of questionable tools, various kinds of manipulations, etc. The inevitable result is the distortion of primary digital material, a matter often complicated by the incompetence of managers and the practice of indexing scientific papers in various bibliographic and abstract databases. Let us dwell on this aspect in more detail.

To begin with, for Russian managers at various levels, the source of initial digital information for planning and controlling the efficiency of scientific activity is information about authors and organisations recorded in the bibliographic and abstract databases of WoS, Scopus and RSCI. In turn, all these databases use three main indicators (in addition to several dozen other metrics): 1) number of publications; 2) number of references (citations); 3) Hirsch index (*h*-index). The author of this study has already repeatedly had to criticise these parameters in detail, and therefore this article provides only a few examples of more detailed criticism. Thus, a significant disadvantage of scientometric data can be their incompleteness associated with the principles of indexing in WoS and Scopus [1]. The fact is that they recognise only those scientific papers published in a limited number of journals selected according to strict criteria, and therefore not all articles are indexed in the above-mentioned bibliographic and abstract databases. The same remark applies to conference proceedings, reviews, and monographs, and among the latter only those published by the most authoritative Western publishers (Oxford University Press, Springer, Taylor, and Francis, etc.)[1] are taken into account. At the same time, the works published mainly in English have an unconditional priority, which results in hidden discrimination against representatives of non-English-speaking countries [2]. Now the political factor has been added: Western journals and publishers sometimes refuse to publish Russian authors because of the current political situation [3]. For example, on January 15th, 2023, the British newspaper The Guardian published a story about discrimination against the work of Russian physicists working at the Large Hadron Collider in Switzerland, as a result of which the publication of more than 70 articles in which they are co-authors was suspended [4].

As for RSCI, unlike its foreign analogues, it, on the contrary, registers not only scientific works, but also educational, methodological, reference literature, data from abstract lists,[2] and occasionally popular scientific works and

[1] Publishers. Web of Science. URL: http://wokinfo.com/mbl/publishers

[2] Elibrary.ru. URL: https://elibrary.ru/item.asp?id=20360369

grant reports,[3] as well as references to them.[4] As a result, the number of registered works in the author profile of a Russian scientist in RSCI can sometimes exceed the number of his/her genuine scientific works and be an order of magnitude higher than in Western bibliographic and abstract databases. Finally, all databases occasionally contain erroneous data related to duplication of works, their attribution to other authors, the appearance of double or even triple author profiles, etc., which distorts basic scientometric information, especially in terms of accounting for the total number of publications of a scientist [5].

It should be pointed out that the total number of works of a scientist (or a scientific team) for a certain period of time does not tell us much about their quality: it is possible to have 50 publications, including monographs and articles in highly rated journals, and the same number of publications that are only articles in second-rate periodicals, abstracts and reviews. In view of the above, a general management recommendation could be the following: **it is always necessary to achieve as much detail as possible in the scientometric indicators**. Ignoring this simple and obvious principle usually indicates either weak competence of the management at the relevant level or bias and the presence of a corruption component.

Another problem associated with the number of publications, which has an extremely negative impact on the objectivity of scientometrics, is co-authorship. The fact is that after the publication of a collective scientific work and its registration in one or another bibliographic database, all co-authors equally receive a corresponding entry in their individual profile as full-fledged creators of this work, although their real contribution may be close to zero. In 2021, a world record was set when 15,025 researchers from 122 countries in the *CovidSurg* group became authors of one scientific article [6]. Of course, in reality, all these numerous authors did not write this scientific paper, but their names were included in the author's list for one reason or another. It logically follows that such fictitious co-authorship unreasonably increases the number of publications recorded in the profile of a particular scientist in bibliographic and abstract databases. In addition, the increasing use of neural networks in the creation of scientific texts may call into question the very authorship of the work and, consequently, further distances scientometric statistics from the criteria of accuracy and reliability.

Domestic specialists have already tried to solve the problem of co-authorship by developing mathematical formulas of share participation [7, 8]. However, this is unlikely to have a positive impact on the objectivity of the final figures, because even if an article has two authors, it does not guarantee that the contribution of each of them to the creation of the text is 50%. The fact is that in real life, often one of them writes the major part (up to 80–90%), and the second one — proportionally less, and the authorial parity is clearly violated. In our opinion, it is necessary to divide all the works of the author into those written personally and those performed within a team, which will give a clear idea of the real merits of the scientist and will be an obstacle to scientometric "scoring" (artificially inflated) and parasitism through co-authorship [9].

In Russian management practice, the problem of co-authorship is usually solved simply and, one might say, formally: either by dividing the initial score for a scientific work by the number of co-authors, or (if there are many co-authors) the fractions are usually rounded up to 10% (less often — to 5% or 20%). Sometimes there is a strict limit on the number of authors for monographs — this is the case at the National Research University — Higher School of

[3] Elibrary.ru. URL: https://elibrary.ru/item.asp?id=53906328
[4] Elibrary.ru. URL: https://elibrary.ru/item.asp?id=21423279

Economics (HSE). Here, according to the order from 26.01.2023 No. 6.18.1–01/260123–9 on the establishment of academic allowances, when taking into account monographs, the number of co-authors is stipulated — no more than 4 people per book.[5] For articles another rule applies: when the number of co-authors is 5 or more, the basic amount of the publication allowance is divided by 5.[6]

Co-authorship is especially common in works on natural, technical, and medical sciences, and much less common in works on social and humanities topics. As a result, there is a significant bias in the number of publications of representatives of natural sciences (which are already many times more) and a kind of scientometric inequality, fraught with discrimination of humanities in case of undifferentiated approach to representatives of the two main spheres of modern scientific knowledge [10]. Therefore, we can formulate an indisputable managerial principle: **when analysing scientometric indicators, it is always necessary to take into account the specifics of scientific disciplines**, which, unfortunately, is regularly violated in practice, especially in technical universities [11].

