



TONY BLAIR
INSTITUTE
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CHANGE

Leveraging Tech in the Developing World – for Covid-19 and Beyond

EVA THORNE

Contents

Gaps in Technology Infrastructure	4
Tracking and Tracing the Spread of Covid-19	6
Remote Learning	8
Financial-Inclusion Services	11
Medical Supply Chain	12
Looking Over the Horizon to a Post-Pandemic World	14

For policymakers in developing countries, the Covid-19 pandemic presents an opportunity to accelerate digitisation. Public investment and policy changes are needed to drive the development of a robust technology ecosystem that is attractive to investors, that is supportive of local entrepreneurs and that delivers for citizens. Effective government matters, and leaders must understand and learn from their experience of leveraging technology during Covid-19. Furthermore, for foreign technology companies that see the enormous potential of these markets, it is important to understand the current state of play. This paper highlights some of the challenges and opportunities developing countries face in building effective tech ecosystems that will enable them to thrive beyond Covid-19 and into the future.

Gaps in Technology Infrastructure

Maximising the benefits of technology requires good infrastructure. First, there must be stable access to electricity. This is a binding constraint in many parts of Africa as well as in rural parts of the developing world. Second, critical digital infrastructure – including universal mobile internet access, faster connections and greater access to smartphone handsets capable of running more complex mobile apps – must be put in place.

Internet access has improved globally, but gaps remain. Within developing countries, mobile internet penetration is as follows: Europe/Central Asia (68 per cent); East Asia and the Pacific (56 per cent); Latin America and the Caribbean (53 per cent); Middle East and North Africa (40 per cent); South Asia (33 per cent) and sub-Saharan Africa (24 per cent). Africa has the lowest mobile internet penetration in the world, and it also accounts for 40 per cent of the global population not covered by a mobile broadband network.¹ The Middle East and North Africa have gained ground: The population not covered fell by more than half between 2014 and 2018 and is now just 11 per cent; still, despite 3G and 4G coverage, nearly half remain unconnected to the mobile internet.² (By contrast, mobile network connectivity in South Asia has doubled since 2014.) Despite overall gains in connectivity in the developing world, developing countries are still home to 90 per cent of those with mobile internet coverage but who do not use the internet and 97 per cent of those globally who live without mobile broadband coverage. Full coverage, including last-mile connectivity, is still a challenge globally, as is faster connectivity. The latter is critical for the more advanced apps required for digital education, health and agriculture.

In addition to electricity and internet access, establishing a secure, universal digital identity would be a key piece of technology infrastructure. Digital identity has the power to exponentially increase the effectiveness of any policy intervention and would be transformational for economic development, the public sector and adoption of technology, as it would lower the transaction costs for financial and mobile services, reduce leakage and facilitate linkages between governments and citizens. Finally, cybersecurity should be included as an operational imperative, given the increasing volume of sensitive, confidential, and private data that is generated, collected and stored.

The Covid-19 pandemic has highlighted the critical role that technology can play in slowing the spread of the virus by enabling social distancing and helping to minimise physical contact. Post-pandemic, the use of technology is unlikely to decline and instead will increase, even in developing countries. For the public digital infrastructure investments to be fully effective, digital literacy skills must be strengthened, not only for citizens but also for political leaders and civil servants charged with policy development and implementation. Such education must be continual to keep pace with rapidly changing technologies. Moreover, government coordination within and across policy areas is key to avoid duplication of efforts, such as apps that are piloted but are not fully scaled – a significant problem in many developing countries. The related and persistent challenge of lack of interoperability could also be addressed by improved coordination within government.

Despite these gaps there is reason to be optimistic. Many developing countries have embraced technology over the past decade and – in response to the pandemic – have adapted it to local conditions. Gains made in the areas of tracking and tracing, financial inclusion (especially digital payments), mobile education and medical supply chains in particular have paid off during the Covid-19 pandemic. Policymakers, international institutions and private-sector actors interested in supporting developing countries need to have a realistic understanding of the technology landscape if they are to make smart investments.

