



Indo-Russian Relation Science and Techonology in the Post Cold Era

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Abstract: India and Russian are the world's pre-eminent examples of pluralistic, multi- denominational societies with a deeply-rooted tradition of tolerance and constructive co-existence between different faiths and beliefs of great internal diversity, combined with a strong sense of national and cultural unity, operating in a federal political frame work. This dimension has enriched the cultural heritage of both countries and helped cultural empathy. Another common element of fundamental importance is that both countries are democracies with a commitment to freedom of speech, assembly, free press and a strong parliament and judiciary. It is in this context, that the new stage in the bilateral relations between the two countries requires a thorough assessment. It stands to reason that with the developments that are taking place in the current international milieu, there is a need for India and Russia to reemphasise their strong strategic partnership, goodwill and diplomatic trust that have stood the test of time. , the study is an effort to analyse the Indo-Russian relations science and techonology in its varied facets during the post-cold war period

Index Terms – Cold War, India and Russian relation, Science and Techonology

I. INTRODUCTION

In modern times the world has greatly shrunk as a result of scientific and technological development. As a consequence events in one part of the world have an immediate impact on the rest of the world. Therefore the states maintain regular relations with other states and the study of International Relations has assumed great importance. Though some sort of International Relations have been in vogue since earliest times and some of the states like Egypt, china, Greece and India had evolved code for the conduct of these relations. These rules were essentially based on morality and were not scrupulously observed by the states. Further these relations generally covered states of the same region and therefore can more appropriately be described as 'regional relations.' It was only in the seventeenth century that the states established relations with other states beyond the region. This in a way marked the beginning of the International Relations. The improvements in means of transport and communication and the industrial revolution further brought the states closer and greatly contributed to the development of International Relations. . As a result, no well conceived theory could be evolved which could help in understanding the significance of the current events.

Post Cold War international relations have undeniably been a litmus test for the bilateral relations between India and Russia. With the emergence of a new international system, the foreign policies of both countries vacillated to explore new avenues of partnerships with other international players, an opportunity that otherwise proved effective to a large extent. National priorities and the geo-political architecture remodelled by the US, thus, compelled New

Delhi and Moscow to pursue a foreign policy that moved away from serving the interests of each other. While defining the trends in the bilateral relations between the two countries, the strategic community has questioned whether the relationship can remain as special and strategic as it had been in the past. Are both countries still as relevant to one another as they once were? 1.

India and Russian are the world's pre-eminent examples of pluralistic, multi- denominational societies with a deeply-rooted tradition of tolerance and constructive co-existence between different faiths and beliefs of great internal diversity, combined with a strong sense of national and cultural unity, operating in a federal political frame work. This dimension has enriched the cultural heritage of both countries and helped cultural empathy. Another common element of fundamental importance is that both countries are democracies with a commitment to freedom of speech, assembly, free press and a strong parliament and judiciary. Besides, both these countries have large and rapidly growing economics with very substantial human and natural resources, augmented by new strengths generated through reform and liberalization emergence of active entrepreneurship and strong science and technology traditions and capabilities 4.

The bilateral relations between India and Russia have been strong ever since the Cold War (1949-1991). The beginning of this Indo-Russian relationship was marked after the Soviet Union was dissolved. Ever since 1991, Russia and India have formulated a special relationship based on military, economic, and political agreements and partnerships. With the increasing trade between nations, and the strengthening of militaries, Indo-Russian relations have formulated an intergovernmental commission to ensure smooth communication between the nations. India and Russia have shared a long history 7.

Modern technologies are not only the source of economic growth but also the basis for the realisation of global prosperity. Consequently, many states are seeking to develop science and technology through international cooperation. Currently, Russia and India, as strategic partners, have developed their partnership in almost all areas of bilateral relations, including politics, security, defence, trade and economy, and culture. The two countries focus on strengthening, expanding and also deepening cooperation in science and technology (S&T). Tatiana Bokova, Intern of the Russian National Committee on BRICS Research – special for InfoBRICS 10.

2 The paper addresses two research questions:

1. Why India is continuing her relations with Russia?
2. Are there any reciprocity in India-Russia relations in regard Science and technology?

