



Science Diplomacy in Action: Highlights of the Indo-Brazilian Agenda in S,T&I



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Introduction

India and Brazil are two emerging economies, guided by democratic values and with large population and territories. Both countries share similar challenges and opportunities, which gives room for a wide spectrum of areas of cooperation. In the field of science, technology and innovation (S,T&I), Brazil and India have pursued an agenda through bilateral and inter-regional mechanisms. This agenda has been gradually growing, and at present includes different areas, such as mathematics, biopharmacy, ICT, aerospace, nanotechnology, among others. In spite of the diversity of fields and mechanisms, the Indo-Brazilian cooperation is based on the principle that science and technology constitutes an essential mean for sustainable development in all its forms, social, economic and environmental – of both. This paper intends to highlight some aspects of the Brazilian-Indo relations in S,T&I. In this realm, it would examine not only the major initiatives in the bilateral relation over the last few years, but also the agenda developed in two inter-regional mechanisms of which Brazil and India are members – BRICS (Brazil, Russia, India, China and South Africa) and IBSA (India, Brazil, South Africa Dialogue Forum).

Bilateral Relations in S,T&I

Brazilian-Indo cooperation in the S,T&I started way back to 1985, when a bilateral agreement was signed in science and technology. However, it gained a momentum in 2005, when the India-Brazil Scientific Council (CCBI, in Portuguese) was created. At that time, it was decided that the Council would be co-led by the Brazilian

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National Academy of Sciences (ABC) and the Indian Scientific Advisory Committee to the Prime-Minister (SAC-PM); currently known as the Scientific Advisory Committee to the Cabinet (SAC-C).

Since then, many joint activities have been performed in different areas of research. In 2007, a workshop on the Indian pharmaceutical industry, held at ABC's premises, was led by Prof. S. Sivaram, director of the National Institute of Chemistry of India. He outlined the history, success strategies and prospects of the said industry in the country.

In the same year, a bilateral workshop on molecular materials, including nanomaterials, was held at the National Chemical Laboratory in Pune, India. The Brazilian delegation was headed by a scientist, Fernando Galembeck, who also participated in the 10th International Conference on Advanced Materials.

A year later, the cooperation evolved in other areas such as biomedical sciences, computer engineering, physics and mathematics. A Brazilian delegation, led by a scientist Eloi Garcia, participated in the Indo-Brazilian Meeting on Infectious Diseases, organized by the Jawaharlal Nehru Centre for Advanced Scientific Research (JNCASR) in Bengaluru. Later in the same year, a Brazil-India Workshop on Infectious Diseases was held at ABC's headquarters in Rio de Janeiro, which discussed the situation of AIDS, tuberculosis, malaria and leishmaniasis in both countries.

Also in 2008, an Indo-Brazilian Workshop on Computer Sciences was organized. The event was coordinated by Prof. Virgilio Almeida, University of Minas Gerais (UFMG), and it focused on advanced research topics, especially those of strategic interest to both the countries such as Information and Communication Technologies (ICT) and Cybersecurity. In the same year, the Brazilian scientist, Luiz Davidovich, coordinated the Brazil-India Workshop on Condensed Matter in Rio de Janeiro. The 1st Indo-Brazilian Symposium in Mathematics was held at the Institute of Pure and Applied Mathematics

(IMPA), in Rio de Janeiro, by a Brazilian scientist, Jacob Palis.

In 2010, a bilateral cooperation was reinforced by the "Agreement on Scientific and Technological Cooperation", signed by both Ministries of Science and Technology. The agreement institutionalized the Brazil-India Joint Commission on Scientific and Technological Cooperation, which met in 2012 in New Delhi. The meeting was followed by a joint call in S,T&I (2013), which hosted 14 projects among universities and research institutions from both countries in areas such as ICTs, geosciences, mathematics and renewable energies. In March 2012, the both signed a "Memorandum of Understanding on Cooperation in the Field of Biotechnology", which resulted in two joint calls in biotechnology (2013 and 2015). The calls supported projects in the areas of biopharmacy, biofuels, and neglected and infectious diseases.

Both countries evaluate the possibility of holding, in the first half of 2018, the second bilateral meeting. At the said meeting, it is intended to adopt 2018-2019 Scientific and Technological Cooperation Programme with emphasis in the areas of biotechnology and health, including low-carbon technologies, geosciences, including ocean sciences and climate change, and innovation and entrepreneurship.

