

TECHNICAL REPORT ON

DEVELOPMENT OF ENVIRONMENTAL HEALTH ENGINEERING FACILITIES, EQUIPMENT, SENSORS AND PUBLIC HEALTH SYSTEMS FOR TACKLING COVID-19 PANDEMIC

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**ABSTRACT**

In January 2020 the World Health Organization (WHO) declared the outbreak of a new coronavirus

disease, COVID-19, to be a Public Health Emergency of International Concern. WHO stated that

there is a high risk of COVID-19 spreading to other countries around the world. In March 2020,

WHO made the assessment that COVID-19 can be characterized as a pandemic.

WHO and public health authorities around the world are acting to contain the COVID-19 outbreak.

However, this time of crisis is generating stress throughout the population. The considerations

presented in this document have been developed by the WHO Department of Mental Health and

Substance Use as a series of messages that can be used in communications to support mental and

psychosocial well-being in different target groups during the outbreak.

* Our digital infrastructure needs strengthening to deal with the impact of COVID-19 and future public health crises;
* Better integration of Artificial Intelligence in to the public health response should be a priority;
* Analysis of big data relating to citizens' movement, disease transmission patters and health monitoring could be used to aid prevention measures.

In recent years, the world has witnessed the rise of SARS, Zika virus, Ebola and now COVID-19. Epidemics are a rising threat.

Cities across the world have made infrastructure innovation a priority to safeguard their physical systems so they can stay robust and antifragile during natural disasters such as earthquakes, tsunami and hurricanes. But pandemics have shown that these methods aren’t enough when it comes to ensuring connectivity and accessing our society during biological disasters. The primary challenge now, at the time of this crisis, is to integrate and streamline digital infrastructure at various stages of the public health response, particularly in the context of epidemic forecasting and decision-making. In the 17 years since SARS, a new age digital era has emerged; artificial Intelligence and the Internet of Things (IoT) could be instrumental in keeping this new virus within reasonable limits.

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**CHAPTER 1**

**Pressure on digital infrastructure**

Governments are now relying on ubiquitous instruments (sensors) and powerful algorithms instead of flesh-and-blood spooks. In the war against COVID-19, several governments have implemented these new surveillance tools.

Maps of the world show how the decrease in the transportation of people has drastically reduced carbon emissions across different countries, but what’s the case for emissions from digital technologies? Will the volume of people working from home or using digital devices in quarantine cause an increase in emissions from other sources? What is being done by the large cloud-providers to address the capacity issue?



Using big data to fight pandemics

**Predicting and modelling outbreaks**

In the ongoing covid-19 pandemic, we are witnessing three major occurrences across the globe:

1. Wider acceptance of online services;

2. A humongous requirement for internet services for conventional industries;

3. Boosted connectivity among diverse types of industries.

These three data streams provide important, real-time data about travel patterns that spread disease and longitudinal alterations in populations at risk, which until recently have been very difficult to quantify on schedules related to a fast-moving pandemic. With an exponential rise in mobility and growing global connectivity, this information will be critical to planning surveillance and containment strategies.

Some researchers and private entities along with their respective state governments are developing a digital platform, [HealthMap](https://healthmap.org/en/), which visually represents the disease outbreaks according to location, time and the type of contagious virus, bacterial disease that is being carried while entering into the city.

Digital infrastructure plays a pivotal role in predicting and modelling outbreaks. Take AI-supported services for a lung CT scan: the AI is premeditated to quickly detect lesions of likely coronavirus pneumonia; to measure its volume, shape and density; and to compare changes of multiple lung lesions from the image. This provides a quantitative report to assist doctors in making fast judgements and thus helps expedite the health evaluation of patients.



How to create real-time epidemic situation awareness

 **Mapping citizens**

Governments across the globe are gradually developing the digital infrastructure and engineering capabilities to face the pandemic and alleviate the spread of COVID-19 through community-driven contact-tracing technologies. These enable citizens to react assertively and promptly to pandemic diseases with a set of digital tools to help spread timely and precise information to its citizens.

