International Day of Science, Technology and Innovation for the South

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Submission by the South Centre

1. Science and technology (S&T) play a transformative role in shaping modern societies, especially within developing countries where challenges such as poverty, limited infrastructure, and public health crises persist. While developed nations have leveraged the massive technological advancements that have taken place in the last decades to secure prosperity and resilience, many developing countries face structural barriers to innovation and knowledge production. This submission briefly explores some issues that may be relevant to consider on occasion of the International Day of Science, Technology and Innovation for the South.

Research and development (R&D)

2. Global R&D has nearly tripled since 2000 – from approximately USD 1 trillion in 2000 to over USD 2.75 trillion in 2023.[1] Developing countries' participation in global R&D has increased steadily in that period, from around 6% to 37%, especially due to the increase of China's contribution to R&D expenditures, which accounted for 26% of the total in 2023.[2] However, there is a major concentration of R&D expenditures, with the 10 largest R&D-funding countries accounting for around 85.0% of the global total.[3] The participation of low-income economies remains negligible, despite progress in certain individual countries. About 80% of countries invest less than 1% of their GDP in R&D.[4]

3. Much of innovation in the South takes the form of incremental improvements, indigenous adaptation, or "learning by doing " that does not register in conventional indicators such as patent filings.[5] However, it would be a mistake to read the undercounting of innovation in the Global South as proof that developing countries should be confined to incremental innovation. With the right policy mix – strong science and engineering education, mission-oriented public R&D, and calibrated use of intellectual property (IP) flexibilities, firms and research systems in developing

[1] WIPO, End of Year Edition – Against All Odds, Global R&D Has Grown Close to USD 3 Trillion in 2023. Available from https://www.wipo.int/web/global-innovation-index/w/blogs/2024/end-of-year-edition .
[2] Ibid.
[3] Congressional Research Service, Global Research and Development Expenditures: Fact Sheet. Updated September 14, 2022, p. 2.
[4] Kim, R. Investigating techonomy: the multilevel effect of R&D investment on economic performance. J Technol Transf (2025). Available from https://doi.org/10.1007/s10961-025-10265-z
[5] Nirmalya Syam and Viviana Munoz Tellez, *Innovation and Global Intellectual Property Regulatory Regimes: The Tension between Protection and Access*, Research Paper No.67 (The South Centre, Geneva, 2016). Available from https://www.southcentre.int/wp-content/uploads/2016/06/RP67_Innovation-and-Global-IP-Regulatory-Regimes_EN.pdf.

countries can move from imitation to original innovation – provided the international rules do not close off learning pathways too early.[6]

4. In fact, some developing countries have made significant progress in many areas, such as solar technologies, 5G, electric batteries, artificial intelligence, robotics, nano manufacturing, and many others. In Nigeria, engineers are building agricultural drones to help farmers monitor crops. Ethiopia and South Africa are developing domestic drone industries for surveillance and mapping. But much more needs to be done, especially to collectively improve the capacity of the Global South to use science and technology to address the multiple challenges they face.

Innovation & Technology transfer

5. Innovation may take place on the basis of indigenous R&D or the absorption of foreign technologies. Most developing countries are still dependent on the latter to modernize production or start new productive activities. Despite decades of commitment to technology transfer, the reality is that developing countries still face significant barriers that are not effectively addressed in multilateral fora. For instance, the WTO Working Group on Trade and Transfer of Technology has been more a space for general discussion without engaging in a concrete examination of how provisions in various WTO covered agreements can be improved to enable effective transfer of technology.[7] In climate change, despite the recognition in the United Nations Framework Convention on Climate Change (UNFCCC) and the Paris Agreement that technology transfer is essential, the experiences of many developing countries reveal how difficult it is to access the know-how, financing and institutional support needed to adapt and deploy technologies effectively.[8]

6. The recent negotiation of the Pandemic Agreement has confirmed once again the resistance of developed countries to make any commitment to transfer technology, even in cases of emergencies like a pandemic. Despite the demands from developing countries, the Agreement limits itself to address transfers on a voluntary basis, left to the discretion of the right holder and under 'mutually agreed terms'.

7. While the need for international cooperation and mechanisms to facilitate the transfer of technology has been stressed by developing countries in many UN processes for a long time, including the failed negotiation of an International Code on Transfer of Technology in the 1970s and for the establishment of a Technology Facilitation Mechanism under the 2030 Agenda

[6] Ibid.

[7] Nirmalya Syam, *Navigating the WTO's Working Group on Trade and Transfer of Technology: A Critical Analysis from the Perspective of Developing Countries*, Research Paper No.213 (South Centre, Geneva, 2024). Available from https://www.southcentre.int/research-paper-213-13-december-2024/.

[8] Nicolas M. Perrone, "Transfer of Technology and Climate Change: A developing country perspective", Climate Policy Brief No.28, South Centre, Geneva, 14 November 2022. Available from https://www.southcentre.int/wp-content/uploads/2022/11/CPB28_Technology-Transfer-and-Climate-Change_EN.pdf. See also, Martin Khor, *Climate Change, Technology and Intellectual Property Rights: Context and Recent Negotiations,* Research Paper No.45 (South Centre, Geneva, 2012). Available from https://www.southcentre.int/wp-content/uploads/2013/05/RP45_Climate-Change-Technology-and-IP_EN.pdf; United Nations Office for South-South Cooperation and the South Centre, "Climate Partnerships for a Sustainable Future: An initial overview of South-South Cooperation on climate change in the context of sustainable development and efforts to eradicate poverty", 2017. Available from https://www.southcentre.int/wp-content/uploads/2017/12/Report-on-Climate-Partnerships-for-a-Sustainable-Future-Nov-2017_EN.pdf.