Methodology: the current paper is based on content analysis method. This paper is based on secondary data. I have used books, journals, newspapers, etc

Science and Technology Cooperation

India and Russia enjoy a very healthy and long standing bilateral scientific cooperation, which began with signing of the Science and Technology Agreement between India and USSR in 1972, and was further strengthened with conclusion of the Integrated Long Term Programme (ILTP) of Scientific Cooperation at the highest state level by the then Prime Minister of India and General Secretary of Communist Party of Soviet Union in 1987. Considering that Russia was the Successor State of USSR, ILTP was termed as Indo-Russian programme by the ILTP Joint Council in its 5th Session held in Moscow in 1992. A new Agreement on Science & Technology between India and Russia was

concluded in 1994 in Moscow. In December 2002 the two governments concluded a Protocol on Protection and Usage of Intellectual Property arising out of bilateral scientific cooperation 8.

Science & Technology has been the epitome of the bilateral India-Russia (and India-Soviet) partnership, apart from political and military partnerships. Roots of the collaborative programme are deep and it has penetrated in many scientific groups in universities or academic institutes, industries, scientific/ basic science laboratories. The joint endeavours have led to generation of knowledge, products, and facilities through hundreds of joint projects. Both countries have been making concerted efforts to strengthen, expand and deepen cooperation in this important sector of bilateral relations. Formulation and implementation of fundamental scientific ideas in order to create new technologies, new types of equipment and materials required of the economic development of both countries has been the main focus of the programme, both in strategic as well as civil science sectors.

India and Russia have a strong and cooperative bonding in the field of science and technology. Since the conclusion of India-USSR —Science and Technology Agreement of 1972 both countries are exchanging so many things and helping each other in this field. New Delhi and Moscow had signed another agreement on Long Term Programme (ILTP) of Scientific Cooperation at the highest state level by the then Prime Minister of India and General Secretary of Communist Party of Soviet Union in 1987. In 1992, ILTP Programme by the joint Council in its 5th meeting held in Moscow. In 1994, another agreement was signed between Moscow and New Delhi on Science & Technology. Now, the cooperation between India and Russia in the field of Science and Technology being implemented based on certain mechanisms— (1) Working Group on Science & Technology, (2) Integrated Long Term Programme (ILTP) of Cooperation in Science and Technology, (3) Basic Science Cooperation programme, (4) Inter-Academy Exchange Programme, (5) Indo-Russian S&T Centre, (6) Inter-Ministerial Science, Technology, and Innovation Cooperation. Indo-Russian Working Group for Cooperation in Science & Technology (IRWGS&T), one of the major Working Groups under the Indo-Russian Inter-Governmental Commission (IRIGC). It was established in 1993. In the research of biotechnology and medical science, joint research projects and R and D are being conducted. In the field of Metrology and Oceanology, both countries are working together. Science and Technology Cooperation was renewed in 2010 to enhance more scientific research and joint projects in various sectors. This cooperation encourages to conduct research projects, holding joint seminars/workshops, visits of scientists in the field of Physics, Mathematics, Hydrology. Computers, Oceanology, Chemical Science, etc. Some joint initiatives have been taken by the Department of Science and Technology (DST), the government of India, and the Russian Academy of Sciences (RAS). Both countries have decided to set-up eight joint Centres of an excellence exchange programme to conduct joint research projects. The elite scientific research centres of both countries are conducting collaborative research. The important joint research centres are: - Indo-Russian Centre for Advanced Computing Research (Moscow) - Indo-Russian Centre for Biotechnology (Allahabad) - Indo-Russian Centre for Gas Hydrates Studies (Chennai) - Indo-Russian Centre for Earthquake Research (New Delhi) - Russian Indian Centre on Ayurvedic Research (Moscow) - Indo-Russian Centre for Biomedical Technology (Thiruvananthapuram) India and Russia cooperating in space science, defense technology, and nuclear science. For a long time, India's space science and nuclear power plants were immensely dependent on Russia's scientific assistance. Although India has not signed the Non-Proliferation Treaty (NPT), Russia has been supplying the required fuel to India to generate nuclear-powered electricity. India has set-up a new nuclear reactor at Kudan-Kulam with the help of Russia to generate 1000 MW electricity. In 2014, in a joint statement, both countries promised to do many things together as a premier vision for the

upcoming decade. As per the joint statement, Moscow and New Delhi will cooperate in various areas, such as energy, technology, and innovation and economic cooperation as focal points.

