The Many Bright Spots on India's Innovation Horizon

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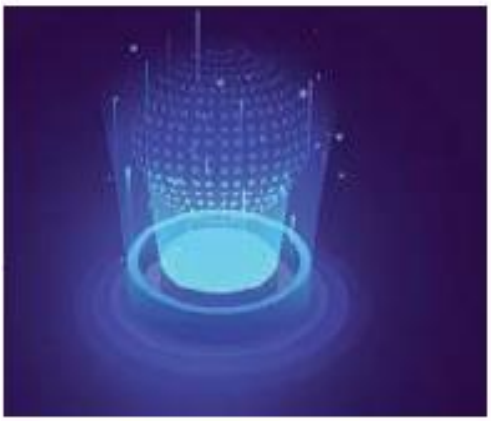
Recognizing the potential, the government is putting in place a framework of collaboration, facilitation and regulation



Innovation rearranges existing elements into permutations and combinations that benefit society. In his Brahmaphuta siddhanta, Brahmagupta's marvelous take on his innovation of zero was, "A debt minus zero is a debt. A fortune minus zero is a fortune. A debt subtracted from zero is a fortune. A fortune subtracted from zero is a debt. The product of zero multiplied by a debt or fortune is zero." The Indian innovation of zero fundamentally reordered history. The novel coronavirus pandemic provides an opportunity for similar reordering for posterity.

REALISTIC POTENTIAL

India is a fertile ground to be a technologyled innovation garage. It is the fastest growing country in terms of Internet usage, with over 700 million users and the number projected to rise to 974 million by 2025. The JAM trinity (Jan Dhan, Aadhaar, Mobile) trinity has 404 million Jan Dhan bank accounts with 1.2 billion Aadhaar and 1.2 billion mobile subscribers. There is a potential to add over $957 billion to India's GDP by 2035 with artificial intelligence (AI), according to a recent report by Accenture.

Innovation in India is being structured around the triad of collaboration, facilitation and responsible regulation. It is advanced by cross disciplinary collaboration. In his famous essay, 'I Pencil', Leonard Read brings forward the wonder of collaboration between people cutting trees, mining graphite, working in factories, marketing, designing and managing, just to produce a single pencil.

Innovation is a recombinant and brings tangential benefits through products and services that may not even have been its initial purpose. The founders of Twitter had set out to make a platform for people to find podcasts; Instagram was first intended to be a sign in application; CRISPR, or the clustered regularly interspaced short palindromic

repeats, which is the transformative gene editing tool, was partly being researched for fixing problems in the yoghurt industry. It won this year's Nobel Prize in Chemistry. The realistic potential of technology for India resonates in the 'Amara law' named after Roy Amara, a Stanford computer scientist, who said that "People tend to overestimate the impact of a new technology in the short run, but to underestimate it in the long run."

October 2020 saw two disruptive events that were organised by the Government of India for collaborative knowledge creation. At the Vaishvik Bharatiya Vaigyanik (VAIBHAV) summit (https:// bit.ly/35aC3O8), which was inaugurated on October 2, more than 3,000 overseas Indian origin academicians and scientists from 55 countries, and about 10,000 Indians participated to ideate on innovative solutions to our challenges. The Prime Minister articulated this spirit of knowledge sharing while inaugurating the summit; he called it "a true sangam or confluence of great minds" where "we sit to form our long lasting association for empowering India and our planet". The concluding session has been planned on October 31. This has been concomitant to the Responsible AI for Social Empowerment (RAISE) 2020 summit (https://bit.ly/2IN0Dx4), which was from October 59. It was to charter a course to effectively use AI for social empowerment, inclusion, and transformation in key sectors such as health care, agriculture, finance, education and smart mobility.

STARTUP DISRUPTIONS

This focus on celebrating innovation has led to several startups disrupting the Indian market. The recent winners of the 'Digital India Aatma Nirbhar Bharat Innovate Challenge' (https://bit.ly/3jer2QV) Chingari with its video communication tools and Map My India with its elaborative maps, 'Logically', with its news delivery features are becoming household names. Furthermore, Setu, true to its name, is building a bridge to bring banks to people. It has built an application programming interface which allows customers to make small ticket payments without going to the bank. Yelo is offering neo-banking payment and money transfer services online for workers in the gig economy. Niramai (or Non-Invasive Risk Assessment with Machine Intelligence) uses an AI-based thermal imaging portable tool that carries out noninvasive breast cancer screening for women for early detection. This intervention is of great importance as an estimate suggests that one in two affected women in India die due to late detection. Qure.ai uses AI for healthcare diagnostics in rural India, tackling challenges such as tuberculosis and now COVID19. Gramophone offers pricing information from *mandis*, advice on soil and crop health and access to agricultural inputs via micro entrepreneurs to farmers in

Madhya Pradesh, aiding their operation efficiency. Vernacular.ai offers a voice based AI product that can understand up to 10 Indian languages and around 160 dialects. It is helping build virtual, smart, responsive and effective chat assistants suitable for diverse Indian consumers.

MANY INCENTIVES

Innovation needs risk capital in terms of resources and psychological security for researchers. It needs an environment where it is safe to fail. The government has been building a comprehensive framework to this end. It is incentivizing research and development with several schemes such as Innovation in Science Pursuit for Inspired Research (INSPIRE) scholarships, the Ramanujan Fellowship, the Knowledge Involvement in Research Advancement through Nurturing (KIRAN) scheme, Smart India Hackathons (SIH), Atal Innovation Mission (AIM), the Biotechnology Ignition Grant (BIG) scheme, setting up of the Future Skills PRIME (Programme for Reskilling/Upskilling of IT Manpower for Employability) capacity building platform and also the triad of Scheme for Transformational and Advanced Research in Sciences (STARS), Scheme for Promotion of Academic and Research Collaboration (SPARC) and Impactful Policy Research in Social Science (IMPRESS). The National Mission on Interdisciplinary Cyber Physical Systems aims to 'catalyse translational research across "Al, IoT or the Internet of Things, Machine Learning, Deep Learning, Big Data Analytics, Robotics, Quantum Computing, Data Science".

Furthermore, the government has been actively facilitating collaborative and light touch regulatory practices to promote innovation and incentivise risk taking. It has increasingly relied on collaboration, communication and creativity, taking the route of standard and principles adherence. The Reserve Bank of India, Securities and Exchange Board of India (SEBI) and the Insurance Regulatory and Development Authority of India allow for regulatory sandboxes for piloting new ideas. The Telecom Regulatory Authority of India (TRAI) has recently introduced recommendations for regulating cloud services in India, suggesting a light touch regulation in collaboration with industry, balancing commercial freedom and principles adherence.

A BETTER LIFE

Walter Isaacson once cited this: "Advances in science when put to practical use mean more jobs, higher wages, shorter hours, more abundant crops, more leisure for recreation, for study, for learning how to live without deadening drudgery which has been the burden of the common man for past ages." Innovation has the potential

to build a future where AI will transform education and health care, machine learning and block chain will make commerce robust and resilient, clean energy will drive our economy, gene drives would exterminate invasive and harmful species, gene editing would help us bring back extinct species and reinvigorate depleted ecosystems, quantum computing will raise our processing capability to resolve challenges which seem insurmountable and augmented, and virtual reality will optimistically change the way we interact with the physical world.

Steam engines made us understand thermodynamics, flights made us understand aerodynamics. There is 'indeed' merit in relentless focus on innovation as it essentially augments ease of living for citizens, dematerializing and democratizing products and services.

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