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NRDC: Aligning with Indian R&D Labs to Combat COVID-19

Startups *vs* COVID-19: The Role of Indian Innovation Ecosystem in Fighting the Pandemic

CSIR, DST, DBT, DRDO: A Glimpse of the Technological Solutions to Combat COVID-19

Startups *vs* COVID-19

Role of Indian Innovation Ecosystem In Fighting the Pandemic

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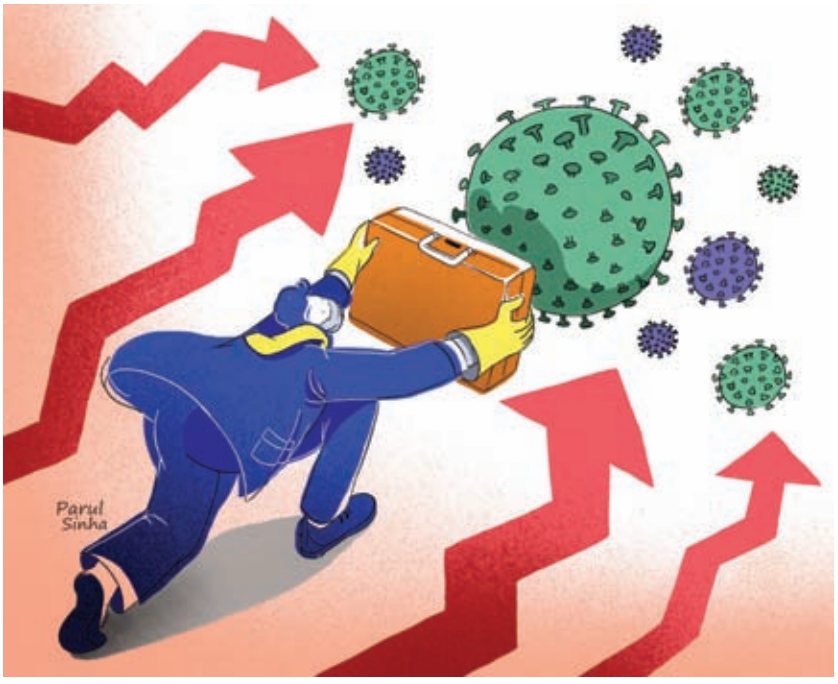
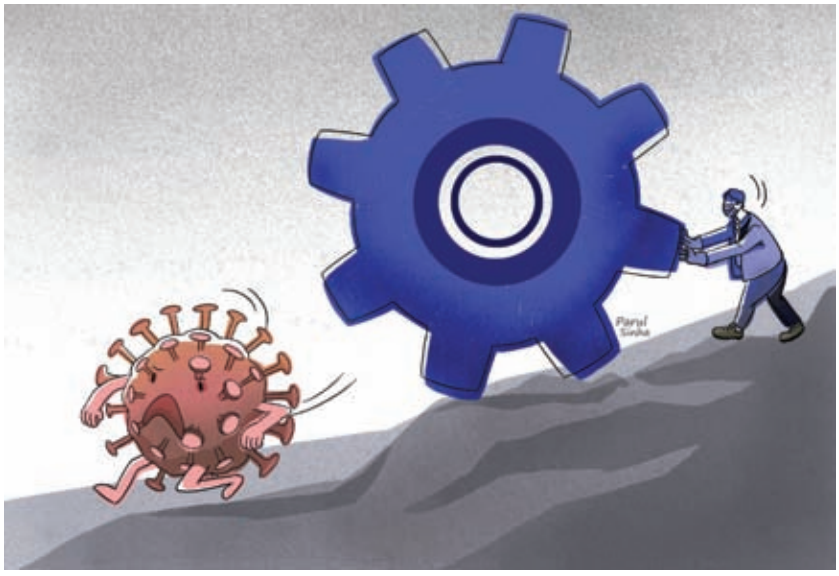
The COVID-19 crisis, which has descended upon the world with unimaginable swiftness, has quickly escalated and deeply disrupted lives, livelihoods, and economies everywhere. Its infectious spread has affected people from all walks of life in over 215 countries, accelerated by a complex interconnected world in which we all live, where the movement of people is essential to the economy of almost all countries. The COVID-19 pandemic has left countries gasping in search of immediate solutions, even as the best scientists and researchers in health and biotechnology in the world are diligently looking for a solution or a vaccine to end this crisis.