Presently, both countries have adopted multi-stakeholder bases and scientific cooperation is facilitated through many agencies. While from the Indian side, Department of Science & Technology (DST), Ministry of Earth Sciences (MOES), Council of Scientific & Industrial Research (CSIR), Department of Biotechnology (DBT), Ministry of Electronics & Information Technologies (MEITY), Indian Council of Medical Research (ICMR), Indian Council of Agricultural Research (ICAR) and Indian National Science Academy (INSA) are the primary agencies in civilian science & technology cooperation. On the Russian side, Ministry of Science and Higher Education (MSHE), Russian Foundation for Basic Research (RFBR), Russian Science Foundation (RSF), Skolkovo Foundation (SF), Russian Academy of Sciences (RAS), Russian Federal Foundation for Small Innovative Enterprises (FASIE) and Russian Ministry of Economy Development (MED) are involved in making this partnership stronger. The India Russia Science and Technology programs are currently steered through India Russia Working Group on Science & Technology which reports to the India Russia Inter Governmental Commission (IRIGC-TEC).

Basic Science Cooperation

Both countries have been supporting joint R&D in Basic Sciences. Around 150 joint projects are presently under implementation in Mathematics & Computations, Physics & Astrophysics, Chemistry, Earth Science, Biological & Medical Sciences, Engineering Sciences and Information & Communication Technologies. These cooperation has resulted in knowledge generation as well as development of institutes of excellence in identified thematic areas.

Collaboration between Indian and Russian scientists on development of India's first indigenous oral polio vaccine, which has benefited millions of people is an excellent example of joint cooperation. Support and training from Russia has been a key factor in the success of the vaccine production facility of Bharat Immunologicals and Biologicals Corporation Ltd at Bulandshahr in Uttar Pradesh. This resulted in the development of oral polio vaccine by several companies. This eventually led to launch of Pulse Polio program and thankfully India is now, one of polio free countries.

Joint collaboration in Materials science has led to establishment of International Advanced Centre for Powder Metallurgy and New Materials (ARCI) set up at Hyderabad. This was the first Centre of Excellence established through the Indo-Russian cooperation 25 years ago. ARCI has grown from strength to strength and is now recognized as a premiere institute for development and transfer of materials related technologies. There are enormous examples of such collaborating efforts like development of streak cameras; high power lasers and their application, growth of BGO crystals with unprecedented perfection. Many programmes pertaining to photo-chemistry, laser spectroscopy and cluster dynamics etc. have been successfully completed under the Indo-Russian joint collaboration. Other completed projects include medical applications of lasers, such as, treatment of drug-resistant TB using phototherapy based on UV light, bio-stimulation and tissue modification, use of laser-based fluorescence technique for cancer diagnostic applications etc.

High Performance Computing was one of the major thrust areas for collaboration. A significant project under its purview pertains to the collaboration between the Centre for Development of Advanced Computing (C-DAC) and the Institute for Computer Aided Design (ICAD) of the Russian Academy of Science in the area of High Performance Computing (HPC).

Remotely Operated Unmanned Submersible (ROSUB) was also jointly developed by National Institute of Ocean Technology (NIOT), Chennai and Experimental Design Bureau of Oceanological Engineering (EDBOE), Russian Academy of Sciences (RAS), Moscow. Joint development of the unmanned submersible for deep sea operation required joint studies in the areas of Computational Fluid Dynamics, Modelling Monsoon Circulation, Transition and Turbulence Control; and Fatigue & Fracture Mechanics. Joint studies were also undertaken by Indian and Russian team in Lake Baikal for exploration of gas hydrates. With joint efforts during winter expedition in Lake Baikal gas hydrates from three cores were recovered in Malenki mud volcanic region.

