Diaspora Scientists: Influencing Science and Technology Policies in Developing Countries

Suresh Babu Naidu Krishna*
Research Fellow, Durban University of Technology, Durban-4000, South Africa
Email: sureshk@dut.ac.za

Introduction

For decades, the migration of skilled professionals from developing nations to more advanced economies has been a critical topic of academic and policy discussions, often framed as a "brain drain."[1] While this concept dominated earlier narratives[2], the evolving global narrative now emphasises "brain circulation" where knowledge and talent flow bidirectionally, fostering innovation and development both in host and home countries.[3] The role of diasporas and their influence on national policies has been extensively studied.[4,5] Various geographical contexts, including China, India, and Russia, have investigated this subject in their regions.[6,7]

Diaspora scientists act as vital connectors, linking their countries of origin with the global scientific community. Their contributions extend beyond research to include strategic roles in shaping bilateral and multilateral relationships.[8] The historical and contemporary economic, social, and diplomatic ties between the Republic of India and the Republic of South Africa–two dynamic countries with rich histories and promising futures– highlight the transformative potential of such collaborations. These ties are further solidified through their active participation in forums like BRICS (Brazil, Russia, India, China, and South Africa). While diverse in their political and economic systems, these associations aim to promote equitable global development, with India and South Africa championing democratic governance and inclusive progress.

India's global reputation as a hub for scientific talent stems from its abundant pool of scientists, engineers, and researchers. Its institutes of higher learning and research have increasingly embraced international collaboration to foster innovation. Similarly, South Africa has emerged as a leader in leveraging physical research infrastructure to attract global partnerships. Landmark projects such as the Square Kilometer Array (SKA) and the Southern African Large Telescope (SALT) exemplify South Africa's commitment to world-class research and its ability to draw top-tier scientists.

The synergistic collaboration between India and South Africa underscores the broader role of diaspora scientists in shaping international science and technology policies. These professionals not only influence research agendas but also strengthen diplomatic and economic ties, fostering a more interconnected and resilient global scientific ecosystem.

* ORCID: 0000-0003-3155-8878

Success Stories: India-South Africa Collaborations in Science and Beyond

The partnership between South Africa and India is a testament to the power of bilateral cooperation across diverse fields. Since the restoration of diplomatic relations in 1993, the two nations have forged strong ties in areas such as politics, trade and investment, energy and minerals, information and communication technology (ICT), security, agriculture, arts and culture, sports and recreation, human resource development, and consular services. These collaborations highlight the depth and breadth of their relationship and underscore the role of diaspora scientists in driving impactful outcomes.

1. **Economic and Strategic Collaborations**
    - **Trade and Investment**: India is South Africa's second-largest trade partner in Asia, and South Africa is India's fifth-largest trading partner globally. Trade between the two countries has grown significantly, reaching over USD 10 billion, showcasing a robust economic partnership.[9]
    - **Strategic Partnerships**: The two nations actively collaborate on various fronts, including politics, trade, investment, minerals, energy, and technology. They also work together in multilateral organisations such as BRICS and the Indian Ocean Rim Association (IORA), focusing on sustainable development, technological innovation, and geopolitical stability.[10]
2. **Science, Technology, and Innovation**
    - **Research Investments:** South Africa's gross domestic expenditure on R&D (GERD) grew by 6.9% in 2021/22, from R25.965 billion in 2020/21 to R27.756 billion in 2021/22 (https://www.dsti.gov.za/). Applied research was the most prominent type, accounting for 48.1% (or R18.380 billion) of the total R&D activity in 2021/22. Basic research constituted 29.2% (R11.148 billion), while experimental development, the least common category, comprised 22.7% (R8.657 billion). Applied research dominated all sectors except higher education institutions, where fundamental research remained the primary focus.
    - **Industrial Leadership:** Leading scientific and technology research organisations like South Africa's Council for Scientific and Industrial Research (CSIR) have developed technologies that promote industrial growth and societal advancement, exemplifying the nation's commitment to innovation.
3. **Educational and Cultural Exchanges**
    - **Scholarship Programs**: Both countries have established scholarship programs to promote educational exchange. For example, the Indian Council for Cultural Relations (ICCR) offers scholarships to South African students studying in India, fostering mutual understanding and collaboration.[11]
    - **Diaspora Contributions**: Indian-origin scientists in South Africa have fostered research collaborations, bringing expertise from India's globally renowned institutions into South Africa's research ecosystem.
4. **Historical and Multilateral Connections**
    - **Legacy of Gandhi and Mandela**: The shared legacies of Mahatma Gandhi and Nelson Mandela forged a deep bond between India and South Africa. Gandhi's formative political activism in South Africa laid the groundwork for his leadership in India, while India's diplomatic and economic sanctions supported Mandela's anti-apartheid struggle.[11]
    - **BRICS Platform**: Both nations play key roles in BRICS, fostering cooperation on sustainable development, economic resilience, and innovation. This platform also enables collaborative opportunities for scientific and technological advancements.

Key areas of Scientific collaborations

Diaspora scientists play a pivotal role in bridging knowledge gaps and fostering collaboration between India and South Africa. Their contributions span multiple domains, including astronomy, biotechnology, nanotechnology, and chemistry. These professionals act as conduits for innovation, helping to align research priorities and transfer cutting-edge technologies across borders.

Both countries prioritise capacity building, particularly among youth, through joint initiatives in science and technology. These programs encourage collaboration in areas such as renewable energy, agriculture, health, and digital technologies while equipping young scientists with the skills and opportunities needed to tackle future challenges. These efforts also emphasise entrepreneurship, recognising its critical role in job creation and economic growth.

Conclusions

The science diaspora serves as a vital bridge between India and South Africa, fostering innovation and addressing shared challenges. By leveraging the expertise of their diaspora communities, these nations can advance their scientific and technological capabilities while strengthening bilateral ties. This collaboration not only benefits India and South Africa but also contributes to global progress, underscoring the transformative potential of science diplomacy.

The India-South Africa partnership exemplifies how science transcends borders to create shared solutions and inspire the next generation of global leaders. This dynamic relationship, enriched by the contributions of their science diasporas, highlights the power of collaboration in shaping a better future. By building on historical ties, both nations are crafting a modern narrative that underscores the significance of leveraging diaspora expertise to achieve mutual goals.

Recognising the predominantly youthful demographic of their populations, South Africa and India have also identified an urgent need to integrate their youth into the workforce. Entrepreneurship emerges as a crucial driver for job growth and economic resilience. With a shared interest in fostering grassroots innovations, the two countries are exploring new avenues to develop accessible, affordable, and readily available technical solutions that meet regional needs. Collaborative initiatives, such as joint calls for innovative projects, reflect this shared commitment to empowering young innovators and addressing pressing challenges through localised, creative approaches.

As both nations continue to invest in research, innovation, and capacity building, their relationship illustrates how the synergy of shared vision and collective effort can create opportunities for a more inclusive and sustainable future. The India-South Africa collaboration is a shining example of how leveraging the expertise of science diasporas and fostering innovation can transform societies and advance global progress.

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