A crisis of this magnitude which is spreading rapidly requires urgent preventive, and curative solutions in several categories, ranging from high-quality, reliable masks, PPEs, and disinfectants to contact tracking, etc. There is an

The COVID-19 pandemic has left countries gasping in search of immediate solutions, even as the best scientists and researchers in health and biotechnology in the world are diligently looking for a solution or a vaccine to end this crisis. There is an urgent need to test, deploy, and evolve these solutions quickly over the next few months. Not only does this require significant innovation appetite, but it also requires incredible agility on the part of businesses and government institutions to effectively capture and eliminate the threat of COVID-19.





urgent need to test, deploy, and evolve these solutions quickly over the next few months. Not only does this require significant innovation appetite, but it also requires incredible agility on the part of businesses and government institutions to effectively capture and eliminate the threat of COVID-19.

Along with the fight against COVID-19 on the health front, India needs to keep its expansionary economic policy in 2020. However, the room for action is limited and further complicated by the COVID-19 outbreak.

In 2019, India implemented an expansionary economic policy to support the slowing economic growth. Consequently, the country's consolidated economic deficit, which includes Central and local governments' general public balances, and its fiscal deficit in 2020-21, may rise up to 6.2 per cent of the GDP from 3.5 per cent as a fallout of the COVID-19 pandemic, Fitch Solutions said. For 2020, India pledges to keep this expansionary economic policy. Moreover, the COVID-19 outbreak and its consequences pose a significant challenge to the economic stance.

In spite of the limited available opportunities, the Indian government would likely spend more on key projects as a counter-cyclical measure. Specifically, there are four priority areas. The first one is poverty alleviation projects. As much as 68.8 per cent of the Indian population lives on less than ₹150 a day. Over 30 per cent have less than ₹94 available per day: they are considered extremely poor. This makes the Indian subcontinent one of the poorest countries in the world; women and children, the weakest members of Indian society, suffer the most.

Against this background, India announced an economic stimulus package of ₹20 lakh crores to support economic activity in the production sector in a bid to ensure the supply of medicines and daily necessities. The effort is further targeted at encouraging enterprises and people to donate money and goods and at easing the tax and fee burden on industries that are heavily hit by the virus outbreak.

With the difficult task of protecting more than 1.3 billion people from the clutches of SARS-CoV-2, the Indian government is pursuing several initiatives simultaneously to ensure that this global pandemic does not cause ruin in a country with multiple challenges. Despite the diversity, it has the benefit of its innovative and emerging ecosystem with more than 250 incubators and more than 30,000 new active companies.

In fact, it is not surprising that the government wants to take advantage of its active system and one of the fastest-growing ecosystems in the world. For many reasons that go beyond the COVID-19 crisis, the ecosystem of startups is essential to the future of a nation and benefits from its demographic dividend.

In response to the COVID-19 pandemic, a Government of India Inter-Ministerial Working Group has been set up to identify promising startups that can offer innovative solutions to address the current crisis. The Atal Innovation Mission (AIM) and NITI Aayog are managing this initiative in partnership with Biotechnology Industry Research Assistance Council (BIRAC),

Department of Biotechnology (DBT); Department of Science and Technology (DST) — Government of India; Startup India; AGNIi; MyGov; and other relevant ministries, under the guidance and direction of senior government officials from Science, Technology and Health Ministries.

The Central Government-led COVID-19 Solutions Working Group, which comprises senior officials from the group of government experts, has been mandated to coordinate and find innovative solutions that can be implemented in the next three to six months. This is accompanied by the identification of diverse needs for startup support to help them test, deploy, and extend. Support needs range from access to testing, manufacturing, distribution and logistics, supply chain management, qualified and organisational human resources, and publishing. In addition, 11 government committees have been created to ease and facilitate the support needed by representatives of startups, state, and country in a variety of ways to implement specific solutions across India. This working group is also supported by industry bodies like CII, NASSCOM, UNDP, and TiE, which are committed to tackling COVID-19.

