DLINE JOURNALS

Journal of Science and Technology Metrics

ISSN: 2582-6956

JSTM 2024; 5 (1)
https://doi.org/10.6025/jstm/2024/5/1/7-10

Strategic Planning of Research and Development in Russia: from Classification to Cluster Topic Prominence in Science

Mark Akoev
Ural Federal University
Russia
m.a.akoev@urfu.ru

Valentina Markusova
All Russian Institute for S&T Information (VINITI)
Russia
valentina.markusova@gmail.com

Olga Moskaleva
Saint Petersburg State University
Russia
o.moskaleva@spbu.ru

Received: 20 November 2023
Revised: 2 December 2023
Accepted: 18 January 2024

ABSTRACT

In this paper, we describe the seven strategic priorities and discuss how the bibliometric indicators evolve to measure them. Using the data, we study the Russian Federation's scientific and technological development strategy. The experimental data is presented in clusters of different subjects.

Keywords: Cluster Topic Prominence In Science, Scival, Incites, Russia Strategic Objectives, R & D Policy

1. Introduction

On May 7, 2018, the President of the Russian Federation signed Decree No. 204, setting an ambitious goal for Russia to become one of the five largest economies in the world by 2024 [1]. This paper explores the potential growth rates in descriptive bibliometrics indicators (scientometrics) that must be achieved in seven strategic priorities (STDP, see App. 1) to elevate Russia to fifth place globally.

Each priority has been described in terms of Web of Science (WoS) categories and ASJC (All Science Journal Classifications) codes for Scopus. We also extracted bibliometric indicators from InCites for the years 2015–2019 for 100 countries. Based on this data, we calculated the Compound Annual Growth Rate (CAGR) of research output for each country. Our calculations indicate that only for priority E–Threats, was fifth place achievable, as it had already been attained in 2019 (see Table 1).

In 2019, the Russian government issued a resolution specifying the revised goal of being among the top 10 countries according to various metrics systems [2]. We focus on indicators related to the number of scholarly publications (Research Output (RO)) indexed in international databases as specified by the Russian government's scientific and technological development priorities and check the precision of the method by which these priorities were defined.

Priorities	Countryin 5th place	RO 2019 (5th place)	CAGR (2015–2019) (5th place), %	CAGR (2015–2019) Russia, %	RO Russia 2019	Russia place 2019	Year of 5th place achievementt
A–Digitalization	UnitedKingdom	29,197	1.5%	7.5%	21,909	9	2025
B–Energetics	India	15,889	5.6%	5.8%	14,193	6	2084
C–Health& Medicine	Italy	31,643	4.5%	9.6%	9,021	18	2046
D–Agronomy	Japan	11,751	4.4%	12.2%	4,289	16	2033
E–Threats	Russia	13,256	5.9%	5.9%	13,256	5	
F–Territories	India	10,530	4.1%	10.0%	7,153	10	2026
G–Society	Canada	6,666	-0.5%	20.1%	3,868	8	2022
A–G	India	91,663	3.7%	7.8%	59,592	13	2030

Table 1. Fifth-place positions in global publication growth rates in 2019 by priority in comparison to the goals of the scientific and technological development strategy of the Russian Federation

An alternative approach for measuring performance could be the use of article classification based on citation topics, for example, Cluster topic prominence in science from SciVal (Elsevier) or Citation topics from InCites (Clarivate). We will analyze the priorities based on cluster topic prominence [3], although similar results can be obtained using the other tool.

Clusters of topics related to the Scientific and Technological Development Priorities (STDP) were identified using ASJC codes. By examining the overlap between these clusters in SciVal, we identified areas where publications can be counted more than once. In other words, due to the classification features of ASJC, publications on a single topic may be attributed to multiple priorities, or multiple ASJC codes may classify a single publication under a particular priority. The analysis of these overlaps is presented in Fig. 1, with the greatest number of overlaps occurring in Priority E–Territories.