Cooperation in the Space Sector

Brazil and India cooperate in Space sector under the "Framework Agreement for Peaceful Uses of Outer Space, 2004"; and two complementary adjustments are for the reception of data from India's remote sensing satellites Resourcesat-1 and 2 (2007 and 2014). These adjustments entail upgradation of Brazilian terrestrial stations in Cuiaba with compatible software and hardware to the said Indian satellites.

Currently, both sides evaluate possibility of cooperating in the SERPENS ("Space System for Research and Experiments with Nanosatellites") programme, organized by the Brazilian Space Agency (AEB). The programme aims at organizing space missions with nanosatellites every two years. The main objective of the project is training of human resource, and the missions

are coordinated by Brazilian federal universities with an aerospace engineering course. Another opportunity for deepening bilateral cooperation would be a possible Indian involvement in the development of the EQUARS (Equatorial Atmosphere Research Satellite).

Possibility of Cooperation in the ICT

Brazil and India have dynamic ICT sectors with a large number and variety of companies, educational entities and research and development centres. Both countries are home to major multinational outsourcing and services companies (TCS, Wipro, Infosys, on the Indian side, Stefanini on the Brazilian side) as well as software houses (Subex, India; Totus, Brazil) and fintechs (Paytm, Indian; Zetrast and Digicon-Perto, Brazilian). In the academic sector, the Indian Institutes of Technology (IITs), throughout the Indian territory, and the university centres of Campinas (SP), Vale dos Sinos (RS) and Campina Grande (PB), among others, are known for highly qualified professionals and for the significant scientific production.

The relations between Brazil and India in ICT are centred on reciprocal investments of the private sector. Wipro, with development centre in Curitiba; Infosys, in Belo Horizonte; and TCS, in Tamboré, São Paulo are the main Indian investors in the sector. Stefanini, with centres in Noida and Hyderabad, and Digicon-Perto in Jaipur, are among the top Brazilian companies.

The main joint government initiative in the area of ICT was organization of a bilateral video-conference on global cyber topics in April 2016. At the occasion, possibilities were discussed for cooperation among CERTs (Computer Emergency Response Teams), training programmes and exchange of experiences on regulatory frameworks. Both countries are about to sign a “Memorandum of Understanding on Cooperation in Cybersecurity”.

Besides that a joint agreement between the Itaipu Technology Park Foundation and the Centre for the Development of Advanced Computing of India (C-DAC) is in an advanced stage of negotiation. Once signed, it would

establish cooperation in areas related to high performance computing (HPC).

In view of the diversity of India and Brazil’s achievements in education, research, trade, regulation, incentive policies and social programmes in ICTs, it is assumed that closer approximation would be a welcome for the benefit of the public and private sectors of both the countries.

Inter-regional mechanisms

BRICS

The first formal BRIC (Brazil, Russia, India and China) Foreign Ministers Summit was held in 2008. Since then, the acronym, created a few years earlier by the financial market to identify four emerging economies, became a new political-diplomatic entity. Later on, in 2010, South Africa joined the group. Since its creation, BRICS has expanded its activities in two main areas : (a) coordination in the international meetings and organizations; and (b) construction of a multisectoral cooperation agenda among its members¹.

With 42 percent of world’s population, contributing 18 percent of global GDP, 17 percent of global R&D investment and 27 percent of science papers published on international journals, as an important force of international economic cooperation and one of the most dynamic and promising emerging economies, BRICS countries are major representatives of emerging economies in the world.² The past few years have witnessed a growing commitment of the BRICS countries in developing joint projects, initiatives and networks in Science, Technology and Innovation (STI). In this sense, BRICS cooperation is aimed at complementing and strengthening existing bilateral and multilateral relations among member-countries. Brazil and India, alongside with the other BRICS countries, consider the collaboration in STI a major driving force to societies to overcome internal sustainable development challenges.

Since 2014, there were five meetings of Ministers of STI of the BRICS countries. Yet,

collaboration in the field began as early as 2011, with regular meetings of STI Senior Officials. The following main five thematic areas of cooperation among the countries were set-up in the Memorandum of Understanding on Cooperation in STI: (i) climate change and natural disaster mitigation, led by Brazil; (ii) water resources and pollution treatment, led by Russia; (iii) geospatial technology and its applications, led by India (iv) new and renewable energy and energy efficiency, led by China; and (v) astronomy, led by South Africa.