Thus, there is tremendous potential for joint collaboration in frontier areas of Ocean Science & Technology such as Design and development of Manned Scientific Submersible; Gas Hydrate Exploration & energy Harvesting; machines and technologies for Deep Sea Mining etc. related to Blue Economy.

In the emerging technologies domains, both sides in 2020 and 2021, with the help of Russian Academy of Science (RAS), Russia India Network of Universities (RIN) and DST/CSIR/IIT/IISER institutes have conducted a series of scientific webinars in Data Analytics, AI, Nano-technology, New Materials, Advanced Manufacturing, Quantum Technologies, Interdisciplinary Cyber Physical Systems, Marine Bio-diversity & Blue economy, Waste to Wealth technologies and Disaster Management Technologies etc. Experts from both sides note that the input cost to R&D is low in India and Russia compared to the rest of advanced countries, therefore, India-Russia collective effort can jointly capture the emerging market with cost effective Science Technology and Innovation interventions.

Similarly, Polar Science could be another area of interest for joint collaboration where scientific research in Arctic/Antarctica is significant. Every year Russian scientists do visit Indian polar stations and similarly Indian scientists also visit Russian stations in Antarctica. Russian Ice breaker vessel helped Indian chartered vessel in Antarctica and India provided logistical help in providing Pistenbulley services to Russia for carrying containers from shelf to Russian station (near Maitri). Recently, India hosted International Conference on Antarctic Research (ICAR) in Bharati, Antarctica, wherein Russian scientists from Progress Station participated. Also, scientists of both National Centre for Polar and Ocean Research (NCPOR), Goa and Arctic and Antarctic Research Institute (AARI) St. Petersburg engage periodically and discuss possible collaborations between the two countries.

The Astrophysics area has also played an important role in bilateral collaboration in basic science because it was considered important and essential for the growth and development of technology and hence for the benefit of society. The projects undertaken covered a wide range of areas from Gamma Ray to Radio astronomy on the observational side to high-energy physics and Cosmology on the theoretical side. This has further widened cooperation as the projects in the areas of ground based optical and space based astronomy are the latest one.

A preliminary design of Light Transport Aircraft Project (LTA) SARAS-DUET is also a major outcome of joint collaboration.

Indian Council of Medical Research (ICMR) and Russian Foundation for Basic Research (RFBR) are also supporting joint research in specific areas of health research such as oncology, bio-informatics and bio-imaging, neurosciences, new generation vaccine research and research in HIV/AIDS.

Applied Research

With the aim to support Applied Research Department of Science & Technology (DST) & Department of Biotechnology (DBT) on Indian side and Russian Ministry of Science & Higher Education, have supported over 15

joint R&D projects in the areas such as Environmental Sciences, Energy (including renewable), Nano-science & Technology, Information & Communication Technologies and Biotechnology.

A new corporate level collaboration linkage for Technology Promotion with Skolkovo Foundation and other leading technology parks in Russia is also being promoted for Tech SME and Startup exchanges. This could be an effective mechanism for promoting two way transfer of technologies. This new initiative can leverage joint intellectual and financial resources to develop technologies that would provide the solutions for tomorrow.

Promotion of entrepreneurship, innovation and techno-commercial R&D

India has one of the largest startup ecosystems in the world, the number of unicorns is testimony to the tremendous talent the country possesses. S&T-led innovation and entrepreneurship are priorities of both countries. Efforts are being made by the two Governments to support joint development of technologies and innovations to facilitate formation of ventures, acceleration programs, grant support for innovations, localization of innovative industries of the two countries based on innovative clusters and technology parks of two countries. To facilitate implementation of such activities, Department of Science & Technology, Govt. of India and Ministry of Economic Development of the Russian Federation in 2019 signed a MoU for cooperation in the field of Innovation. Under this MoU Indo-Russian Bridge for Innovation program, aimed at organizing and conducting start-up forum on an annual basis, as well as the business missions of medium-sized high-tech companies will be supported.