THE PROBLEM OF CITATION COUNTING AND THE HIRSCH INDEX

Let us proceed to the analysis of the second main scientometric indicator — the number of references (citations) of the works of this or that author. This parameter also has many disadvantages due to the dependence on the specifics of the scientific discipline, citation traditions, etc. Although it is believed that the number of references best demonstrates the high (or, conversely, low) quality of scientific work, this is not always true. Much depends on the object of research: too narrow a topic is unlikely to yield abundant citations, despite the scientific value of a particular article or monograph. However, such moments, as a rule, are completely disregarded in management activities.

It should also be noted that the number of references can be easily manipulated, especially in so-called "citation corruption". This occurs when familiar specialists agree to cite each other's results without real need [12]. There are also opposite situations when scientists, due to personal antipathies, dislikes, aversions, or fierce competition, refuse to make references to the works of their colleagues.

Sometimes there is a political or ethnic bias — Canadian bibliometrician Yves Gengra notes that scientists of the most developed Western countries pay much less attention to journals (especially in the humanities) published in the "periphery" (which includes Russia), in fact reproducing the imperial logic of relations between the metropolis and colonial countries [13]. The inevitable consequence is an insignificant number of citations of works by "peripheral" scientists. This unfavourable trend is clearly intensifying with regard to Russian specialists after the beginning of the special military operation (SMO) and the introduction of total anti-Russian sanctions.

In conclusion of a brief review of the main scientometric indicators, let us turn to the well-known Hirsch index [14]. Being actually derived from the number of publications and their citations, the h-index has a number of disadvantages (partially mentioned above), including the possibility of its artificial increase. It is no coincidence that since the publication of this index, numerous attempts have been made to improve it, similar indicators have been developed (e.g., Leo Egge's *g*-index) [7], and some specialists both at home and abroad have proposed to abandon the use of the Hirsch index in scientometric practice. The general

[5] Regulations on Academic Allowances of the Federal State Autonomous Educational Institution of Higher Education "National Research University Higher School of Economics". CLAUSE 10.1.2. OF THE SRI HSE. URL: https://www.hse.ru/docs/810929207.html

[6] Ibidem. Clause 10.3.2.

conclusion for the manager is the following: **one cannot absolutise individual scientometric indicators**, because they are far from flawless, and therefore **a comprehensive approach is always necessary**. Although even this, it should be said, is not always able to give 100% accuracy when analysing the publication activity of an individual scientist or scientific team.

SHOULD SCIENTOMETRICS BE USED IN MANAGEMENT PRACTICE?

After this critical review of the main scientometric indicators, the reader may get the impression that the use of scientometrics to assess the effectiveness of scientific activity is completely useless. In fact, such a conclusion was reached in the UK, when the opinion about the viciousness of scientometric metrics was confirmed in the management structures supervising science. Accordingly, in 2014, the *Research Excellence Framework* (REF) system was introduced in the country to analyse the state of local universities with the absolute priority of expert assessments [15]. Moreover, in 2015, scientometrics experts themselves, aware of the imperfections of the scientometrics toolkit, issued the so-called "Leiden Manifesto", which stated that the quantitative analysis of scientific publications should only complement the qualitative, expert assessment and contained recommendations to expand the range of scientometrics indicators, their periodic critical discussion and revision [16].

Indeed, there is an urgent need to improve tools and metrics, but, on the other hand, it is hardly worth relying solely on expert opinion. The important fact here is that any scientific article or monograph before publication must undergo an external independent review, i.e., basically the same expertise. Additional evaluation by a specialist is not always the best option, because much depends on the subjective factor — the possible bias of the expert for one reason or another (in particular, due to adherence to a particular theory or scientific school) or on his/her competence. In addition, there is a problem of possible significant variation of expert opinions [17]. It remains to add that expert judgement usually takes much longer than the calculation of scientometric indicators and statistics, and sometimes requires significant financial costs.

Summarising the preliminary results, it should be emphasised that, despite all the imperfections of scientometrics and the shortcomings of its indicators, it is impossible to abandon them, because **without knowledge of the basic, even the most primitive scientometric parameters, it is impossible to assess the scientific achievements of any scientist or team**. Otherwise, how can we judge the professional performance of the author, if we do not know, for example, the total number of his publications? Therefore, we should try to use scientometric data and tools in the most efficient way and achieve the highest possible accuracy of the final indicators.