In the 5th Meeting of the Ministers of STI, which took place in Hangzhou (18/7/2017), the action plan 2015-2018 was updated by identifying activities included in the Action Plan 2017-2018. One of the main concerns that have underpinned the debate of the document was the need of concrete actions, which should emerge from the mechanism. In addition to the five thematic areas of cooperation, the new potential domains included in the updated Action Plan are ³. a) creation of BRICS Young Scientists Forum (India as coordinating country); b) Cooperation on Biotechnology and Biomedicine including Human Health and Neuroscience (Russia and Brazil as coordinating countries); c) Cooperation on Information Technologies and High Performance Computing (China and South Africa as coordinating countries); d) Cooperation on Ocean and Polar Science and Technology (Brazil and Russia as coordinating countries); e) Cooperation on Material science including Nanotechnology (India and Russia as coordinating countries); and f) Cooperation on Photonics (India and Russia as coordinating countries).

The final section of the action plan sets forth the creation of a network of technological parks and incubators for start-ups to create BRICS research and innovation centres. The implementation of the plan would be under the responsibility of the working group of the BRICS Science, Technology, Innovation and Entrepreneurship Partnership (BRICS STIEP). Indian proposal was endorsed during the last meeting of ministers.

Recently, three initiatives stand out within the BRICS cooperation on the STI. The first is the framework programme for funding multilateral joint projects for research, technology commercialization and innovation, launched at the 7th BRICS Summit (Ufa, 2015), which has established joint calls for projects. Eight funding agencies took part into the framework-agreement (for Brazil the National Council for Scientific and Technological Development - CNPQ, and for India the Department of Science and Technology - DST). The pilot-call for projects in 2016 had 26 proposals approved (from 320 proposals submitted in response to the call); of which eight had Brazilian participation and 22 Indian participation (six of them were joint Brazilian-Indo endeavours with other BRICS countries) in projects covering main thematic areas of cooperation. In 2018, the 4th meeting of the BRICS STI Funding Parties would take place in Brazil for final selection of projects to be funded as the outcome of the Second BRICS Coordinated Call for Proposals.

The second initiative is the Young Scientists Forum; its first edition took place in Bengaluru in 2016. The logic that underpins the idea of gathering together young scientists of the BRICS countries lies on the positive impact that this action may have long-term scientific cooperation. The second Young Scientists Forum took place in Hangzhou (2017). South Africa has the intention of holding another edition of the forum in 2018, and Brazil in 2019. This is a remarkable occasion for young Brazilians and Indian scientists to have fruitful interactions and bring about new venues for cooperation.

The third is the creation of a working group on research infrastructures, including mega-science projects, which would promote coordination within large-scale research infrastructure to support initiatives leading to efficient use and development of mega-science projects such as the BRICS Global Research Advanced Infrastructure Network (BRICS GRAIN). The first meeting of the WG took place in Russia in 2017 and the second meeting would take place in Brazil in 2018. When the initiative kicks off, Brazilian scientists

would be able to use Indian large-scale research infrastructures as well as the other way round with positive implications in joint-projects and mega-science projects; carried out by both parties.

Prospects for continuous and enhanced cooperation within BRICS nations are bright and have the potential to unleash other opportunities in the ambit of the Brazilian-Indo cooperation on the STI.

IBSA

It is a unique Forum which brings together India, Brazil and South Africa, three large democracies, and major economies from three different continents, facing similar challenges. All three countries are developing, pluralistic, multi-cultural, multi-ethnic, multi-lingual and multi-religious nations.⁴ The first formal meeting of the Foreign Ministers of the IBSA Dialogue Forum took place in Brasilia in 2003. An IBSA Trilateral MoU on cooperation in the field of the STI was signed during the fourth IBSA Summit, in Brasilia, in 2010.

Since its inception, STI has been identified as one of the key areas for trilateral cooperation. Activities in this area are guided at the Ministerial level through meetings of the S&T Ministers of member -countries (four meetings have been held till now). A Joint Working Group (JWG) was formed to support development of cooperation activities in the STI. To enhance knowledge sharing in the areas of use of IT for development and e-Governance, a Joint Working Group (JWG) on Information Society was created. It was later merged with JWG on Science and Technology. During various Information Society JWG meetings, synergy in the areas of e-Governance, capacity-building, local content development and e-health was sought to be established. The issues discussed by JWG were: a) e-Readiness Indicators and Assessment Methodology for the IBSA Countries; b) e-Governance Standards and Data Quality Management; c) Free and Open Source Software (FOSS).