With the aim to connect Indian and Russian Science & Technology (S&T) led SMEs and Start-ups for joint R&D for technology development and for cross-country technology adaptation, the Department of Science and Technology, Govt. of India and the Foundation for Assistance to Small Innovative Enterprises (FASIE) of the Russian Federation have launched the India-Russia Joint Technology Assessment and Accelerated Commercialization Programme.

Bilateral Youth Innovation Exchange Program

Based on the Hon. PM initiative and vision to bring together the young school children of India and Russia, towards inculcating a spirit of innovation and collaboration between young minds, Atal Innovation Mission (AIM) and SIRIUS, Russia have conducted 02 Deep Learning and Exchange programs in 2018 and 2019.

This has nurtured the bilateral relations through youth in the field of education and cultural exchange with Science and Technology as the prime driver to motivate the youth to collectively understand and solve the global challenges.

In 2020 due to pandemic restrictions, an online program was developed between AIM and SIRIUS, in coordination with the Embassy of India, Moscow. The motivation of these program is to cultivate Co-innovation for societal/economic impact and also introduce the richness and strengths of cultural similarities of both countries.

Drawing inspiration from India's Aatmanirbhar Bharat and Russia's Big Challenges, these programs were focused on developing technological solutions (web-based and mobile applications) to address the grassroots problems of the two countries. A two week *virtual educational learning, innovation and hackathon program was attended by 48 talented students aided by 16 educators and 16 mentors from India and Russia.*

The educational exchange program and innovation hackathon also helped the students' competencies on understanding 21st century technologies and developing innovative engineering and technological projects to meet the challenges of sustainable development. The Eight Program Focus Areas, namely, Linguistics: Embracing Cultural Talents of Russia and India; Distance Education: Statistical analysis of the difficulty of Olympiad tasks; Applied Cognitive Science: Development of web-platform for parallel neuro-imaging data processing; Health and well-being

