

G20 and India: Decision Support System (DSS) for Pandemic COVID-19

By

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1. Background

On 31st December 2019, China reported a cluster of 27 pneumonia cases with common links to the Wuhan city, Hubei province. On 11th March 2020, COVID-19 (novel Coronavirus), a respiratory disease with serious public health risks, was [declared a pandemic](#) by the WHO. As of March 2020, more than 800,000 cases and 40,000 deaths have been [reported](#) in over 170 countries. G20 countries like India, the USA, China and EU member states have [declared full or partial lockdown](#) to control the spread of COVID-19.

Community spread (a situation where infected persons have been in contact with others who are subsequently infected) is a major concern of this disease. Initially, only those with travel history to China and other affected countries were infected. Exponential transmission happens when these carriers come in touch with the rest of the population. Elderly persons and people with health issues are more susceptible to the disease, although younger people are also affected.

Within the G20, even developed countries, with sophisticated healthcare systems, are struggling to cope with the scale, complexities and rapid spread of this disease. On March 26, 2020, the Director General of the WHO [requested](#) at the G20 Leaders' Summit to "*Fight, unite, ignite*" and "*to do whatever it takes to overcome the pandemic*". In response, the G20 committed to support and further strengthen WHO's mandate in coordinating the response and called for full funding of WHO's Strategic Preparedness and Response Plan. The [G20 Leaders' Statement](#) made fighting the pandemic a priority by stating that, "*We commit to take all necessary health measures and seek to ensure adequate financing to contain the pandemic and protect people, especially the most vulnerable. We will share timely and transparent information; exchange epidemiological and clinical data; share materials necessary for research and development; and strengthen health systems globally, including through supporting the full implementation of the WHO's International Health Regulations (IHR 2005).*" Prime Minister Narendra Modi, [highlighted](#) the need for reforming and empowering international organizations like the WHO to deal with pandemics like the Covid-19 so that it was effective in assisting countries and developing health protocols.

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Overall, there is a consensus among G20 countries on the need for timely sharing of data and information. In case of a pandemic like COVID-19, the effects are global, but efforts have to be made at the ground. Hence, it is best addressed at the local level through collaboration at the global level. Information about potential carriers, their infection status over 14-30 days, movement history, contact tracing, and enforcement of quarantine and isolation rules are real gaps in the public infrastructure that led to its spread and this needs to be bridged with urgency through a robust **Decision Support System (DSS)**, in which all G20 countries can work together. ***India can take a lead in this to develop a DSS framework, which addresses the issue at the local level and ensure greater collaboration and co-operation at G 20.***

2. COVID-19 and INDIA: Concerns and Strengths

India had taken initial measures to contain the spread of the virus by implementing measures such as screening at the airports, quarantining suspected cases, revoking visas, creating isolation centers and has also evacuating Indian citizens from acutely affected foreign countries (like China and Iran). India is [now](#) at the Second Stage of the outbreak (Local transmission) where infections spread by coming in contact with those who have a travel history to countries affected by coronavirus. Some cases of Stage 3 (Community transmission) are also emerging. March 25th, 2020 was an inflection point when the number of confirmed cases exceeded 500 and the Indian Prime Minister announced a 21 days lockdown period. Discussions with policymakers, healthcare experts and service providers confirmed that COVID-19 is a major concern for India in particular, because:

- India has one of the largest populations in the world.
- It has a quasi-federal governance structure in which states shoulder a key responsibility in healthcare.
- Significant part of high-quality healthcare is in the private sector .
- While government had announced universal health care through Ayushman Bharat there is no unique identity system of patients - the scheme is not linked to Aadhar Card.
- There are no longitudinal public patient health record / databases, only some private hospitals have it.
- Most of the primary healthcare centers are not computerized and the system of data acquisition, dissemination and storage is manual and thus slow and inadequate.
- Most of the technology solutions implemented are quick fix solutions like creating dashboard rather than a detailed process of data capturing, analysis and building a DSS, which can be used in the future.
- There are shortages of medicine, protective equipment, infrastructure for treatment and trained manpower.
- India has strong prevalence of traditional medical practices like Ayurveda.