Tracking and Tracing the Spread of Covid-19

Tracking and tracing the spread of Covid-19 is key to containing the virus. There are centralised and decentralised versions of tracking and tracing apps, which are discussed at length in our briefing "[Contact-Tracing Apps: What the UK Government Should Do Next](#)". In developing countries, the Covid-19 tracing apps in use are overwhelmingly centralised and are often developed by governments. The more important point is that proximity-alert contact-tracing apps – as opposed to symptom trackers with no proximity detection – assume widespread ownership of modern smartphones enabled with Bluetooth and up-to-date operating systems. This is a reasonable assumption in developed countries but is often not the case in emerging markets. Different solutions are required in settings where Bluetooth-enabled smartphone use is more limited. Centiva Health, a Swiss digital health company, has developed an app called Covid-19 Module, which takes the realities of developing countries into consideration. The app tracks and traces confirmed cases and their contacts; it alerts users if they have been exposed to the virus and allows them to monitor their symptoms and inform their contacts.³ Because the app requires the user to share any captured data, it does not rely on Bluetooth-enabled smartphones and can therefore work in a variety of locations in developing countries. Its utility for governments is twofold: First, it provides information on locations where people were exposed to the virus; second, it allows them to make data-informed decisions about how to deploy resources to support health-care delivery.⁴

Often governments have not mandated the use of tracking and tracing apps, so data are limited. Over time, governments and users are learning and iterating together, thereby improving the functionality of these apps. African countries, for example, have learned from previous pandemics, such as Ebola, and are deploying software to help track Covid-19. Nigerian and German public-health institutions – along with a software company – developed the Surveillance Outbreak Response Management and Analysis System (SORMAS) during the West African Ebola outbreak in 2014 and 2015. SORMAS is a free, open-source mobile and web application that empowers health-care workers to inform hospitals about new instances of infectious diseases, as well as identify potential epidemic outbreaks and control responses.⁵ Critically, SORMAS offers offline functionality. Community health workers operating in rural areas without reliable internet access can input data through a mobile app, which automatically synchronises its data with a central database. Because the software is based on interoperable, open-source programming, it can be effectively used by software developers to advance public-health objectives, meeting the needs of national health systems. SORMAS is being used in Fiji, Ghana, Nigeria and Germany for both contact tracing and case management.

Other developing countries have developed tracking programmes for smartphones. For example, in Sri Lanka, the government's Ministry of Health, Nutrition and Indigenous Medicine, together with the Information and Communication Technology Agency (ICTA), launched MyHealth Sri Lanka, a mobile app for smartphones.⁶ Users record their location when they are using the app; if they become infected with Covid-19, they can share the stored location history information with government authorities to protect those with whom they have been in contact over the last two weeks. The app allows users to self-

register with the government's national disease surveillance system. Data are not transmitted to external systems without the user's consent.

The government of Jamaica formed a partnership with Amber Group Limited, a private-sector company, to create JamCovid19 App.⁷ The app has several features. First, it manages the process for overseas Jamaicans who travel back to the island. There is a tab for immigration and travel that allows the user to register for the government's strict screening programme upon re-entry. It includes all the steps, "from application to approval to completing the immigration and customs declaration."⁸ Second, JamCovid19 provides current statistics and data on the pandemic for both Jamaica and other countries. Third, it allows users to self-report and monitor their symptoms. Fourth, users can make appointments to be tested for Covid-19 if they show symptoms. Fifth, the app can be used to contact ambulance and police services. Finally, the app developers are addressing the growing challenge of the returnees who must be quarantined upon arrival through the use of bracelet tracking. The person would have to give permission to be tracked.

Sierra Leone – whose government the Tony Blair Institute is currently supporting – has also deployed technology to address the needs of those who have to be quarantined. Contacts linked to confirmed cases are confined for 14 days, either in their homes or in a central facility. During the period of quarantine, the government provides food support, psychosocial support and health checks. All contacts are tested on day 14 and only released when negative results are confirmed. The coordination of these services proved to be an early challenge for the response, with many contacts in quarantine complaining about inadequate or inconsistent services. To improve monitoring and service delivery, the government's Directorate of Science Technology and Innovation partnered with Dimagi (a social-impact technology organisation) to develop a mobile application that enables the response to track the services that are provided to contacts in quarantine on a daily basis. Decentralised monitoring officers use the quarantine compliance to record daily services to each home. The data are linked directly to the government's public-health surveillance database, DHIS2, which enables central oversight of service provision for those in quarantine as well as decentralised management of quarantine service provision. Data can be collected offline and synched using mobile internet data. Rapid response to any gaps in service not only builds confidence in the government but ensures greater compliance with quarantine protocols for contacts.