Many governments are encouraging private companies to develop innovative tools that make use of hundreds of millions of facial recognition cameras and people reporting their body temperature and medical condition. Through this authorities can quickly identify suspected coronavirus transporters and identify anyone with whom they have come into contact. An array of mobile apps warns citizens about their proximity to infected patients.

**Roadmap for a better future**

The virus has provided a new start for digital infrastructure development. Using the cloud, big data and AI applications creates room for industries to develop and build new business models that help citizens understand the severity of pandemic disease and ensure preventive measures.

# CHAPTER 2

# Rebuilding our Public Technology Infrastructure in Local Government

The public sector especially government has failed to keep up. Until recently, cities and states faced a host of legal and financial constraints when it came to engaging residents digitally in the way that businesses engage customers online.

But the COVID-19 pandemic and the social distancing efforts it requires are forcing the public sector to try to make some long-overdue changes as communities contend with crisis. Amid tragedy, some municipal and state governments are seizing an opportunity to make up for lost time andembrace digital tools for the deep-but-distant civic engagement this moment demands. Cities and states have been prototyping digital tools to reach their people at an unprecedented pace. As America and the world eventually recover, this new public, digital landscape can reinvent our public technology infrastructure and make permanent improvements in how we engage residents.

The radical notion of involving citizens directly in governance and decision-making allows governments to achieve higher levels of legitimacy, collaboration and transparency. When applied to the world of civic engagement, technology originally intended for workplaces and activism can foster make these efforts more inclusive and build a more participatory democracy.

What does this look like on the ground?

First, now is the time to make virtual civic engagement a part of the fabric of civic life in cities not just under lockdown, but always. Last week, the [City of Miami](https://twitter.com/Sarasti/status/1243295739670925316) held its first virtual commission meeting and introduced three new methods of public participation. In record time, the city turned around new technology to ensure that a diverse group of residents could participate and that the existing laws were met. Crisis brought creativity and broke logjams. Now Miami can offer a paradigm for making engagement more accessible that other cities can embrace.

And it’s not just government that is innovating when it comes to civic life in America. The website [Nextdoor](https://nextdoor.com/) has become a hub of resource sharing, and user activity has [doubled](https://www.nytimes.com/2020/03/25/style/nextdoor-neighbors-coronavirus.html) since COVID-19 hit the U.S. The neighborhood social networking app introduced [Help Maps and Groups](https://techcrunch.com/2020/03/19/nextdoor-adds-help-maps-and-groups-to-connect-neighbors-during-the-coronavirus-outbreak/) to enable people to help support one another during the outbreak. Recognizing its ability to connect individuals in a time of high-need service delivery, the website promptly added a feature that allows users to offer volunteer services, and enhanced its existing “groups” feature that lets users communicate about specific topics. As a result, the Help Map has connected community members with those who are high-risk, specifically the elderly and immune compromised and those willing to offer assistance.

Second, states need to loosen up their existing restrictions to ensure that online tools can take their place as a part of the engagement equation. As states impose bans on people congregating, state business must continue. The challenge is figuring out how to carry on under the circumstances. Here, too, necessity can be the mother of invention. California Gov. Gavin Newsom [loosened](https://www.heraldmailmedia.com/news/nation/public-meetings-and-social-distancing-it-s-complicated/article_e7b6a312-7e85-53b6-9a78-2e4a9e6a5934.html) restrictions in the state’s open government laws to enable California to “hold public meetings via teleconferencing and to make public meetings accessible telephonically or otherwise electronically to all members of the public.” New York’s Governor Cuomo [suspended](https://www.gothamgazette.com/state/9203-open-government-meetings-in-coronavirus-outbreak-new-york) parts of the state’s Open Meetings Law to enable government bodies to move from in-person to remote engagement.