- India’s Epidemic Disease Act (1897) is outdated, and the National Disaster Management Act 2005 does not adequately cover pandemics like COVID-19.

In spite of these concerns, India has certain strengths, which includes high quality manpower in the healthcare sector and in information technology. India has already announced a universal health insurance and Niti Aayog in its [2019 paper](#) detailed out the need for a health stack – a proper and comprehensive method of data capturing and analysis. States like Kerala are already in the process of framing appropriate regulation to address pandemic incidents.

3. The Proposed DSS Framework

The objective of a robust and integrated DSS framework is to (a) provide early awareness, critical information and relevant actions to contain and manage the risk of COVID-19 type pandemics and similar emergencies (b) support Indian government in promotion of technology to address such pandemics (c) data-driven support for India’s position in forums like the G 20 and the SAARC (d) share our best practices in forums like G20 which will also help to bring in investment and aid into India.

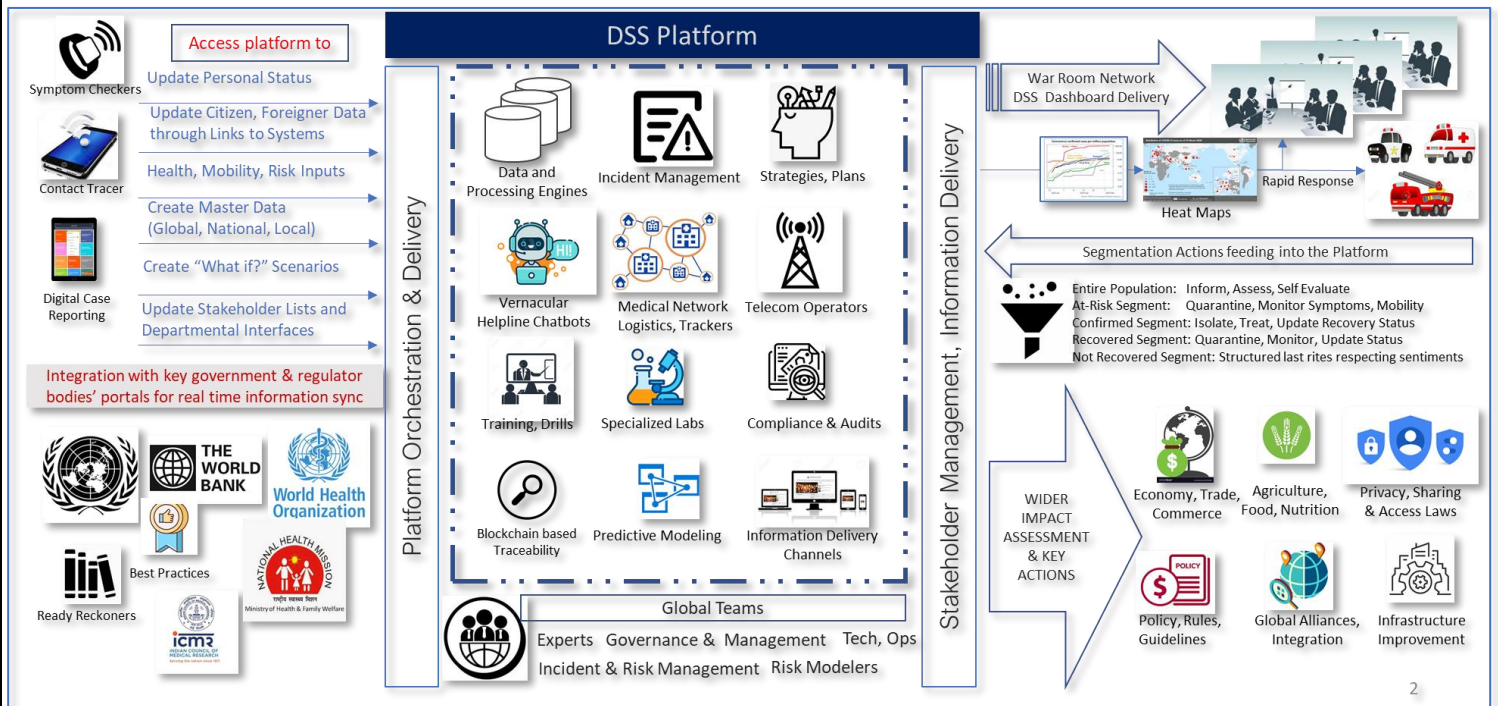


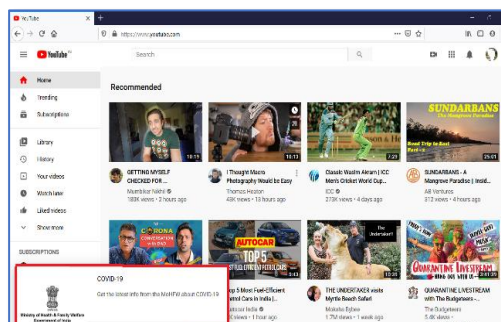
Figure 1 (above) presents a tentative layout of an indicative DSS platform and some of its key features/requirements are given below:

Key Requirements

1. **Data:** The requirement is to gather data that enable correlation of events, risks, information delivery and decision making. The broad-spectrum of data requirements are:
 - a. **Reference Data:** Reference data or Metadata are those that are factual in nature and updated occasionally when new facts are identified. Symptoms, thresholds (that define limits of tolerance), geo-fenced cartographic data (official data of maps, roads, location of hospitals and primary healthcare centers), emergency contact points, centers for disease control, laboratories, location of war rooms, listing of essential services, are some examples of such data.
 - b. **Resources and Logistical Data:** These are data that are continually updated and must be concurrent at any point in time. These include availability of doctors, nurses, specialists, medicines, ambulances, paramedic staff, alternative sources of logistics, movement of essential supplies, etc. They also include telecommunication data, individuals with smartphones, geo-tagged data for individuals and resources (for example, correlating ambulance staff to a driver).