USE OF SCIENTOMETRICS AND ITS INDICATORS IN THE MANAGEMENT OF RUSSIAN SCIENCE AT THE FEDERAL LEVEL

The first attempt to introduce statutorily scientometric indicators in Russia was made in 2006, when the Ministry of Education and Science, the Ministry of Health and Social Development of the Russian Federation and the Russian Academy of Sciences (RAS) issued a joint order on the regulation of incentive payments for employees of their respective departments.[7]

[7] Order of the Ministry of Education and Science of the Russian Federation, the Ministry of Health and Social Development of the Russian Federation and the Russian Academy of Sciences of 3.11.2006 No. 273/745/68 "On Approval of Types, Procedure and Conditions of Application of Incentive Payments Ensuring Improved Performance of Scientific Workers and Heads of Scientific Institutions and Scientific Workers of Scientific Centres of the Russian Academy of Sciences". URL: https://www.garant.ru/products/ipo/prime/doc/90338/

This document defined the criteria for individual research performance indicators (IRPIs) for representatives of academic research institutes and university teaching staff (the faculty).

The individual research performance indicators can be represented as the sum of these indicators with weighting coefficients taken into account:

$$IRPI = kJ + pMU + hD + sK + bP + gR + C,$$

where J — is the number of publications in journals; MU — number of monographs and textbooks; D — sum of reports at conferences; K — number of scientific and educational courses; P — number of patents; R — quantitative parameter related to scientific supervision; C — number of references to the author's works for the reporting period of time; k, p, h, s, b, g — weighting coefficients.

It is hardly expedient to analyse this formula in detail, because its detailed criticism is contained in the articles by I. D. Kotlyarov [18, 19]. Only two points should be noted: 1) it was impossible to include textbook writing, development of scientific-educational courses, and scientific supervision as part of scientific activity, since this refers to teaching and methodological, educational, methodological, and pedagogical practice; 2) the use of the weighting coefficients recommended in the Order leads to bias, in particular, direct or hidden discrimination of monographs, foreign publications and works on humanitarian topics [11]. Although the above-mentioned Order[8] was later cancelled, many of its provisions are still present in one form or another in many evaluation regulations of universities and academic research institutes.

In 2009, the Ministry of Education and Science of the Russian Federation attempted to further stimulate the publication activity of Russian scientists by issuing Order No. 406 dated 14.10.2009 together with an annex to the standard methodology of individual research performance indicators (IRPI),[9] which outlined the criteria by which scientific institutions should report. The new regulatory document partially contained the shortcomings of the previous order of 2006, and also contained a number of new ones, which testified to the insufficiently high professional level of the management staff of the Ministry of Education and Science of the Russian Federation [20]. Nevertheless, the Presidium of the Russian Academy of Sciences in the resolution of 12.10.2010 No. 201 confirmed the main provisions of this document, adding RSCI as one of the sources of control scientometric information to assess the performance of academic research institutes' employees.[10]

However, all normative acts of state bodies since 2006, as well as subsequent bylaws (secondary legislation) and orders of ministries, universities and research institutes of the Academy of Sciences have not really brought significant changes that could radically stimulate the ac-

[8] Order of the Ministry of Education and Science of the Russian Federation No. 1, Ministry of Health and Social Development of the Russian Federation No. 1H, RAS No. 1 of 11.01.2010 "On invalidation of the Order of the Ministry of Education and Science of the Russian Federation, Ministry of Health and Social Development of the Russian Federation and the Russian Academy of Sciences of 03.11.2006 No. 273/745/68 "On approval of types, procedure and conditions of application of incentive payments ensuring the improvement of performance of scientific workers and heads of scientific institutions and scientific workers of scientific centres of the Russian Academy of Sciences". URL: https://normativ.kontur.ru/document?moduleId=1&documentId=151080

[9] Order of the Ministry of Education and Science of the Russian Federation No. 406 of 14.10.2009 "On Approval of the Standard Regulations on the Commission for the Assessment of the Performance of Scientific Organisations Performing Research, Experimental Design and Technological Works of Civil Purpose and the Standard Methodology for the Assessment of the Performance of Scientific Organisations Performing Research, Experimental Design and Technological Works of Civil Purpose". URL: https://www.garant.ru/products/ipo/prime/doc/97371/

[10] Resolution of the Presidium of the Russian Academy of Sciences "On Approval of the Provision on the Commission for Performance Evaluation of Scientific Organisations of the Russian Academy of Sciences and the Methodology for Performance Evaluation of Scientific Organisations of the Russian Academy of Sciences". URL: https://www.ras.ru/presidium/documents/directions.aspx? ID=9767952e-4821–4510–89d6–5f678677066d

tivity of domestic scientists. As a result, Russia occupied increasingly low places in international rankings, which primarily recorded scientific periodicals indexed in leading international bibliographic and abstract databases [21]. The matter has moved from the dead point only after the Decree of the President of the Russian Federation Vladimir Putin "On measures to implement the state policy in the field of education and science".[11] The document envisaged an increase in the share of Russian researchers' work in the total number of publications in the world's scientific journals indexed in the Web of Science bibliographic and abstract databases to 2.44% by 2015 and the inclusion of at least five Russian universities in the top 100 leading world universities according to the international university ranking by 2020. Accordingly, an ambitious government programme "5–100–2020"[12] was adopted in 2013, along with a sharp increase in funding for the country's leading research universities.