As we have shown above based on formal indicators, achieving a Top-10 ranking by 2030 is feasible in all areas except Medicine and Agriculture. To reach the Top-5, significant efforts must be expended. This includes increased funding for research, improvements in personnel and material-technical support, etc. To reach global standards, decision-makers must analyze those fields where experts believe Russian science can make contributions and where there are few publications compared to global trends. The most relevant of these fields should be developed.

This example demonstrates that neglecting expert evaluations, which must be updated in accor-

dance with achievements, can make planning systems counterproductive, especially when based solely on journal classification tools.

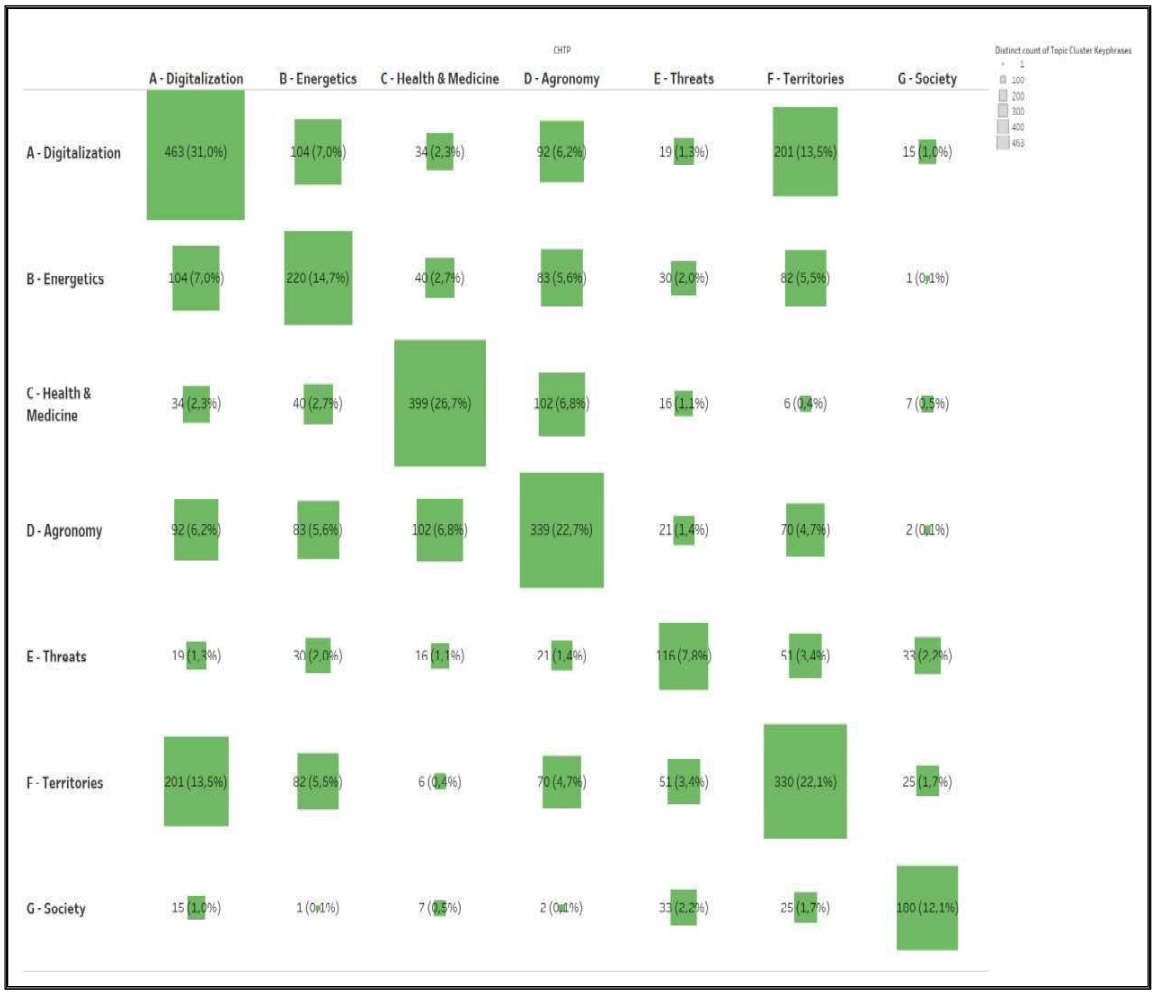

Figure 1. Number of SciVal topic clusters falling into pairs of STDP priorities (in brackets % of total number of clusters) for 2016–2020. Each publication corresponds to a single SciVal topic, and each SciVal topic belongs to only one topic cluster