The challenges in India are huge. These include controlling the prevalence of COVID-19 in the cities with their share of densely-populated areas, a vast network of villages that lack adequate hospitals, medical or medical staff, and a migrant workforce that earns a daily wage. Consequently, the solutions required are innumerable by nature and must also be personalised according to local needs. Affordability, as well as high quality and accessibility, is a major challenge and a requirement in a country like India.

Some solutions received from applicants are as follows:

1. **Scitech Airon**: Scitech Airon is a negative-ion generator that helps control viruses, bacteria, and fungal infections through COVID-19 positive cases and suspects. It has been scientifically tested to reduce the viral load by 99.7 per cent in a room. The efficacy of the ion generator has also been observed in different types of pathogens like the influenza virus, Coxsackie virus, poliovirus, human coronavirus, a range of allergens, bacteria, and fungi. It could also be useful against floating viruses in the air on public transport, train stations, or airports, or especially within a confined space like a plane cabin, house, hospital ward, and so on. The Department of Science and Technology (DST), Government of India has released ₹1 crore to manufacture and scale-up the product, and 1,000 of them will soon be ready for installation in various hospitals in Maharashtra.

2. **WHIFF Bio Spray**: WHIFF Bio Spray by OMG Innovations LLP is a unique patented technology that has potent antimicrobial and antiviral properties. This property could be used to eliminate and neutralise disease-causing bio-agents in the air quickly, safely, and effectively. Whiff Bio Spray can prevent this spread through the air, both outdoor as well as indoor, and has been tested for drug-resistant pathogens at a NABL-certified lab. It has been successfully pilot-tested for efficacy on drug-resistant pathogens in a hospital environment at All India Institute of Medical Sciences, New Delhi.

3. **VapCare**: VapCare by Coeo Labs is an automated secretion management and oral hygiene system for ICU patients on mechanical ventilation. It provides a completely closed system for intelligent and accurate removal of saliva and secretions in a ventilated patient — without any risk of exposure of the nurse to these secretions. VAPCare also significantly reduces the nursing burden by automating a key nursing step in the management of ventilated patients, which will also be critical in the impending shortage of nursing staff with increased ICU admissions for COVID-19 patients.

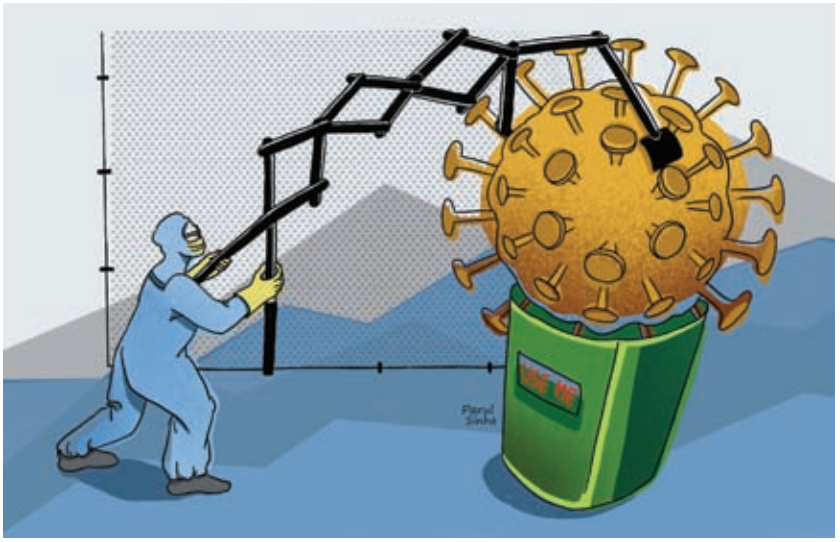
4. **Ozyn-D**: Ozyn-D by Rcupe Lifesciences is an indigenously developed, novel intraosseous (IO) device for pre-hospital and hospital critical care in resuscitation of patients. The manual device gains access to circulation through long bones in less than 10 seconds and infuses fluids and medications in comparable rates as that of IV. The device is usable by paramedics and nursing staff in resource-poor settings (typical of medical emergencies). It is sterile, single-use, disposable, and ready to use at the point of care without any preparation. This highly scalable device is usable in both adult and paediatric patients. The insertion site being away from the face protects the care provider from the risk of infection.