(paragraph 70), to mention a few, the reality is that technologies are kept as a precious asset by their holders in developed countries.

8. A persistent barrier is the international IP regime itself. The global expansion and strengthening of IP rights have not delivered the promised surge of innovation in developing countries; instead, they have tightened exclusivities, delayed diffusion and narrowed policy space to use flexibilities that nurture domestic capability-building.[9] Weak patent examination standards and legal "fictions" facilitate evergreening, inflating portfolios that can choke follow-on research, local manufacturing and learning. The South Centre has been providing technical assistance to developing countries to implement pro-competitive patent examination criteria to curb such practices, but the underlying point travels more broadly: if exclusivities are granted too readily, they can stymie technology transfer, delay market entry of competitors, and suppress follow-on innovation.

9. The macro picture on the balance of payments underscores the current structural imbalances. Using World Bank data on "charges for the use of intellectual property", a South Centre report finds persistent and net outflows from developing countries – hard currency spent to rent knowledge rather than build it – underscoring how the current IP regime diverts resources that could otherwise finance domestic R&D and innovation ecosystems.[10] Complementary work of the South Centre on taxation shows just how large these royalty streams are for many Southern economies, reinforcing the point that the financial architecture surrounding IP can entrench dependence unless counterbalanced by industrial policy, fiscal tools, and cooperation for genuine technology transfer.[11]

10. This scenario is compounded by the restrictions imposed on the export of advanced technologies grounded on a broad and vague concept of 'national security', as well as by the implementation of screening mechanisms for foreign direct investment applied with the aim of preventing the transfer of technologies to foreign investors.[12]

A vision for the South

11. Science, technology, research and innovation (STRI) are central pillars of sustainable development, for meeting the Sustainable Development Goals (SDG), and for ensuring that developing countries are not perpetual bystanders but active shapers of global scientific and technological progress. On the International Day of Science, Technology and Innovation for the

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[9] Carlos M. Correa, *Innovation and the Global Expansion of Intellectual Property Rights: Unfulfilled Promises,* Research Paper No.70 (South Centre, Geneva, 2016). Available from https://www.southcentre.int/wp-content/uploads/2016/08/RP70_Innovation-and-IP-Unfulfilled-Promises_EN-1.pdf.

[10] The South Centre, "Direct Monetary Costs of Intellectual Property for Developing Countries: A Changing Balance for TRIPS?", 2 March 2022. Available from https://www.southcentre.int/wp-content/uploads/2022/03/SC-Report-DIRECT-MONETARY-COSTS-OF-INTELLECTUAL-PROPERTY-FOR-DEVELOPING-COUNTRIES-FINAL.pdf.

[11] Abdul Muheet Chowdhary and Sebastien Babou Diasso, "Taxation of Computer Software: Need for Clear Guidance in the UN Model Tax Convention", Tax Cooperation Policy brief No.31, South Centre, Geneva, 25 March 2023. Available from https://www.southcentre.int/wp-content/uploads/2023/03/TCPB31_Taxation-of-Computer-Software-Need-for-Clear-Guidance-in-the-UN-Model-Tax-Convention_EN.pdf.

[12] See, Daniel Uribe, Foreign Direct Investment screening for "national security"or sustainable development: A blessing in disguise?, South Centre, Research Paper 205 30 Jul 2024. Available from https://www.southcentre.int/wp-content/uploads/2024/07/RP205_Foreign-Direct-Investment-Screening-for-'National-Security-or-Sustainable-Development_EN.pdf .

South, we reaffirm the importance of building inclusive, open and equitable systems of R&D, technology transfer and innovation, in line with the vision of Dr. Abdus Salam, 1979 Nobel Prize in Physics, and with the obligations and opportunities under international frameworks.

12. Dr. Abdus Salam, one of the most distinguished voices from the South on the role of science in development, championed the idea of an inclusive open science system – one in which knowledge is shared; where developing countries build a critical mass of highly qualified scientists and technologists; where strong science education systems ensure a continuous supply of skilled individuals; and where scientific solidarity transcends national boundaries to uplift those historically underprivileged. His warning that without embedding scientific technology and capacity in developing countries dependence will continue with associated political, economic and equity costs, remains relevant.[13]

13. South-South and Triangular Cooperation has already proven to be an important channel for technology transfer and innovation adapted to the needs of the recipient countries in many areas, such as agriculture, digital health and industrial development. It is critical to enhance the institutional capacity of the countries of the South to engage more actively in such cooperation both as providers and recipients. This is one of the most promising avenues to overcome the historical dependence on science and technology from the North.

14. The UN agencies and other international organizations must play a more decisive role in assisting developing countries to harness science, technology and innovation to address the structural barriers that delay or impede their development. The South Centre will be keen to contribute to a debate on how to make existing mechanisms more effective and on the room for new initiatives that could contribute to that end.

[13] Hameed Khan, Education, science and technology in developing countries: some thoughts and recollections, COMSATS, 2004. Available from https://comsats.org/Publications/Other_Docs/Education_Science_and_Technology_in_Developing_Countries_2004.pdf.