As civic life migrates online whether temporarily or permanently that comes with an increased responsibility to bridge preexisting digital divides and reduce barriers to access and entry when it comes to technology. Otherwise we risk deepening existing power imbalances and further dividing people by wealth, race, age, zip code, or urban/rural as they experience different civic realities depending on their degree of access to technology. Recent reports suggest that far more Americans are lacking broadband connectivity. [Microsoft Research](https://www.zdnet.com/article/microsoft-fcc-massively-overstating-how-many-americans-have-broadband-access/) puts this number closer to 162 million Americans not using the internet at broadband level. [Broadband Now Research](https://broadbandnow.com/research/fcc-underestimates-unserved-by-50-percent) suggests that the number of Americans lacking broadband connectivity is closer to 42 million These numbers are a far cry from the 20 million usually reported by the FCC. Across states access varies widely. Rural populations are particularly vulnerable. According to recent [Pew Research](https://www.pewresearch.org/internet/fact-sheet/internet-broadband/) “acial minorities, older adults, rural residents, and those with lower levels of education and income are less likely to have broadband service at home.” And this can have serious impacts on civic engagement efforts newly focused on civic tech. For example, in New York, how can the city’s 59 [community boards](https://www1.nyc.gov/site/cau/community-boards/community-boards.page) continue their City Charter-mandated monthly meetings, especially in a population which skews older and less tech savvy? The State of [Tennessee, for example, has seen initiatives](https://twitter.com/JasonIsbell/status/1245083800167735298?s=20) to expand broadband access into rural areas falter. These efforts take on a new urgency now.

Answering these questions well can help us not only respond to the current crisis. But there will be a day after COVID-19. And these innovations can also build a better democracy for the future one that’s a digitally-connected, inclusive democracy, harkening back to some of the early visions of an open, democratized Internet.

Take for example initiatives to push for more participatory democracy, such as [participatory budgeting](https://www.participatorybudgeting.org/), where communities have decision-making power over a portion of public monies. In this process those under 18, non-citizens, and recently incarcerated people can participate in how a portion of the budget is allocated, even though they don’t have decision-making power in many other aspects of civic life. These initiatives, which have been integrated online and through SMS text-messaging tools, facilitate a voting process that mixes in person and online engagement and that occurs over several days and includes. This year participatory budgeting may not take place in communities because of COVID-19. But we can’t lose the momentum on these innovations to make our democracy more inclusive and responsive.

All of us have seen the dark side of the Internet over this last decade. From misinformation to demagoguery, it has damaged democracy and will continue to do so through new tools such as “deepfakes.” And of course digital engagement can’t fully take the place of physical protests, door-to-door canvassing, and attending council meetings face-to-face when we can safely do so once again. But this is not the moment to return to politics as usual, but rather to think creatively about how to invest in tech-centered public infrastructure to address these challenges head-on. That may give digital technology a chance to make more constructive contributions to democracy even as we contend with its downsides.

We are living in the midst of tragedy and uncertainty. But we should seize opportunities where we can to care for each other and rebuild for the future. Crisis response opens a window of time to invest in more vibrant and inclusive digital democracy improving broadband access across cities and rural communities; addressing digital literacy and training; and equipping public leaders in cities and states with the tools to ensure public meetings, notice and comment, and public engagement. If we succeed, we can ensure that, as societies bounce back, democratic governance wins people’s trust and moves forward into the future.

**CHAPTER 3**

**CONCLUSION**

##### The World Health Organization declared COVID-19 a pandemic on March 11, 20201, causing huge impact on people’s lives, families and communities.

As the international response continues to develop, we know that organisations are facing significant challenges and need to respond rapidly. PwC's [Global Crisis Centre](https://www.pwc.com/gx/en/issues/crisis-solutions.html) is working together with a range of organisations across industries to help them during this difficult time. Here’s how organisations, including those without direct exposure, can focus their efforts. Crisis management and response.

Existing business continuity plans may not be capable of handling the fast-moving and unknown variables of an outbreak like COVID-19.

What you can do now:

* Develop incident management and scenario plans that are specific to this crisis
* Focus on factually and effectively communicating to stakeholders
* Plan on how to meet government priorities in individual countries and minimise the risk of business disruptions