The main thematic areas of research cooperation on STI are: a) biotechnology b) nanotechnology c) Health Sciences (HIV/AIDS, malaria, tuberculosis

d) Indigenous Knowledge e) Alternative and Renewable Energy f) Oceanography and Antarctic research and g) Information and Communication Technologies. Activities in each area are implemented by area coordinators, who are experts in their respective disciplines.

In support of the activities in these sectors, the three countries created a seed fund of USD 1 million in each country for collaborative activities,⁵ in which seven proposals were approved – three in the field of HIV/AIDS, two in nanotechnology and one in oceanography and another in biotechnology.

Despite the fact that some analysts point out that the cooperation within IBSA has waned in the past few years (Woolfrey, 2013), overall IBSA Forum has been quite successful in promoting IBSA cooperation within multilateral fora and advancing some concrete projects in the area of the STI. The cooperation within IBSA may pave the way for mutual knowledge and sharing of experiences that had strengthened bilateral cooperation between the two.

Closing Remarks

In 2018, Brazil and India are celebrating 70 years of establishment of diplomatic relations. Throughout these years, the two countries have succeeded in bringing out robust national systems of science, technology and innovation, and both countries stand out in international indexes on numbers of science papers published on international journals. Despite several initiatives that have already been jointly put in place by both nations, the signatures of international instruments that enable the cooperation in the sector and the creation of a bilateral commission to evaluate the pace of the cooperation on S,T&I, there is still room for improvement and for further action. The recent establishment of an specific mechanisms on S,T&I within inter-regional mechanisms has pushed even further the bilateral agenda fostering contacts and interactions among scientific communities of Brazil and India, which would certainly bear fruit in the forthcoming years.

Endnotes

- ¹ Available at: <http://www.itamaraty.gov.br/en/politica-externa/mecanismos-inter-regionais/7505-brics-brazil-russia-india-china-south-africa>.
- ² Preamble of the BRICS Action Plan for Innovation Cooperation (2017-2020).
- ³ BRICS Science, Technology and Innovation Work Plan 2015-2018, Adopted on 28 October, 2015 and revised on 18 July, 2017.
- ⁴ Available at: <http://mea.gov.in/in-focus-article.htm?21578/IBSA+India+Brazil+amp+South+Africa>.
- ⁵ New Delhi Ministerial Communique (2007). India-Brazil-South Africa Forum.

Reference

- Agreement on Scientific and Technological Cooperation between the Government of the Republic of India and the Government of the Republic of Brazil" concluded on March 30th, 2012 in New Delhi, India.
- BRICS. Science, Technology and Innovation Work Plan 2015-2018, Adopted on 28 October, 2015 and revised on 18 July, 2017
- BRICS. Action Plan for Innovation Cooperation (2017-2020).
- BRICS. Science, Technology and Innovation Ministerial Meeting: Cape Town Declaration, 10 February, 2014.
- IBSA. New Delhi Ministerial Communique (2007). India-Brazil-South Africa Forum.
- IBSA. Memorandum of Understanding on Trilateral Cooperation in Science, Technology and Innovation Among the Government of the Republic of India, the Government of the Federative Republic of Brazil and the Government of the Republic of South Africa, Brasilia, 15 April 2010.
- Shogwe, L . 2014. The Diplomacy of India, Brazil, South Africa Dialogue Forum: Trilateral Opportunities and Global Limitations. University of Pretoria. Available at: https://repository.up.ac.za/bitstream/handle/2263/46072/Shongwe_Diplomacy_2015.pdf;sequence=1. In: 16.01.18.
- Silva, F. 2015. International Science and Technology Cooperations: the case of IBSA Dialogue Forum – India, Brazil and South Africa (2003-2010). Brasília: Revista Brasileira de Pós-Graduação, v. 12. N. 27.
- Woolfrey, S. 2013. The IBSA Dialogue Forum ten years on: examining IBSA cooperation on trade. Available at: <http://www.eldis.org/document/A65864>. In: 16.01.18.