5. **Swachhta Picker**: Swachhta Picker by Sarjan Innovations Private Limited is a manually operated handheld equipment that helps to pick up all kinds of solid and semi-solid waste from a distance without a need to bend or physically touch the waste. It, therefore, eliminates the need for direct contact with waste and hence minimises many kinds of health and safety risks for the sanitation workers. In the context of COVID-19, it has a significant role to protect sanitation workers from the transmission of the disease through contaminated waste. In the current situation, sanitation workers are facing an onslaught of contaminated domestic garbage as millions of people stay home and throw a lot of contaminated masks, gloves, hand sanitizer bottles, used food packets, etc., along with the domestic waste. Direct exposure to this waste is likely to exponentially increase the risk of sanitation workers to get infected with COVID-19. The criticality lies in the fact that even if one frontline sanitation worker gets infected, the whole municipal system in an area may come to a halt, which would be disastrous. This is because most of the workers and staff will then have to be moved to isolation, and it can stir fear among the workers in other areas too. The second major threat is that many of our sanitation workers live in densely-populated areas or slums, and if anyone of them gets infected, COVID-19 will reach the Indian slums, which can have a catastrophic effect. The use of ***swachhta picker*** will add another barrier to such transmission by the physical distancing of waste from sanitation workers and would protect them from getting infected. Hence, proper equipment is necessary to save these bravehearts who are at the front for all of us. Moreover, the equipment is not just for SARS-CoV-2; it would be used in the long term to save the workers from a lot of other health and safety risks on account of their job. Transmission through waste could be another big challenge against the fight with COVID-19. A recent press release by the United Nations on 24 March 2020 has warned about the same. (https://www.unenvironment.org/news-and-stories/press-release/waste-management-

essential-public-service-fight-beat-covid-19)

6. **Net4Medix**: Net4Medix by Periwinkle Technologies Pvt. Ltd. is a cloud-based system with apps on Android, iOS and web for patients and their healthcare providers. It is a multi-specialty system intended to be used by doctors/caregivers to receive diagnostic data from the patients and provide related consultation even remotely. Primary Goal Pandemic Monitoring enables effective management of positive patients/suspect positive patients of COVID-19, and provides a pre-determined level of remote support to non-COVID-19 patients who need medical assistance.

7. **Jiyyo**: Jiyyo is also an AI-enabled Patient Care Coordination Platform (mobile/web) with a focus on telemedicine and networking features for doctor-doctor, patient-doctor, patient-chemist, hospital-referring doctor interactions. Jiyyo is collaborating with the local healthcare workforce (in Tier-II & Tier-III cities, and also in villages) to create a SMART network of thousands of HealthCare Access Points in rural India powered by its Artificial Intelligence Enabled Patient Care Coordination Platform. Built on top of the proprietary telehealth platform, the team has launched a Patient app as well to connect rural and urban patients with qualified doctors.



8. **Noctua M**: Noctua M by Detect Technologies is an effective solution to monitor large and dynamic crowds. Comprising a visual camera and a smart megaphone, it provides a live feed at the client's hand, which helps in the live monitoring of people. With the help of a smart megaphone, the client can access the speaker on the drone through the access given on the mobile phone with one tap on the call icon. While drone surveillance is live, alerts/messages can be passed on to the people under surveillance with the help of the smart megaphone. Noctua M solution can also be equipped with thermal cameras, which help in monitoring people at low-light conditions. Accessing the work areas from the desk in any day/night conditions to pass on the alerts is made easy with Noctua M.

9. **ReMeDi CORONA**: ReMeDi CORONA by Neurosynaptic Communications Pvt. Ltd. is a screening application for self-use by individuals. This application can be downloaded by any individual, and a risk assessment for infection can be obtained by filling up details like travel history, contact history, and symptoms. Further, this screening can be done by an individual often to check the updates in the risk assessment. High risk would prompt the individual to immediately visit a hospital. The location of the individual is also tagged with his/her consent. This kit includes a tablet and IR thermometer as well as a Rapid Test Kit (lateral flow assay) for COVID-19 suspects, and BP, SPO2 for other patients, who might need care but are not COVID-19 suspects. This is ideal for hospitals or NGOs to carry out screenings on a large scale. There is a bridge available for teleconsultation for non-COVID-19 patients who have been indicated as medium or low risk, as they may need consultation.

Continued on page 34...