The promulgation of the Decree was a decisive step towards the total use of scientometrics in management practice and the application of scientometric indicators in universities and institutes of the Russian Academy of Sciences system [22]. In September 2014, it was possible to conclude an agreement to place the best Russian journals from RSCI on the WoS platform in the form of a separate RSCI WoS database [23]; however, domestic publications selected in the new database are not taken into account when calculating such metrics as impact factor and *h*-index in the "core" bibliographic and abstract databases of WoS (Web of Science Core Collection, WOSCC). Therefore, articles and reviews in journals from the RSCI WoS list are not considered by managers supervising science as equivalent to publications in WoSCC or Scopus, which was confirmed by the official letter of the Ministry of Education and Science of the Russian Federation from 26.12.2016 No. 14–2201.[13]

In general, measures and requirements of state structures to increase the publication activity of universities and academic research institutes with certain financial incentives have had a noticeable positive effect: for several years there has been a significant increase in Russian articles registered in all bibliographic and abstract databases; especially many publications belonged to universities participating in the Programme "5–100–2020" (although it was never implemented) [24]. At the same time, excessive administrative pressure to increase the quantity and quality (at the expense of publications in journals of 1–2 quartiles registered in bibliographic and abstract databases of WoS and Scopus) led to the emergence of a number of negative phenomena in the Russian scientific community, among which the increase in fictitious international collaborations and the growth of artificial co-authorship represented the "lesser of evils". Much more severe consequences were the expansion of the practice of duplication of publications, publication of articles in the so-called "predatory" journals (they are characterised by payment for publications in the absence of real peer review), participation in low-quality ("rubbish/junk") conferences, along with the increase in "citation corruption" [25–27]. In many respects, this was the result of violation of the managerial

[11] Decree of the President of the Russian Federation from 07.05.2021 No. 599 "On measures to implement the state policy in the field of education and science". URL: http://www.kremlin.ru/acts/bank/35263

[12] Resolution of the Government of the Russian Federation of 16.03.2013 No. 211 "On measures of state support for leading universities of the Russian Federation in order to increase their competitiveness among the world's leading scientific and educational centres". URL: http://publication.pravo.gov.ru/Document/View/0001201303200001

[13] Letter of the Ministry of Education and Science of the Russian Federation dated 26.12.2016 No. 14–2201 "On achieving the value of the indicator "Share of publications by Russian researchers in the total number of publications in the world's scientific journals indexed in the database "Web of Science" (Web of Science)". URL: https://base.garant.ru/71622282/

principle of **proportionality of workload and staff capabilities**. At the same time, one of the scientometric consequences of the "conference explosion" and "citation corruption" was a sharp jump in the Hirsch index of unscrupulous authors in the bibliographic and abstract databases of Scopus and WoS; as for RSCI, this was reflected, in particular, in such a metric as the RSCI core percentile.

Such phenomena have become a consequence of one of the "managerialism traps". Its essence lies in the fact that almost all scientometric indicators were formed (and are still being formed) at the upper levels of the management vertical without taking into account the opinions of academic staff, faculty and employees of academic research institutes, who have to adjust their activities to various control (and often quite arbitrary) figures sent down from "above" [28].

The "managerialism trap" showed itself very clearly at the federal level in January 2020, when, in an effort to further stimulate the publication race among institutes of the Russian Academy of Sciences, the Ministry of Education and Science sent out a directive letter "On the adjustment of the State Assignment taking into account the methodology for calculating the integrated score of publication performance".[14] It proposed to calculate the efficiency of scientific work according to a complex integral formula based on the points gained primarily for scientific publications. The benchmark figures were placed in a table, the analysis of which shows that the ministerial requirements for scientific metrics have reached a complete absurdity: one article published in a journal of the first quartile (Q1) of WoS was equated to 20 articles registered in bibliographic and abstract databases of Scopus (regardless of quartiles!) or 40 articles of Russian journals from the list of the State Commission for Academic Degrees and Titles, or 20 monographs! But the labour and time required to write even a small monograph is not comparable to that required to prepare even the highest quality article. At the same time, the one-sided orientation to bibliographic and abstract databases of Web of Science meant an extreme degree of discrimination for humanities scholars, as it became impossible for them to receive high scores for their scientific work. The fact is that the overwhelming majority of the most authoritative journals on humanitarian topics have no impact factor calculation in WoSCC, hence, no quartile. In this case, the humanities could not be helped by publications in journals registered in the bibliographic and abstract databases of Scopus or RSCI WoS, as they were awarded, respectively, only 1 and 0.75 points per article [11].

Naturally, the publication of the ministerial letter led to violent protests by representatives of academic institutions of the Russian Academy of Sciences specialising in humanitarian issues. As a result, on 25 August 2020 the Ministry of Science and Higher Education adopted a new procedure for the methodology of calculating points for representatives of social and humanities sciences in the form of a separate table.[15] According to this document, all journal publications, regardless of quartiles, were rated at 3 points, and the points for monographs were calculated in author pages (1 a.p. = 40,000 characters). Although the amendments made to the methodology regarding the calculation of points for socio-humanitarian publications largely mitigated the absurdity of the indicators and the discrimination of humanitarians in the original table, several issues remained unresolved. In

[14] Letter of the Ministry of Science and Higher Education of the Russian Federation from 14.01.2020 No. MN-8/6-SK "On the adjustment of the state assignment taking into account the methodology for calculating the complex score of publication performance". URL: https://docs.cntd.ru/document/564894817