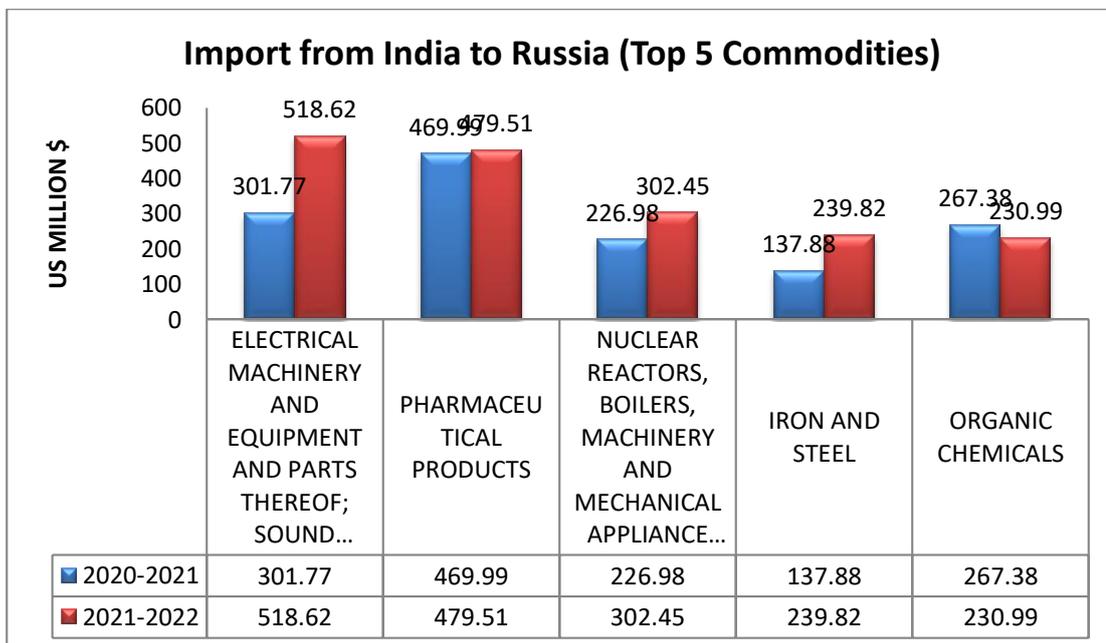
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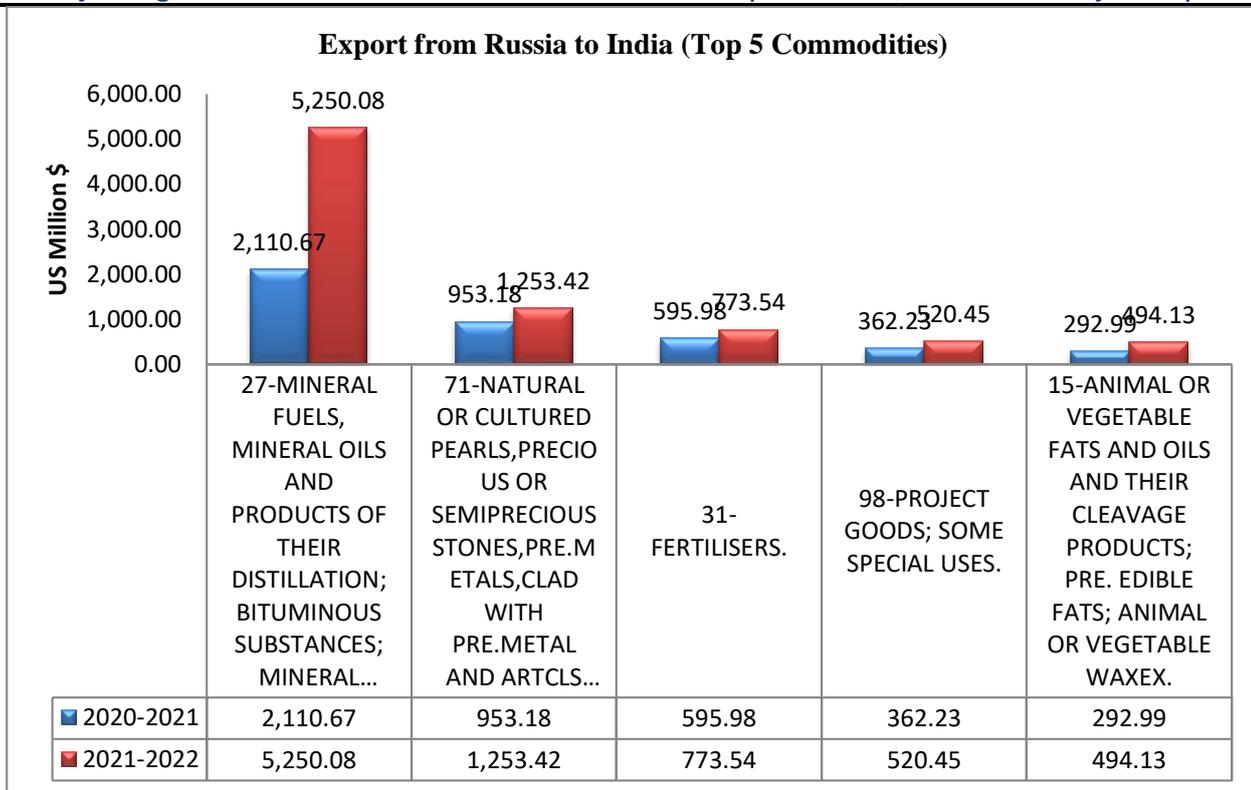
Multilateral Cooperation

India and Russia are active contributors to BRICS program. In addition of supporting joint R&D projects (with at least one partner from one more BRICS member country), there are active engagements at Young Scientists Conclaves and Youth Innovation events, in addition to Basic sciences cooperation. The latest BRICS R&D call was also focussed on combating the current pandemic, Covid-19. Joint projects are being formulated on developing new therapeutics (including vaccine), studying virology, applications of high computing and artificial intelligence against the COVID.

In addition to BRICS, two countries are actively supporting research engagements in SCO framework which includes all Central Asian countries within a broad circle around Russia, China and India. Young researchers are also provided special opportunities for interaction in addition to joint research projects. India has also taken over SCO Presidency in November 2020. Opportunities of Indian STI collaboration with CIS countries also has a great potential in near future.