Remote Learning

The pandemic has caused most governments globally to close schools, either completely or partially. At one point, 85 per cent of the world's schools and 1.6 billion students were affected.⁹ UNESCO has outlined the dire consequences of school closures. Education is affected as a result of interrupted learning, parents who are not equipped to supervise remote learning, loss of academic skills and knowledge, teachers who are unclear about how to interact with their students and the increased likelihood that students will not return to school once they reopen. What's more, learning assessments and exam schedules are thrown off by closures. Social consequences include social isolation, which attendance in school combats, and increased risk of experiencing exploitation and violence. Economic costs include lost wages as parents may have to stay home to supervise out-of-school children. Health is also affected. Frontline health workers who have children may miss work, thereby putting strain on health-care facilities, and many children who receive food at school may be at risk of going hungry when schools are closed.¹⁰

Addressing the access gap for students is key to tackling these challenges, but shortcomings in technology infrastructure can make it difficult. As outlined above, internet connectivity is foundational. Moreover, for remote learning to take place, additional barriers must be addressed, such as mobile coverage and the cost of devices and data packages. Most people who log on to the internet via their telephones have small data bundles. One gigabit of data in sub-Saharan Africa, which is enough to stream a standard-definition film for one hour, costs nearly 40 per cent of the average monthly wage. Even where smartphone penetration is high, internet or electricity access may still be patchy. Tackling this challenge requires multilevel and cross-sector partnerships. Governments have been working collaboratively with the private sector to distribute distance-learning teaching and materials and with mobile networks to remove data charges when accessing online learning platforms. For example, the Egyptian government contracted with Edmodo, a private-sector online learning provider, to provide the country's primary- and secondary-school student population with remote instruction. In Jordan, private firm Mawdoo3 developed Darsak, an educational portal; the entire process was managed by the Ministry of Education and Ministry of Digital Economy and Entrepreneurship.¹¹

Supporting teachers to roll out learning materials online and centralise resources is also essential to tackling the remote-learning challenge. Wading through the wide range of educational materials, supporting the development of their digital skills, designing and planning for the most vulnerable students, and adapting online teaching are all critical for success. A review of the literature shows that adaptation is happening. In most developing countries, a mix of offline, SMS-enabled and online resources are being used.

Offline resources

Several education ministries have made good use of television and radio to connect students to learning. Angola, Botswana, Colombia, Haiti, Indonesia, Iraq, Libya, Mexico, Sri Lanka and Vietnam, among

others, have dedicated TV channels that broadcast lessons for primary- and secondary-school students. Radio has been used by countries such as Fiji, Mauritania, Sierra Leone and Uganda. The obvious benefit of television and radio is that they are widely available and do not require an internet connection. These are among the most accessible approaches for developing countries to deploy although, as the World Bank points out, there are things to consider, including issues such as: content development (live or pre-recorded broadcasts); which channels to use (government or private channels, rebroadcasting material to other channels/platforms); creating a programme schedule; and communications strategy. ¹² The government of Indonesia uses its public broadcasting television network, TVRI, to broadcast *Belajar dari Rumah* (Learning from Home). Indonesia's Ministry of Education organises it, and it reaches children from primary school to secondary school and is broadcast daily; it includes a programme to support parents. UNICEF is supporting the government to assess the programme's effectiveness through regular surveys of children, teachers, and parents, carried out via SMS to reach areas that lack internet access. The feedback gathered on home-learning activities is designed to provide the right kind of educational support. ¹³

Low-tech approaches

The binding constraints for many developing countries are connectivity and access to a smartphone, which enable data-heavy content to be accessed. For these reasons, solutions that work on simple handsets and 3G networks are more accessible to a larger swathe of the population. An initiative in Botswana between the government and its trusted partner, Young 1ove (an NGO that works on evidence-based health and education initiatives ¹⁴), offers a good example of how this approach works. After schools closed, Young 1ove quickly collected mobile telephone numbers for 10,000 students and used these to send text-message-based learning along with support lines to support students and parents. It is playing a key role in helping the government to ensure continuity of learning during the pandemic by creating strategies and identifying educational materials to facilitate national distance learning. Young 1ove is also working alongside the government to scale the initiative.