[15] Methodology for calculating the qualitative indicator of the state task "Comprehensive score of publication performance" for scientific organisations subordinated to the Ministry of Science and Higher Education of the Russian Federation for 2020. URL: https://minobrnauki.gov.ru/documents/?ELEMENT_ID=24754&sphrase_id=20352

particular, it is unlikely that the quartile metric should have been abandoned (at least for journals indexed in the bibliographic and abstract databases of Scopus), since otherwise representatives of social and humanities disciplines lose the incentive to publish their work in highly rated journals. It is probably worth maintaining some differentiation in the assessment of publications published abroad and indexed in bibliographic and abstract databases of WoS and Scopus, on the one hand, and RSCI WoS on the other hand.

THE IMPACT OF FOREIGN POLICY ON SCIENTOMETRIC PRACTICE

It has been about two years since the January 2020 Ministerial Letter was made public, when the Special Military Oreration, which began in February 2022, made its own adjustments to the government's scientific policy regarding the use of scientometric parameters. The fact is that in the course of the collective West's imposition of unprecedented sanctions against Russia, both leading international bibliographic and abstract databases (WoS and Scopus) announced in March 2022 that they would not cooperate with Russian scientific and educational organisations. In response, on 19 March the Chairman of the Russian government M. V. Mishustin signed a decree "On Some Issues of Application and Requirement of Target Values of Indicators Related to Publication Activity", according to which until 31.12.2022 the rule according to which Russian authors were obliged to have publications in editions indexed in bibliographic and abstract databases of Scopus and WoS when defending theses and dissertations, receiving grants, etc., was cancelled. Later, by order of the head of the Ministry of Education and Science V. Falkov introduced an amendment extending the validity of this decree until 31.12.2023.[16]

Since the role of international bibliographic databases in Russia has significantly decreased, it was decided to partially replace their data with domestic indicators. At the end of 2022, the Higher Attestation Commission (State Commission for Academic Degrees and Titles) under the Ministry of Education and Science of the Russian Federation approved the list of journals,[17] for which 2,587 Russian periodicals were selected, divided into three categories in descending order of the integral rating indicator. The first category (K1) included 25% of highly rated journals, the second category included lower rated journals (K2) — 50%, and the third category (K3) — the remaining 25%. Now, according to the new requirements of the State Commission for Academic Degrees and Titles, PhD students in biological, geographical, physical-mathematical and chemical branches of science need to publish at least two articles, one of which — in the publications of category K1 or K2, or registered in RSCI WoS. In the humanities and other sciences, three articles, two of which are not including the new categories. Doctoral candidates in the Humanities or Social Sciences must publish at least 15 articles, five of which must be published in the editions or publications either classified as K1 or K2 or listed in the WoS RSCI. For other branches of science — at least 10 articles, five of which should also be published in the above categories. Thus, a not unreasonable question arises: on what grounds is the scientometric discrimination of representatives

[16] Order of the Ministry of Science and Higher Education of the Russian Federation of 03.11.2022 No. 1071 "On Amending the Order of the Ministry of Science and Higher Education of the Russian Federation of 06.05.2022 No. 442 "On non-application of certain provisions of some acts of the Ministry of Science and Higher Education of the Russian Federation in terms of requirements and target values of indicators related to publication activity"". URL: http://publication.pravo.gov.ru/Document/View/0001202212060038

[17] Letter of the Higher Attestation Commission of the Ministry of Education and Science of Russia from 06.12.2022 No. 02–1198 "On the List of peer-reviewed scientific publications" (together with "Distribution of journals included in the list of peer-reviewed scientific publications, in which the main results of dissertations for the degree of candidate of sciences, degree of doctor of sciences should be published by category"). URL: https://sudact.ru/law/pismo-vak-minobrnauki-rossii-ot-06122022-n/

of humanities disciplines continuously being repeated and will this end?

The above examples show that decisions taken at the federal level often provoke various negative phenomena, ranging from encouraging artificial co-authorship, "citation corruption", publications in "predatory" and "rubbish/junk" publications to social discontent up to open protests, as it happened after the publication of the ministerial letter in 2020. It is relevant to recall that the use of the imperfect individual research performance indicators (IRPIs) system in its time (2006) generated acute conflict situations in some scientific teams [29]. In light of the above, it is obvious that it is necessary to take certain organisational measures at the federal level in order to solve the accumulated problems and prevent the repetition of managerial errors in the use of scientometrics and its indicators.

APPLICATION OF SCIENTOMETRICS IN UNIVERSITY AND INSTITUTE PRACTICE

The situation at the level of universities and academic institutions can be called ambiguous. A kind of "scientometric anarchy" reigns here, when the administration of each educational or research organisation forms its own set of requirements for scientometric indicators. Several years ago, the author of this article already had to touch upon this topic [20], and a review of several dozens of normative acts and regulations of universities and academic research institutes for 2020–2023 showed that no significant and positive changes in the regulatory framework (in which management decisions are recorded) have occurred.

