COVID-19 EPIDEMIC: A WORKPLACE READINESS INDICATOR

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18 May 2020

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Summary: India is going through a tough phase of the global health scare COVID-19 pandemic. The Government of India is considering all possible measures to keep a check on the spread of this disease in India. These measures include social distancing, isolation of those people suspected to be carriers of this contagious virus, and an appropriate period of lockdown.

The end of the lockdown does not automatically mean a return to the old "normal" and the opening will take different shapes, with different regions, and different business sectors opening up in different ways and at differing speeds. The virus still lurks and the ability to contain its spread will dictate what happens next; any resurgence will likely bring about renewed restrictions.

Organisations will need to take a holistic approach to restarting their activities. Emerging from the lockdown, organisations and workplaces will need to be ever more vigilant about the health of their most valuable resource, employees, and improve their standards on safety. They will need to bring in improved products and services that adhere to rigorous health and safety conditions, and should be able to show or explain them to their employees, customers and authorities.

The **COVID-19 Readiness Indicator** is a software that we have designed which will enable organisations to understand their current level of preparedness and key risk areas. It also helps in planning and in establishing pandemic-specific policies, procedures, and necessary management practices. From a pandemic planning perspective, organisations could pay closer attention to the geographical concentration of critical activities and functions, and their segmentation for work transfer to alternate locations, sites and shifts. Organisations could create requisite capabilities, practice relevant standard operating procedures and conduct pandemic safety training of employees to enhance employee and organisational preparedness to respond effectively to COVID-19 pandemic.

To help organisations navigate this difficult environment, the COVID 19 Readiness Indicator not only provides a readiness score but also provides suggestions on measures that could help organisations improve safety and readiness, and relaunch economic activities in a safe and compliant manner.

Introduction

In order to contain the spread of COVID-19, the Government of India announced a national lockdown beginning 25 March 2020. This was extended first until 03 May 2020, then 17 May 2020, and then 31 May 2020. With each extension, several relaxations were allowed and certain activities were permitted to take place in order to mitigate hardship to the public. While there were many decisions that the local authorities could make, and these could be based on the local circumstances, the broad decisions on the list of allowable activities were largely centralised. The purpose of this document is to highlight a soft-touch, decentralised, and adaptive mechanism that transfers the decision making power into the hands of the stake holders, yet provides an ability to bring in stricter restrictions in the event of a resurgence.

Lockdown restricts *all* activities assuming that all activities have *equal epidemiological risk*. The COVID-19 virus spreads mostly via aerosol transmission in close proximity or via fomite transmission. In light of this, many activities with low epidemiological risk can then continue to take place if suitable precautions are taken to break the virus transmission. These precautions could include social distancing, hygiene and sanitation, face covers, and significant reduction in inessential contact.

There is however an issue of information asymmetry. A social planner, like a local government authority in charge of decision making, while having the broader perspective of the epidemic state, the economy, and the associated public health and economic risks, is not often aware of the nature of the specific activities within an organisation and their associated epidemiological risks. Such information is most readily available only with the organisations themselves. On the other hand, organisations may make decisions based on their short-term business objectives without being aware of the consequences of their decisions on the state of the epidemic.

To remedy this information asymmetry, the social planner could ask organisations to send large amounts of data on their operations, and then suggest restrictions and allowed activities. This is generally not feasible.

We propose a **soft-touch** approach that could help us in the emergence from the lockdown. It keeps the best interests of the organisations in mind while balancing the broader social objectives of public health and livelihoods.

Our approach is as follows. The social planner, taking the broad epidemic factors and social objectives into account, suggests a simple *readiness threshold*. If agents and firms operate within this threshold, the epidemic could be better handled by the healthcare providers. Organisations then *respond* to this threshold by identifying their best mix (shifts, precautions, advisories to their employees, etc.) to meet their business objectives, so that they can continue to operate as long as they meet the readiness threshold.

There are several advantages to this approach.
1. Organisations are empowered to decide for themselves how best to maximise their productivity, given the advertised epidemic-readiness threshold. This will likely lead to greater acceptance and larger compliance among the stake holders.

2. The social planner has a means to respond to an emergency situation or a waning public health threat, by adaptively raising or lowering the threshold readiness level.

In order to enable this soft-touch approach, one needs a readiness indicator tool. We next describe the various components of our readiness indicator tool.
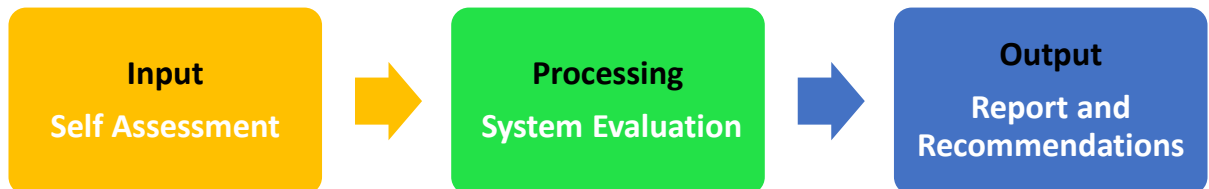
Process flow

Figure 1 Process flow for the readiness indication

The process flow is described in Figure 1 and involves three steps.

1. Self-assessment – organisations enter relevant information about their workplace into the readiness indication tool.
2. System evaluation – responses are evaluated, an index is calculated, and specific recommendations are generated.
3. Report and recommendation – the organisation's readiness scores under various sub-headings are displayed. Specific and general recommendations help the organisation understand their preparedness to the COVID-19 pandemic.