Online learning

Cambodia's Ministry of Education, Youth, and Sport collaborated with private-sector companies to develop an e-learning initiative to support students while schools are closed. Teachers pre-recorded lessons for grades 1 through 12 and made them available on YouTube, the ministry's Facebook page and an e-learning website. Ninety percent of the country's population has 3G mobile internet access and mobile broadband connections have a penetration rate of 92 per cent, which means that online learning is within reach of much of the population. ¹⁵ India has a wide range of digital remote-learning resources. Its Ministry of Human Resource Development has made available free digital e-learning platforms, while the government's DIKSHA portal houses "e-Learning content for students, teachers, and parents aligned to the curriculum, including video lessons, worksheets, textbooks and assessments." ¹⁶ Created by more than 250 teachers, the materials are available in several languages, and the app can be used

offline. The National Council of Educational Research and Training (NCERT), an autonomous government organisation, offers parents, students and educators an e-learning app, e-Pathshala, to serve grades 1 through 12 with videos, books, audio and other materials; multiple languages are available. Ninety per cent of the country has 3G coverage while 97 per cent has 4G coverage and 54.9 per cent of Indians own a mobile phone.¹⁷ According to market research firm techARC, *India* had 502.2 million *smartphone* users as of December 2019. Online learning is within reach for a significant portion of the population.

Financial-Inclusion Services

The highly infectious nature of Covid-19 has highlighted the importance of reducing interpersonal contact and raised the profile of digital financial services. Government payments and other forms of support, wages and financing can be distributed effectively and quickly and without in-person contact. These services are critical to helping poorer countries cope with the pandemic, especially for their hard-to-reach populations. In the developing world, there are 228 mobile money agents for every 100,000 adults but only 33 ATMs and 11 banks. Access to these means that these populations do not have to travel, stand in lines or interface with people, thereby reducing the risk of spreading the virus. ¹⁸

The financial-inclusion services sector is, arguably, the most developed tech sector in sub-Saharan Africa, building on the pioneering work of the mobile-phone-based money-transfer service m-Pesa. Several countries pivoted early to tweak these services to cope with Covid-19. For example, telecommunications operations in Ghana, Kenya, Rwanda and Zambia halted fees on smaller mobile money transactions in order to minimise the handling of cash; other payment platforms have done the same, making digital-payment services cheaper and safer. ¹⁹ Kenya's Safaricom also increased the daily transaction limit for small and medium-sized businesses. Saudi Arabia decreased mobile usage fees, while Malaysia expanded free mobile internet access; in two weeks, Ecuador doubled the number of licensed cash agents. ²⁰ The Kenyan government's treasury has earmarked USD\$100 million to provide cash transfers to orphans, the elderly and other vulnerable groups, while the West Africa Central Bank is incentivising the use of electronic payment tools by making P2P transfers free, and making it easier for people to open mobile money accounts. ²¹ The Tunisian government has made similar provisions for the elderly and those in the informal sector by giving one-time cash transfers through mobile payment systems. Five million impoverished families in Bangladesh are receiving government-provided support in the amount of USD\$30 per month, via the country's four mobile financial services. Emergency cash is being transmitted to banks and mobile money accounts in the same way by governments in Cambodia, Chile, Colombia, India and Peru. ²²

Medical Supply Chain

The Covid-19 pandemic has highlighted the importance of medical supply chains, which have experienced delays, interruptions and significant gaps, particularly for equipment such as ventilators, personal protective equipment (PPE) and medicines. These challenges have given rise to opportunities for innovation.

Usually drug companies have strong quality-compliance and recalls standards in place, but in certain instances rising demands for certain drugs may trigger an increase in low-quality drugs (because of mistakes in supply chains and production) and fake drugs (driven by outright fraud), further imperilling lives. The former occurs because of cost-cutting measures while the latter is due to scarcity and flourishes when desperate people purchase from the grey and black markets.²³ There is already evidence of fake drugs entering the market in developing countries, with regulatory authorities issuing warnings to consumers. Moreover, social distancing rules and interrupted global supply chains mean that critical inspections of pharmaceutical factories by regulatory authorities have decreased.