 - c. **Risk Data:** The central government may receive risk information from multiple sources, like WHO, other countries, educational institutes, research institutes in India and abroad. This information must be shared with state/local governments.
 - d. **Geo-Tagged Individual Data:** This includes not only the data of citizens but also foreigners and their geo-tagged information on movement and contact with other persons. This will help build up a localized risk profile and predictive information on community contamination using mobile phone data.
 - e. **Data from External Systems:** This includes individual travel data, as well specifically requested data from third parties like service providers, app developers, etc.
2. **Regulations:** The government needs to be empowered with legislations/rules, which will help to contain the pandemic or other emergency situations. For example, the ability to push situation-focused apps into smartphones that enable the government to send out alerts, receive alerts when individual moves out of geo-fenced locations, conduct self-checks (for example monitor pulse rates), find nearest hospital in case of being potentially at-risk of infection, manage compliance, push information about lock-down levels local to the individual, etc. These apps can be removed from operation once the pandemic is given the all-clear. All the data may then be archived for future use into the DSS. This will entail revisiting the regulations to address such pandemic situation along with policies related to consumer privacy and data sharing.

3. **Digitization:** In order to achieve the high level of data driven DSS, there needs to be a high level of digitization of government, private and public-private partnership (PPP) infrastructure. For example, hospitals, associated doctors and staff, fields of expertise, local schools or building that can be used as potential isolation centers, etc., have to be in the DSS.
4. **Infrastructure:** There is a need for robust and large ICT infrastructure to ensure that data is organized and stored in the desired way; applications and micro-services are deployed as per agreed architecture and design; and it supports large-scale modelling.

Figure 2



There is also a need to have multi-channel information dissemination capability, across devices and services. For example, for the COVID-19 pandemic, WHO have provided the latest information through a pop-up in YouTube – this is a non-traditional channel for information delivery and consumption by a segmented audience. In India, this is now used as a delivery channel by the Ministry of Health and Family Welfare.

