

# Reform of Russian Science as a Reason for Scientometrics Research Growth

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## Introduction

After the USSR had fallen down in 1990, there was a steady stagnation of Russian science for fifteen years. Iron curtain that separated soviet researchers from the international science disappeared, but research funds sharply decreased due to the economic problems. As a result, the number of publications registered in Web of Science, stayed between 30 000 and 34 000 per year. Thus, Russian science moved from the group of leading countries to the second dozen.

Restoration of Russian Science started in 2006 after government had introduced a new model of the research process. Essential part of the model was wide application of the formal scientific results assessment. This approach triggered a rapid growth of scientometrics publications written by mathematicians, physicists, philosophers and others. The main goal of this paper is to make a review of new Russian scientometrics landscape, which could help to determine its strengths and weaknesses and launch new collaborations.

## Method

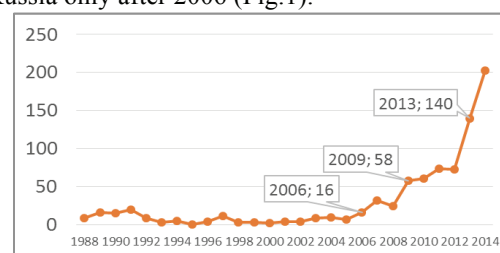
In this paper basic set of scientometric articles produced by Russian scientists is analysed. It consists of two periods: 1988-1999 and 2000-2014. The data for the first part (99 publications) was extracted from Russian Institute for Scientific and Technical Information database, abstract journal "Informatics" (Penkova, O. & Tyutyunnik V., 2011) Publications from 2000 until 2014 were requested from Russian Science Citation Index (national bibliometric database) by using context search with terms "bibliometric", "scientometric", and "webometric" (in Russian) in titles and annotations.

For every article in this set we identified topic category according to its title, annotation and, in some cases, full text. Afterwards, we analysed the distribution and dynamics of the categories and of the whole set.

## Dynamics of Russian scientometric researches

Noteworthy, scientometrics in Russia has very meaningful historical background. It was Russian philosopher and mathematician V. Nalimov, who in 1969 introduced the term "Scientometrics" in his

famous book. In 1973 Marshakova and Small simultaneously introduced co-citation analysis, which is used for research front findings now. Dutt, Garg & Bali in 2003 analysed fifty volumes of journal *Scientometrics* during 1978 to 2001 and examined the distribution of the output of different countries. According to their paper, former USSR contributed 59 of 1317 articles that are emphasized on history of science, theoretical studies and scientometrics distribution. Despite these go-ahead results, scientometric researches became a trend in Russia only after 2006 (Fig.1).



**Figure 1. Dynamics of scientometric publications in Russian journals.**

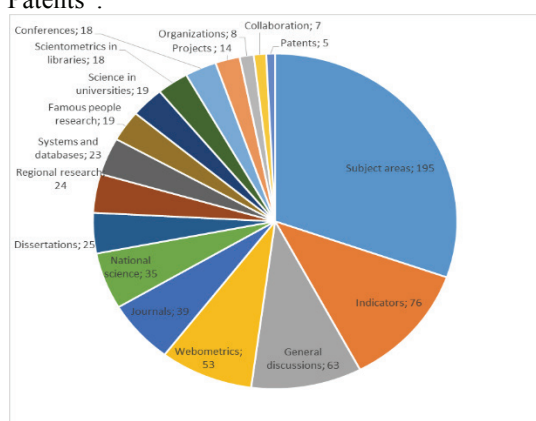
There are three sharp increases at Fig 1: in 2006, 2009, and 2013. The first growth in 2006 relates to the reformation of salary system, which implied significant dependency of the payment bonuses upon publication scores for every single scientist. Facing this new challenge, a number of researchers considered its fairness; some of them noticed the helpfulness of the bibliometric methods and started to apply it for their subject area. The second wave started in 2009<sup>th</sup> after the end of the salary system reformation. From that moment, every researcher became financially interested in improving his scientometric indicators. Research society had to analyze these changes, thus we can observe sharp increase in 2009<sup>th</sup> at Fig 1.

Despite the rapid growth before, in 2013<sup>th</sup> the number of scientometric publications had doubled. The reason is clear: in May 2012, President of Russia V.V. Putin proclaimed that the fraction of publications of Russian researches indexed by Web of Science in 2015<sup>th</sup> has to be greater than 2.44%. This was quite a big challenge for national science, because it literally meant that the annual number of articles has to be increased from 32-33 thousands in 2010-2011 to 46-50 in the next 3 years. The

reasons, the ways and the possibilities of that breakthrough were the main topics for discussion over the year. After that, in June 2013 another dramatic event occurred: restructuring of the Russian Academy of Science (RAS), headquarters of fundamental sciences. This tough stage was accompanied by criticism of the Academy for low scientometric indicators. Unfortunately, scientometrics has been used as an instrument for a radical transformation of management of Russian science.

### Directions of researches

We defined 16 categories and analyzed the articles distribution (Fig.2). 33% of researches were devoted to a specific subject area investigation. It is followed by: development and applying of indicators (13%), general discussions about scientometrics and its place in research management (11%), impact-factors and journal improvement issues (7%), positions of Russian science in a global scope (6%). According to our estimates, from 50% to 75% of publications were made using bibliometric methods, principally in categories: "Subject areas", "Journals", "National science", "Dissertations", "Regional research", "Leading scientists research", "Science in HEI", "Conferences", "Organizations", "Collaborations", "Patents".



**Figure 2. Distribution of scientometric researches by categories (number of pubs.)**

We determined the most developing categories and analyzed the dynamics. The main contribution to publication rise, shown at Fig.1, was made by "Subject area" category from 2007 to 2012. The second contributing category "Indicators" contains a number of articles about publications and citations amount, impact factor and Hirsh index. The third category supports general scientific discussion about scientometrics, started in 2009. Three more categories significantly increased in 2013: "Journals", "Science in universities", "Systems and databases".

### Conclusion

Figure 1 can be thought of as an indirect measure of the influence of the State on Russian Science. Indeed, there was a lack of scientometricians and poor scientometric publication activity in Russia before 2006<sup>th</sup>, the very beginning of reformation. The following alterations made many researches slow down or suspend what they had been doing before and start making their own scientometric investigations. The more severe were the changes, the more scientists were influenced. Furthermore, it seems there were no other reasons for the mentioned breakthrough. At first glance, scientometrics is supposed to benefit from it. That would be so, excepting two facts. First, concerning scientometrics as an instrument of reformation, many scientists consider it primarily as a stick for punishment and do not trust it. This creates quite a negative environment for further development, but this story has already happened. "When a system of assessing and funding researchers was introduced in South Africa, there were cases when scientists attacked scientometrics..." (Pouris, 1994). Second, the most of the scientometric researches, which were published in Russia the last years, relate to one of the groups: 1) Position of the scientometrics and its indicators in the processes of the management of Russian science. 2) Bibliometric researches of science disciplines and Russian science as a whole. 3) Bibliometric and webometric researches of various sources of publications: journals, organizations (incl. universities), famous scientists, conferences, projects, dissertations sets and so on. Since those three groups include up to 90% of publications, there is not much space left for more complicated and go-ahead researches, such as collaboration studies, research fronts detecting, R&D cycle analysis, altmetrics, society impacts, etc. At the moment, scientometrics in Russia remains the "product for internal use" mostly. Still, we expect the internalization of this research field and the increase of the visibility of Russian publications worldwide.

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