The Self-assessment Questionnaire

Identification of the right mix requires a calculator that will take as inputs the various attributes of operations at the organisation and an assessment of their epidemiological risk. This is not an easy task and requires some understanding of the nature of the disease transmission and methods that could be employed to reduce the transmission risk.

We have developed a detailed questionnaire that organisations can fill up to see their readiness. Information on the following could be entered.

1. Nature of the organisation (IT, IT-enabled services, software park, BPO, manufacturing, garment manufacturing, bank/financial, government office, etc.)
2. Infrastructure
3. Employees (age-distribution, shifts, work-from-home policies)
4. Epidemic related precautions
5. Medical history and isolation room availability
6. Outreach, education, and training
7. Transport
8. Nature of employee interactions in the organisation
9. Canteen, pantry, or kitchen
10. Hygiene and sanitation

The purpose of this questionnaire is not to collect information about the organisations, but to help the organisations assess the readiness. Organisations enter their information and get the readiness indication as an output. If the score does not meet the readiness threshold set by the social planner, they could revise the inputs, e.g., reduce the shift size (which reduces the information spreading opportunities), increase the number of shifts, place restrictions on areas with high footfall, take up more frequent cleaning and disinfection activities, etc.

Evaluation of readiness

There are ten specific readiness indices, each with a maximum score of 100. These include:

1. Infrastructure
2. Epidemic related: precautions
3. Epidemic related: awareness and readiness
4. Epidemic related: advertisement and outreach
5. Transport
6. Employee interactions: mobility
7. Employee interactions: meetings
8. Employee interactions: outside contacts
9. Canteen/pantry
10. Hygiene and sanitation.

Some of these are weighted combinations of various precautions and awareness actions taken by firms. Others are roughly proportional to the doubling rate of a hypothetical infection, if contacts were to take place at rates deduced from the input data. As an example, we highlight one computation from input data.

Cafeteria/pantry: We now indicate how a component index that relates to cafeteria/pantry readiness is computed. The basic idea is that each person has a personal space-time that should not be infringed if infection spread is to be kept under check. The number of overlaps in this space-time block is then proportional to the contact rate. The specific calculation for this example goes as follows.

- Each employee needs a circular area of 3 feet radius personal space, which results in $A_p = 28$ sq.ft of personal space, and spends $T_l = 30$ minutes at lunch.
- If N_s employees have lunch in a shift, we then need a total of $N_s A_p T_l$ sq.ft.-minutes (space-time units) in the cafeteria during the lunch time.
- If the canteen seating area is A (in sq.ft.) and the canteen is open for a duration of $T = 60$ minutes for lunch, we have only AT sq.ft.-minutes space-time units available for all the employees in the shift.
- So an employee eating lunch will overlap with $(N_s A_p T_l)/(AT)$ individuals, on the average.
- The contact rate for a typical employee is then taken to be proportional to $(N_s A_p T_l)/(AT)$. The doubling time of a hypothetical infection (with a very small curing rate and assuming a large population of employees) is inversely proportional to this quantity.

- Larger the doubling time, better the score. The score is therefore taken to be proportional to the quantity: $AT/(N_s A_p T_l)$.
- Similar calculations account for breakfast, snacks, and lunches brought from home but eaten at a common time in a common seating area. All these scores are then added up.
- Discounts are provided to the contact rates for use of masks, number of cleaning occasions, etc. These reduce the expected number of infection spreading contact events.
- A suitable scaling factor and a saturation then turns the composite score into a reported score from 0 to the maximum value (100).

Infrastructure score, transportation score, mobility score (employee interactions), meetings' score (employee interactions), outside contacts score (employee interactions), hygiene and sanitation score, all follow the above "number of potential infection spreading contacts" based approach.

Epidemic related indices' calculations: The calculation of the three epidemic-related indicators are based on specific precautionary, awareness/readiness, and outreach related actions taken, as given in the questionnaire, and weights assigned to each of them.

Total: The overall readiness index is the sum of the ten individual readiness indices. A provision for showing the organisation's percentile with respect to other similar organisations is provided.

Report and recommendation

As mentioned earlier, the organisation's readiness scores under various sub-headings are displayed. Specific and general recommendations help the organisation understand their preparedness to the COVID-19 pandemic. Organisations also have the option of revising their inputs and recalculating the score, until the readiness threshold is met.

It is this flexibility to choose how to operate and maximise business objectives, subject to a constraints on the readiness threshold, which places decision making in the organisations' hands.

Summary

Organisations will need to take a holistic approach to restarting their activities. They must be ever more vigilant as they emerge from the lockdown, and must protect the health of their most valuable resource, employees. They will need to bring in improved products and services that adhere to rigorous health and safety conditions, and should be able to show or explain them to their employees, customers and authorities.

In this work, we described the **COVID-19 Readiness Indicator** tool that can enable organisations to understand their current level of preparedness and key risk areas. Our tool helps in planning and in establishing pandemic-specific policies, procedures, and necessary management practices. We believe this can be a key enabler that can help organisations relaunch their economic activities in a safe and compliant manner.

The tool can be accessed from:
https://covid.readiness.in
The software that we have developed is open-source and can be downloaded from github:
https://github.com/cni-iisc/workplace-readiness

Acknowledgements