G-20 is Group of 20 developed nations. Both India and Russia are members of this platform which acts as policy think tank. India will host the summit of this high-profile grouping in 2023 and India and Russia Bilateral, Multilateral STI strengths can also be leveraged to capture emerging technology markets with the help of G-20 nations.





The bilateral Science Technology Innovation cooperation between India and Russia spans across a wide range of scientific rainbow, including Realization of High Technologies; Basic Science, ICT, High Energy Physics, Renewal Energy; Biotechnology; Medical Sciences; Meteorology; Metrology, Standardization & Certification and Oceanology. The bilateral programme offers funding opportunities through many agencies from each side; and the funding portfolio covers basic, interdisciplinary, and translational, task oriented research and leads to a holistic environment to yield Innovation-led scientific development.

The India-Russia STI cooperation has a very bright and a vibrant future based on the principle of reciprocity. The statistical projection of rate of India’s growth invokes need for overwhelming demand of highly skilled resources to support flagship programme of Government of India like GIAN, Vajra, renewal energy, smart cities, supercomputing mission, digital India, infrastructure, cognitive science, future transport system, manufacturing of low cost medical devices, space exploration, data science, ocean and sea exploration, disaster management, etc. India has not only evolved as a market for merchandizing but has created successfully perfect eco-system to absorb skilled resources of the world. On the other hand, Russia has enormous skilled resources and has created perfect ground to generate skilled human resources and scientific know-how to fuel the demand of economic power of the world, and therefore both the countries have enough to offer to each other for a long-term basis. identified for potential areas of cooperation are agriculture and food science and technology, blue economy, marine industry, and ocean resources, chemical science & technology engineering sciences energy, water, climate, and natural resources, health and medical technology, life sciences, and biotechnology, ICT, applied mathematics and data science and technology, material science & technology; physics and astrophysics, polar research and quantum science and technologies 25.

CONCLUSION: It is believed that the relationship between these two nations will persist in sharing a good bond of harmony, welfare, and beneficiary. These pillars have continued to stand strong despite the straining times. This allows for a strong positive belief in Indo-Russia relations. Science and technology have always been a key focus of the India-Russia (and Indo-Soviet) bilateral partnership, besides political, trade and economic and military collaborations. Joint efforts have led to the creation of knowledge, products and facilities in hundreds of common

projects, industries and scientific laboratories. Russia could refurbish India's strategic assets, and it has a strong scientific and technological base that can be taken advantage of by India. With the support of both governments, there are good prospects to take S&T cooperation to a new level, ensuring not only global leadership in modern industries but also improving the quality of people's lives in both India and Russia.

References

1. *"Scientific and technical cooperation". The Embassy of the Russian Federation in the Republic of India (in Russian).*
2. Hans Morgenthau's Politics among Nation (Calcutta: Scientific Book Agency, 1995), p2.
3. Indian Science Diplomacy – A Forward Agenda 2 - Dr. Bhaskar Balakrishnan, Science Diplomacy Fellow, RIS and Former Ambassador of India • Promising Future for India-Russia STI Cooperation 3 - Dr. Abhishek Vaish, Former Science Counselor of India to Moscow
4. K.S GUPTA, Indias International Relation , vol.1 (Delhi: Atlantic Publishers & Distribute Pvt, Ltd. 1997) p.44.
5. Kapoor, N. (2019, October). India-Russia ties in a changing world order: In pursuit of a special
6. Karnad, B. (2018). Staggering forward: Narendra Modi and India's global ambition, Penguin.
7. Nirmala Joshi, "India and Russia: Enduring Partnership" India Quarterly Vol.111, No.314 July-Dec, 2002, p114.
8. Sergei Lavrov, "Russia and India Mutually Beneficial Cooperation and Strategic Partnership" International Affairs Vol.53, No.3 2007, pp24-29.
9. strategic partnership (ORF Occasional Paper No.12).
10. Tatiana Bokova, Intern of the Russian National Committee on BRICS Research – special for InfoBRICS