Let us start with the problem that has long required managerial optimisation, namely, the "embedding" of scientific work in the general point reporting, which also includes assessments of pedagogical, methodological, organisational, and educational activities. It should be noted that there are noticeable distortions and omissions here. The reasons for this lie in the 2006 order and the formula of individual research performance indicators. For example, in this document there is a point related to scientific supervision of postgraduate students — it (as it was mentioned above) cannot be attributed to scientific work in the strict sense of the word, but should be attributed to methodological and pedagogical activity. However, the drafters of the order ignored this obvious fact. Scientific supervision itself is described in Section 2.1.6 of this document: "For the supervision of a candidate for a degree who has defended a candidate's thesis, a score of 30 points is set for the scientific supervisor".[18] For comparison: the same 30 points according to the formula of individual research performance indicators could be obtained for a monograph of 15 authored pages. However, it is obvious that it is much more difficult to write it than to supervise an intelligent postgraduate student. What was the reason for such high scores for scientific supervision in the 2006 order? Obviously, it was not so much a concern for improving the human resources potential of domestic science, as it was to provide top university official and functionaries, who usually have several postgraduate students, with high final scores and, accordingly, cash payments. These large (and unreasonable) accruals of points for scientific supervision recommended by the order are still present in the normative regulations of a number of higher educational institutions. For example, in the Regulations on the rating system for assessing the quality of OmSTU (Omsk State Technical University) employees' performance, adopted at the meeting of the Academic Council

[18] Order of the Ministry of Education and Science of the Russian Federation, the Ministry of Health and Social Development of the Russian Federation and the Russian Academy of Sciences of 3.11.2006 No. 273/745/68 "On Approval of the Types, Procedure and Conditions of Application of Incentive Payments Ensuring Improved Performance of Scientific Workers and Heads of Scientific Institutions and Scientific Workers of Scientific Centres of the Russian Academy of Sciences". Section 2.1.6. URL: https://www.garant.ru/products/ipo/prime/doc/90338/

of this university on 31.03.2023 (Minutes No. 4), an employee is entitled to only 13 points for publishing a monograph, while for scientific supervision of a defended PhD student — as much as 45 points (i.e., almost 3.5 times more).[19]

At the same time, there is no doubt that it is scientific work, rather than methodological or educational work, that should be prioritised based on its complexity. Not everyone can successfully engage in highly intellectual, creative activities aimed at obtaining, understanding, and systematising new scientific information, as they require the highest professional qualifications, extensive knowledge, and creativity. In practice, the managerial principle that **work should be rewarded in proportion to its complexity and quality** is constantly violated. Let us take a specific example: in the Regulations on the performance indicators of the Novosibirsk State Agrarian University, the faculty members were entitled to 100 points just for writing an application for a grant of international level — as for 10 monographs or almost half of an article published in the Q1 journal (WoS/Scopus).[20]

Another example: according to the Regulations on the organisation of rating of the teaching staff of the Plekhanov Russian University of Economics, approved by the Academic Council in 2023,[21] a representative of the university's teaching staff received 4 points for a monograph, textbook or manual in Russian, and the same number of points for preparing a team to participate in student competitions (international/all-Russian level, inter-university, intra-university stage, pre-final stages), and almost the same number of points — 3 points — for being a member of the admissions committee for at least 22 days on end or more.[22] But it is obvious that being a member of the admissions committee for 1–2 months or preparing students for competitions are much easier than writing a scientific book.

Thus, contrary to elementary fairness, in many regulations of higher education institutions scientific work has no preferences compared to other types of teaching activity. Apparently, the strength of the traditions of the Soviet higher school, where scientific work was given only the third place after academic and methodological work, continues to have an effect. At that time, abstracts of reports made at local conferences were recognised as quite worthy publications, because in the USSR it was believed that scientific work should be carried out not by universities (as in the West), but by institutes of the Russian Academy of Sciences system. In the USA, on the contrary, there is a clear pattern — the higher the university category and its reputation, the more attention is paid to the scientific activity of the teaching staff [30]. Of course, one should not go beyond common sense in this matter, as excessive attention to publication activity may lead to the fact that the representatives of the teaching staff start to neglect their main function — teaching activity [31].

In addition to this problem, there is another one, which is the lack of a common orderly scale of evaluation of scientific publications, which manifests itself in the accrual of points for the

[19] Regulations on the rating system of quality assessment of OmSTU employees' performance FSAEI HE "Omsk State Technical University", Minutes No. 4 of 31.03.2023. URL: https://omgtu.ru/educational_activities/dokumenty_smk/Pologeniya/%D 0%9F%D 0%BB%D 0%B 6_%D 0%9E_%D 1%80%D 0%B 5%D 0%B 9%D 1%82%D 0%B 8%D 0%BD%D 0%B 3%D 0%BE%D 0%B 2%D 0%BE%D 0%B 9_%D 1%81%D 0%B 8%D 1%81%D 1%82%D 0%B 5%D 0%BC%D 0%B 5_%D 0%BE%D 1%86%D 0%B 5%D 0%BD%D 0%BA%D 0%B 8_%D 1%80%D 0%B 0%D 0%B 1%D 0%BE%D 1%82%D 0%BD%D 0%B 8%D 0%BA%D 0%BE%D 0%B 2.pdf

[20] Regulations on the organisation of the educational process. Minutes 1. NSAU (official website). URL: https://nsau.edu.ru/directory/lokalnye-normativnye-akty/

[21] Regulations on the organisation of rating of pedagogical staff of basic general and secondary general education of G.V. Plekhanov Russian State Budgetary Educational Institution of Higher Education (approved by the decision of the Methodological Council No. 3-OH dated 4.11.2023). URL: https://www.xn — p1ag3a.xn — p1ai/~file/85931/%D 0%A0%D 0%B 5%D 0%B 3%D 0%BB%D 0%B 0%D 0%BC%D 0%B 5%D 0%BD%D 1%82+%D 0%A0+%D 0%9E%D 0%9E%D 0%9E+%D 0%B 8+%D 0%A1%D 0%9E%D 0%9E+%D 0%BE%D 1%82+17.11.2023.pdf.