Conclusion

Before adopting digital indicators in government programs, it's essential to calculate the boundaries of goal attainment by consulting with experts in the relevant subject areas.

Planning should focus less on journal thematic classification and more on actual thematic classification (journal lists, topics, clusters - SciVal, InCites).

Based on formal indicators, achieving a Top-10 ranking by 2030 is feasible in all areas except Medicine and Agriculture. To reach the Top-5, significant efforts are required. This includes increased funding for research, improvements in personnel and material-technical support, and enhancing the global presence of Russian science (supporting scientific mobility, developing scientific journals, and hosting world-class conferences).

To reach global standards, it would be beneficial to analyze those fields where expert reviews

identify needs and there are few publications compared to global trends. The most relevant of these fields for the country should be developed.

The provided example shows that neglecting expert evaluations, which should be updated in accordance with achievements, can make planning systems harmful, especially when based solely on journal classification tools.

References

[1] Ukaz Prezidenta Rossijskoj Federatsii ot 07.05.2018 No. 204 "O natsionalnykh tselyakh i strategicheskikh zadachakh razvitiya Rossijskoj Federatsii na period do 2024 goda" (2018). [Decree of the President of the Russian Federation dated May 7, 2018 No. 204 "On national goals and strategic objectives of the development of the Russian Federation for the period up to 2024"] http://www.kremlin.ru/acts/bank/43027 Access date: 25.09.2023

[2] Rasporyazhenie Pravitelstva Rossijskij Federatsii ot 15.08.2019 No. 1824-r (2019). [Directive of the Government of the Russian Federation dated August 15, 2019 No. 1824-r] http://publication.pravo.gov.ru/Document/View/0001201908230026?index=1 Access date: 25.09.2023.

[3] Klavans, R. Boyack, K. W. (2017) Research portfolio analysis and topic prominence. Journal of Informetrics, 11 (4), pp. 1158–1174. https://doi.org/10.1016/j.joi.2017.10.002

Appendix 1. Seven Russian strategic priorities

Code	Description	Code name
A	The transition to advanced digital, intelligent production technologies, robotic systems, new materials and methods of construction, creation of systems for processing large volumes ofdata, machine learning and artificial intelligence	Digitalization
B	The transition to environmentally friendly and resource-saving energy, improving the efficiency of extraction and deep processingof hydrocarbon raw materials, development of new sources, ways of transportation and energy storage	Energetics
C	The transition to personalized medicine, high-technology health and technology health savings, including through the rational useof drugs (especially antibacterial)	Health & Medicine
D	The transition to a highly productive and environmentally friendlyagro- and aquafarm, development and implementation of systemsfor the rational use of chemical and biological protection of agricultural plants and animals, storing and efficient processing ofagricultural products, the creation of safe and high quality, including functional, food	Agronomy
E	Counteraction of technogenic, biogenic, social and cultural threats, terrorism and ideological extremism, as well as cyberthreats and other hazards to society, economy, and state	Threats
F	The connectivity of the territory of the Russian Federation due to the creation of intelligent transport and telecommunication systems, as well as taking and holding leadership positions in thecreation of international transport and logistics systems, the development and utilization of outer space and air space, the World ocean, Arctic and Antarctic	Territories
G	The possibility of effective response from the Russian society atlarge to issues related to the interaction of man and nature, manand technology, social institutions at the modern stage of global development, including using methods of the Humanities and Social sciences	Society