Innovators in developing countries are taking action to address this serious problem. For example, MedSaf, a Nigerian company, is a “[curated medication marketplace for African hospitals and pharmacies. [The company] is a one-stop shop solution that connects quality pharmaceutical manufacturers to health facilities using our Medsaf platform. It includes medication tracking, inventory management, access to credit facilities, and tech-enabled logistics service.”²⁴ Medsaf serves as an intermediary between producers and manufacturers, verifying both before listing their medications. The company also does the same with health facilities before allowing them to make purchases. As a result, the supply chain is protected and consumers are safer. Another player in this space – with a broader range of customers – is mPedigree, which was founded by a Ghanaian. The multi-award-winning company partners with a range of regulatory agencies and companies – including pharmaceuticals – through the use of its web and mobile technologies that protect products against counterfeiting, diversion and faking. It uses “a unique product identification marker that consumers use to determine authenticity. They simply scratch off the label and evaluate a code within seconds using a mobile phone camera or text message. A rich overlay of software tools and sensor technologies create full supply chain traceability and visibility, risk management, and predictive analytics.”²⁵ The company has also leveraged its technology to secure the value chains critical products such as soaps, antiseptics, and hand sanitisers to help citizens reduce the spread of the virus. mPedigree has expanded its footprint to a range of countries: Bangladesh, Egypt, Ghana, India, Kenya, The Netherlands, Nigeria, Pakistan, Rwanda, Sierra Leone, South Africa, Tanzania, Uganda and Zambia.

Kenya’s dynamic, vibrant tech sector has played a significant role in creating local approaches to stopping the spread of the virus. The Safe Hands Kenya initiative takes into consideration the reality that ongoing lockdown in a developing country with densely populated areas is not feasible. “Safe Hands Kenya (SHK), a mission-driven alliance of Kenyan organisations, has mobilised to rapidly manufacture and distribute free soap, hand-washing stations and masks to Kenyans, as well as to disinfect public spaces. [The organisation] ha[s] prioritised [its] activities for those most in need – in informal settlements, where

social distancing and other recommended approaches to curbing the spread of COVID-19 are nearly impossible asks. [SHK] simultaneously launched a massive consumer education campaign to drive behaviour change around adoption and maximise public health benefits. This is branded #TibaNiSisi ('We are the cure' in Kiswahili)."²⁶ Private-sector companies such as Unilever, PwC, Zipline and others are involved, and the initiative works closely with the government to support its emergency response. SHK works with local and international manufacturers to source inputs that can be made available at scale to supply vulnerable communities. The inputs are used by local manufacturers of hand-sanitiser, soap, face masks and surface disinfectant who meet increasing demand; repurposed manufacturing capacity contributes to protecting jobs.²⁷ Next, geospatial demand and distribution maps guide where the supplies go. SHK uses Internet of Things-enabled order and replenishment systems "of its alliance partners and their existing distribution centres and informal shop retail networks in communities across the country. The technology platforms of [their] partners enable [the organisation] to monitor the demand/supply situation in real time and act quickly to resolve bottlenecks and coverage gaps."²⁸ The "We Are the Cure" campaign is about educating Kenyans to use the products correctly. TBI is supporting the Kenyan government on its Covid-19 response.

Looking Over the Horizon to a Post-Pandemic World

There are numerous other ways in which developing countries have effectively used technology to cope with the Covid-19 pandemic beyond the examples highlighted in this paper. The effects of the virus in developing countries in Asia, Africa, Latin America and the Caribbean are different because these countries have fewer resources at their disposal to control it. Weaker health systems, densely populated settlements, and economies and financial systems that do not allow for extended lockdowns have forced governments, civil society and the private sector to creatively use technology, which will allow them to be better prepared for the next pandemic. Now is the time for the governments of these countries to view the pandemic as an opportunity to drive development by investing in whole-of-government approaches to digitally enabled, inclusive economic development that can take crisis-led deployment of technology and scale it into something strategic and comprehensive. A critical starting point is closing the digital divide through last-mile internet connectivity, greater affordability and use of mobile data and smartphones. Such investments will enable developing countries to take full advantage of the technology revolution.

Footnotes

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