[22] Ibidem, paragraphs 1.2.1, 1.10.3, 1.13.1.

same type of printed works. For example, in the evaluation regulations of some universities the score for publishing a monograph and/or textbook is fixed as a constant value, in others the score is multiplied by the number of printed (or author's) pages, and in others — monographs have some point preferences, although mostly insignificant. At the same time, in a number of universities, such as Plekhanov Russian Economic University (as mentioned above), there is no differentiation between monographs and textbooks in the regulatory documents.

Again, the requirement of regulations applied in several universities and academic research institutes to have a minimum print run or circulation of 100 to 500 copies looks archaic in view of the transition of some scientific publications entirely to digital format.

In the West, the print run/circulation of a book is never specified, as it is considered a trade/commercial secret by the publisher; moreover, as orders come in (now via the Internet), there may be periodic reprinting of the original print run. In Russia it reaches the point of absurdity. For example, the latest edition of the rating system for evaluating the performance of teaching staff at Orenburg State University states that 20 points (divided by the number of co-authors) are awarded for publishing monographs, collections of scientific papers affiliated with OSU and having a volume of more than 300 pages, and only 10 points if the volume is less than 300 pages.[23] The chosen criterion is rather dubious: if a book has 299 pages, it will get only 10 points, and if it has 301 pages, it will get twice as many. It is difficult to understand why the number of pages is the measure of scientific significance, especially since their number directly depends on the font size and format of the publication, which has nothing to do with science.

In addition to the fact that a significant difference in the evaluation of scientific publications (partly in terms of their nomenclature and other indicators) exists between different universities and academic research institutes, it is sometimes present even in the regulatory framework of a particular university or institute of the Russian Academy of Sciences. First of all, it is worth mentioning once again the unprecedented, overestimated prestige of articles, especially those of the 1st-2nd quartile, published in journals indexed in bibliographic and abstract databases of WoS/Scopus. Probably, many Russian universities, by giving clear preference to such articles, hope to increase or maintain their place in international university rankings, which take into account data from foreign bibliographic and abstract databases with their emphasis on registration of primarily scientific periodicals. For example, in the Regulations on the rating assessment of the quality of Omsk State Technical University employees' performance, 150 points were given for an article of the 1st-2nd quartiles (WoS/Scopus), but only 13 points for a monograph (just like for an article in the RSCI WoS journal).[24]

However, recently, due to the current political situation, some universities have already abandoned Western metrics and switched to domestic indicators. For example, in the Regulation on the rating assessment of faculty performance adopted at Voronezh State Technical University, articles in journals of 1–2 quartiles are not mentioned at all, but there are publications of the State Commission for Academic Degrees and

[23] Regulations on the rating system of evaluation of pedagogical staff related to the teaching staff dated 04.04.2022 No. 62-D, with amendments No. 1 dated 04.04.2023. paragraph 8. URL: http://www.osu.ru/doc/4701

[24] Regulations on the rating system of quality assessment of OmSTU employees' performance. Approved by OmSTU order from 01.07.2022 No. 653. URL: https://xn — c1arfsf.xn — p1ai/educational_activities/dokumenty_smk/Pologeniya/%D 0%9F_%D 0%9E%D 0%BC%D 0%93%D 0%A2%D 0%A3_%D 0%9E_%D 1%80%D 0%B 5%D 0%B 9%D 1%82%D 0%B 8%D 0%BD%D 0%B 3%D 0%BE%D 0%B 2%D 0%BE%D 0%B 9_%D 1%81%D 0%B 8%D 1%81%D 1%82%D 0%B 5%D 0%BC%D 0%B 5_%D 0%BE%D 1%86%D 0%B 5%D 0%BD%D 0%BA%D 0%B 8_%D 0%BA%D 0%B 0%D 1%87%D 0%B 5%D 1%81%D 1%82%D 0%B 2%D 0%B 0_%D 1%80%D 0%B 0%D 0%B 1%D 0%BE%D 1%82%D 0%BD%D 0%B 8%D 0%BA%D 0%BE%D 0%B 2.pdf

Titles in three categories with the corresponding points: K1–30 points, K2–20 points, K3–10 points.[25] Other universities retain a mixed way of recording articles, i.e., both those indexed in bibliographic and abstract databases of WoS/Scopus, and publications according to the State Commission for Academic Degrees and Titles K1–3, as, for example, in the Dagestan State Pedagogical University.[26]

In addition to various kinds of publications, which usually act as the most significant indicators of scientific activity, the regulations of universities and academic research institutes also include other types of scientific activity. There is no uniformity in the evaluation criteria here either — just consider the issue of scoring of conferences, which are usually divided into Russian and international. It can be added that in practice in our country the transformation of a conference into an international one is achieved by inviting colleagues from Belarus, Kazakhstan, and other CIS countries (often in an extramural/distance format). Apparently, some additional amendments and restrictions should be made to this issue as well.

