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INDIA AS A QUAD-LED BIOMANUFACTURING HUB

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‘The Quad countries do not collaborate enough in biotechnology; yet, today, the need for collaboration is urgent, especially in emerging technologies’ | Photo Credit: Getty Images/iStockphoto

In March 2021, the Quad (Australia, India, Japan, and the United States) set up a Critical and Emerging Technology Working Group to facilitate cooperation, monitor trends, and scout for opportunities related to developments in critical and emerging technologies, that included biotechnology. However, the potential for Quad cooperation in biotechnology remains insufficiently tapped. The establishment of a Quad-led biomanufacturing hub in India will give the necessary fillip to enhance this cooperation. (The writers have examined this proposal with researchers at the Australian National University.)

Biomanufacturing uses living systems, particularly microorganisms and cell cultures, to produce molecules and materials on a commercial scale. It has the potential to transform the global industrial system, with up to 60% of physical inputs to the global economy expected to be producible using this technology. Many countries, including the United States and China, recognise the need to optimise this ecosystem and have designed specific policies to shape their bio-economies.

India’s National Biotechnology Development Strategy also envisions the country as a “Global Biomanufacturing Hub” by 2025. While the strategy sets a target of $100 billion for the hub, it is important to recognise that India’s ambitions require external support, particularly through its Quad partners, to enable its initial development.

Specifically, the Quad should establish a biomanufacturing hub in India to benefit from the country’s economic potential and address supply-chain vulnerabilities. Quad nations have complementary strengths that can be leveraged to create this hub. The U.S. has significant funding capability, while all three (Japan, Australia and the U.S.) also possess advanced biotechnology innovation ecosystems and intellectual property. India has skilled manpower and the potential to provide affordable scale.

Indeed, India is the ideal choice to host the biomanufacturing hub thanks to its existing infrastructure, pharmaceutical manufacturing expertise, and the available workforce. According to the Australian Strategic Policy Institute, India is among the top performers in the field of biomanufacturing in both the quality of research output and in the share among research publications. India also has significant potential in low-cost biomanufacturing, particularly in the

production of enzymes, reagents, research materials, and equipment. According to at least one analysis, the cost of manufacturing in India is around 33% lower when compared to that in the U.S. However, India still requires significant capability and capacity uplifts to become a world leader.

India also aims to become a leading biomanufacturing hub with plans to increase fermentation capacity tenfold to 10 million litres in the next three to five years. China has also expressed its intention to capture this market, similar to how it dominated small-molecule active pharmaceutical ingredients (APIs). In fact, concerns about China's dominance in APIs pushed India to launch a production-linked incentive scheme that allocated $2 billion to the pharmaceutical sector to make biopharmaceuticals, APIs, key starting materials, and related products.

Such dependence in the biomanufacturing sector will be detrimental to both India and the Quad. The proposed hub can help facilitate technology transfer, connect investors, and establish a biomanufacturing fund that is administered through the Quad, to support India's efforts to reduce dependency on China.

To scale up the biomanufacturing sector, India needs to uplift its workforce quality. While there are many life science professionals in the country, they lack access to cutting-edge technology and training. To address this, permanent training facilities can be established in universities around the Quad hub, with experts from other Quad countries providing the training. Recent policy changes in India allow the establishment of foreign universities and can encourage scholar exchange programmes. Training should also focus on commercialising research and development, a common challenge for non-U.S. countries in the Quad.

To facilitate cross-Quad collaboration, the biomanufacturing hub can house all current bilateral government efforts and establish a research collaboration office for this purpose. The hub can also harmonise language, regulations, and data-sharing regarding biomanufacturing to secure supply chains for Quad nations and facilitate international collaboration. Such streamlining will boost collaboration efforts within the Quad and create opportunities for collaboration with nations outside the Quad as well.

The proposed hub in India can capitalise on the economic potential of the biomanufacturing industry and address existing and potential vulnerabilities in the global system. India can become a leading player in the field of biomanufacturing and help the Quad to compete in this key area.

Shambhavi Naik and Saurabh Todi are researchers at the Takshashila Institution

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