

Opportunities for scientific cooperation between developing countries in the BRICS + Global South format

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Volume of R&D funding and number of Scopus-indexed publications of

the BRICS countries in total already exceed those of the EU-total and the United States. These metrics have opportunity for further growth if the five developing countries strengthen scientific cooperation with other countries from Global South that have significant growth potential. Researchers from the Institute for Statistical Studies and Economics of Knowledge Alexander Sokolov, Sergey Shashnov, and Maxim Kotsemir analyzed the opportunities for research collaboration within these clusters of countries along with the obstacles standing in the way of greater cooperation. The researchers presented their findings in the article 'From BRICS to BRICS Plus: Selecting Promising Areas of S&T Cooperation with Developing Countries', published in *Scientometrics*.

While speaking at a press conference for the fifth session of the 12th National People's Congress in Beijing in March 2017, Chinese Foreign Minister Wang Yi suggested that the concept of BRICS Plus can be considered as a possible platform for expanding cooperation between the BRICS countries with other major developing countries in 'South—South' direction.

ISSEK researchers examined the potential for scientific cooperation of the BRICS countries with a group of 21 countries that belong mainly to the so-called Global South. The sample of the BRICS Plus states in this paper was determined based on the criteria of population, economic and scientific potential, etc.

Promising topics for scientific cooperation between the BRICS and BRICS Plus countries were identified using Scopus data for 2000-2018. The analysis shows a significant increase in publication activity both in the BRICS countries and those in the Global South.

Gross expenditures on research and development, as well as the number of publications indexed in Scopus, of all BRICS countries exceed those for the EU (in total) and the USA. In 2018, China ranked first in the

total number of Scopus-indexed publications, slightly ahead of the United States, and was the global leader in 12 Scopus subject areas (the United States leads in the remaining 15 areas). Other BRICS countries have also significantly increased their presence among the leaders in a number of subject areas.

Among the BRICS Plus countries, Iran, Turkey, Indonesia, Malaysia and Mexico entered global top-30 countries by number of publications in Scopus in 2018.

Iran demonstrated 30.4 times growth in number of publications in 2000-2018 and jumped from 48th to 15th place in the global ranking of countries.. Malaysia, Pakistan and Vietnam increased their number of publications indexed in Scopus by more than 16 times.

The authors also calculated the thematic structure of publications of BRICS and BRICS Plus countries for 2014-2018 by 27 Scopus subject areas. The results show that the main subject area for China in Scopus is Engineering. The thematic structure of Russian publications is dominated mainly by physical, chemical and technical sciences. That said, the topics covered by Russian publications has not changed significantly since the Soviet period. India specializes mainly in Pharmacology, Toxicology and Pharmaceuticals, and Computer Sciences subject areas. For Brazil, the most important subject areas are Medicine and Agricultural and Biological Sciences. South Africa shows quite strong bias toward social sciences and humanities in the thematic structure of Scopus-indexed publications.

For the BRICS Plus countries in general, the main subject areas are Medicine, Engineering, Computer Science, and Agricultural and Biological Sciences, but each country has its own thematic profile. For example, Kenya, Nigeria and Ethiopia specialize in Agricultural and Biological Sciences and Medicine, while Bangladesh, Indonesia,

Malaysia, Vietnam (and Thailand to a lesser extent) specialize in Engineering and Computer Science.

The BRICS and BRICS Plus countries differ significantly in the level of research and technological development. An analysis of the joint publications of these two groups in Scopus shows that the BRICS Plus countries are not yet among the most important scientific partners of BRICS countries. However, the fields of cooperation within the BRICS and the BRICS Plus group are very similar, which is a promising factor for intensifying cooperation among the countries in these two groups.

Turkey, Saudi Arabia, Malaysia, Pakistan, Chile, Thailand, Iran and Egypt are the most promising candidates for joining the hypothetical BRICS Plus platform in terms of their research collaboration with the BRICS countries.

Each of the BRICS countries has its own list of potential partners from BRICS Plus.

The researchers conducted a special bibliometric analysis for 14 priority areas of scientific and technological development of the BRICS countries and, in relation to these areas, calculated the scientific specialization index of the BRICS and BRICS Plus countries for 2014-2018.

The index value exceeded 1.00 for 16 of the 21 BRICS+ countries in three priority areas: Climate Change, Environmental Protection and Disaster Management, Food Security and Sustainable Agriculture, and Renewable Energy Sources. This means that joint high-tech projects aimed at solving problems relevant to the [developing world](#) can be initiated in these areas, which determine the current focus of scientific specialization for most BRICS Plus countries.

Several policy measures could be appropriate for supporting cooperation in relevant areas including research mobility, joint projects, and joint competitions of BRICS engaging partners from the BRICS Plus countries. When developing them, one should consider both the existing collaboration links and their potential in the most promising scientific and technological areas.

Further studies could be focused on more detailed analysis of collaboration between BRICS and BRICS Plus countries with the use of a wider set of metrics. The index of relative intensity of intra-BRICS collaboration (RIIC index) proposed in (Shashnov and Kotsemir, 2019) can be applied here to detect thematic areas with the highest (and lowest) intensity of intra-BRICS (and intra-BRICS Plus) [research collaboration](#).

More information: Alexander Sokolov et al, From BRICS to BRICS plus: selecting promising areas of S&T Cooperation with developing countries, *Scientometrics* (2021). [DOI: 10.1007/s11192-021-04142-3](https://doi.org/10.1007/s11192-021-04142-3)

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