There is a need for reliable and switchable audio, video, chat, virtual meetings and collaboration frameworks. The DSS should be linked to other government systems like procurement sites and financial systems to track allocated budgets and procured assets. These processes can be optimized as lessons are learnt from current pandemics.

When building the DSS frameworks, there are many non-functional requirements like the need for data security, integrity and authenticity, especially for reference data / metadata. This can be achieved through technologies like Blockchain drawing upon the [India Strategy](#) developed by the Niti Aayog. There are other requirements like role-based access control, performance, dedicated high-speed data links, remote access and authentication.

5. Incident Management - Provisioning of Distributed and Scalable Capability:

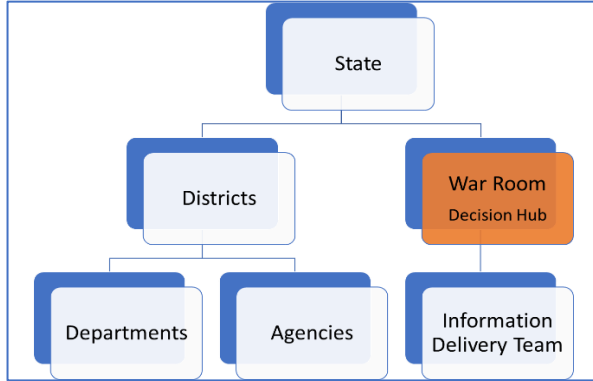


Figure 3: Multi-Dimensional DSS Information requirements

Emergencies and pandemics can originate and spread from any possible location. As a result, rapid response teams need to be distributed so that they can be sourced from any location to their target destination, using infrastructure under DSS Framework. For the central / state / local governments dealing with the pandemic or emergency, the starting point is to create a War Room, which is the single point and hub of decision making.

This **War Room** consists of an “Incident Management (IM) Team”, including both government and private players / participants. This is a team of experts trained to execute incident management processes to achieve closure in the fastest possible time. The team should have ready access to contact points, logistics information and ability to request any information quickly to ensure containment and closure of the pandemic or emergency. Depending on the nature of the pandemic, local/state/district level war rooms may be linked to the national-level war rooms. The national level War Rooms can coordinate/collaborate to share information/success stories with similar War Rooms of other countries.

War rooms can be scaled down to ‘Control Rooms’ once the pandemic peaks and incident management operations are gradually shut down. Over a period, scaling down of deployed infrastructure, which can be re-purposed for other day-to-day operations – for example, the equipment in isolation centers can be deployed into primary healthcare centers, which will strengthen grass roots infrastructure and release pressure from urban healthcare systems.



Figure 4: Multi-dimensional data flow & Information Delivery

6. Information Delivery Model:

The DSS Framework is based on a highly data intensive model that drives compute intensive correlation analytics and predictive modelling. The critical requirement for any DSS is information. Multi-dimensional data flows, in both structured and unstructured formats are key in making decisions, refining the models and delivering success.

7. **Regulations, Audits and Compliance:** In a sensitive sector like health, there will be concerns of data sharing/localisation, misuse, patient's privacy, policy implementation, protocol adherence and compliance. Therefore, appropriate regulations, audits and compliance processes are needed. The DSS framework should have some basic standards and processes of access control, secured data input and audited data retrieval to ensure protection of highly sensitive data, the integrity and sanctity of data sources, change management and governance.
8. **Information Exchange:** The ability to share real-time information with identified stakeholders should be one of the main features of the DSS Framework. It should not only have the ability to share real time information but also generate alerts, soft communication, etc.

4. Conclusion

To conclude, this DSS framework can be further fine-tuned by conducting in-depth research on initiatives taken by India and other G20 countries and their research and academic organisations. At the G20 level, the model platform may have some common minimum standards, process, and guidelines, which helps countries to replicate it based on their own needs and priorities. The benefit of such collaborative initiative is to have the ability to efficiently manage risks and incidents using common minimum standards, information, processes and guidelines, bring together relevant government departments, international organizations, and other stakeholders, showcase India's initiative in technology, regulation, healthcare and allied areas, and generate funds, needed at a time when the country's economy goes through a slowdown.