To conclude the discussion on the use of scientometric indicators in the normative developments of Higher Education Institutions and academic research institutes, let us touch upon the Hirsch index, the value of which (in points) is occasionally recorded in the scientometric reporting of individual universities, and sometimes in a rather peculiar way. For example, in the Regulations on the rating system of evaluation of teaching staff, approved by the Academic Council of Samara State Technical University on 25 November 2022 (Minutes No. 4),[27] the number of points awarded is equal to the Hirsch index according to Scopus and RSCI without any differentiation (WoS data are not taken into account). This approach can hardly be called correct, if we remember the principle of indexing in these databases (as discussed at the beginning of the article). In addition, the Hirsch index as a relatively stable value should be taken into account not in current reporting, but in qualification documents related to employment or when prolonging a labour contract.

CONCLUSIONS

By and large, it is possible to analyse for a long time the inherent imperfections and errors related to scientometric indicators in the regulatory bases of domestic universities and academic research institutes.

As a brief analysis of this topic has shown, scientometrics in its applied version still clearly lacks reliability both because of deficiencies related to its main indicators in all bibliographic and abstract databases and the indexing of publications in them, and because of managerial miscalculations reflected in normative acts. At the same time, the impact of administrative policies has directly affected the development of science itself in both positive and negative ways. Thus, on the one hand, the flow of Russian scientific publications has grown significantly in recent years, although the country is still not among the top ten countries in terms of publication activity, ranking only 12th in the SJR ratings (Scimago Journal and Country Ranks).[28] On the other hand, the forced introduction of scientometric indicators combined with excessive administrative pressure, initiating a formal increase in the number of publications and citations, led to a sharp increase in artificial co-authorship, "citation corruption", an increase in

[25] Regulations on the rating assessment of teaching staff performance dated 29.07.2023. URL: https://cchgeu.ru/upload/iblock/071/uzdyyb6txrt5xbir5p42oaktxum4965z/Polozhenie-o-reytingovoy-otsenke-deyatelnosti-PPS.pdf

[26] Regulations on the rating system for assessing the effectiveness of the teaching staff (Order of 31.01.2023, Minutes No. 5). URL: https://dspu.ru/000/dok/230231-pol-reiting-pps.pdf

[27] Provision on the rating system for evaluating the performance of the teaching staff of Samara State Technical University. URL: https://samgtu.ru/uploads/documents/polojenie/P-789.PDF?ysclid=lsu397kjbg948026639

[28] Scimago Journal & Country Rank. URL: https://www.scimagojr.com/countryrank.php

the number of materials in "predatory" journals and participation in "rubbish/junk" conferences. There was a deformation of the evaluation of scientific works with the absolutisation of journal articles indexed in foreign databases, the logical consequence of which was discrimination against monographs and, accordingly, a decrease in the number of published scientific books. Thus, at the M.V. Keldysh Institute of Applied Mathematics of the Russian Academy of Sciences there were more than twenty monographs published in 2006, and in 2019 — only two monographs were published [32].

Special military operation entailed sanctions of the collective West, including in the sphere of access to scientometric information, concentrated in foreign bibliographic and abstract databases, which in turn led to a gradual transition to domestic indicators (implementation of the categories of K1-K3 journals proposed by the State Commission for Academic Degrees and Titles). However, it will be quite difficult to replace foreign bibliographic and abstract databases that sabotage cooperation with Russia by establishing a full-fledged scientometric assessment of Russian authors' works without a qualitative reorganisation of RSCI. For this purpose, first of all, the state control over RSCI should be established, duplicate and unreliable data should be removed from author profiles, as well as all pseudoscientific information and references to methodological literature, school textbooks, etc., leaving only monographs, theses, dissertations, scientific reports and articles from a strictly limited range of journals and conferences, following the example of Scopus and WoS. And to record the works of Russian scientists published in foreign editions and their citations, it is necessary to involve the global search engine Google Scholar with mandatory filtering of unreliable data found in it. This seems to be the only possible way, as it is unlikely that in the near future it will be possible to establish the same old relations with the West, including due to the ever-increasing divergence in the basic value attitudes.

In order to improve the situation, a number of management principles discussed in the article should be followed and several theoretical and applied problems should be solved, without which scientometrics cannot serve as a reliable support in the management of scientific activity. In the author's opinion, if properly applied and impartially taken into account, the reliable scientometric indicators and this discipline can become one of the barriers to the violation of scientific ethics and social justice in personnel matters, bonuses, grants or the awarding of honorary degrees and academic titles. The need for a comprehensive study on the use of scientometric assessments and indicators in various Russian universities and academic research institutes of the Russian Academy of Sciences on a national scale is long overdue.

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ABOUT THE AUTHOR

Andrei V. Grinev — Dr. Sci. (History), Professor of the Higher School of Social Sciences, Peter the Great St. Petersburg Polytechnic University, St. Petersburg, Russia
https://orcid.org/0000-0002-0246-7945
agrinev1960@mail.ru

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