McKinsey & Company

How technology is safeguarding health and livelihoods in Asia

Six technology-enabled interventions by Asian governments and businesses shaped the region's early response to COVID-19.

By Oliver Tonby, Jonathan Woetzel, Noshir Kaka, Wonsik Choi, Jeongmin Seong, Brant Carson, and Lily Ma

The COVID-19 infection caused by the new coronavirus SARS-CoV-2 that emerged in China has presented a global challenge. Unprecedented global flows of people in a highly interconnected world enabled the virus to spread rapidly to every continent except Antarctica. Fighting the virus has been a huge society-wide crisis-management task that, in Asia, has been enabled by deepening technological capabilities and innovation, most notably digital and mobile technologies.

At the time of writing in May 2020, a resurgence of COVID-19 infections in Asia remained a possibility. However, firm responses in countries such as China and South Korea appeared to have been effective, with the curve of cumulative confirmed
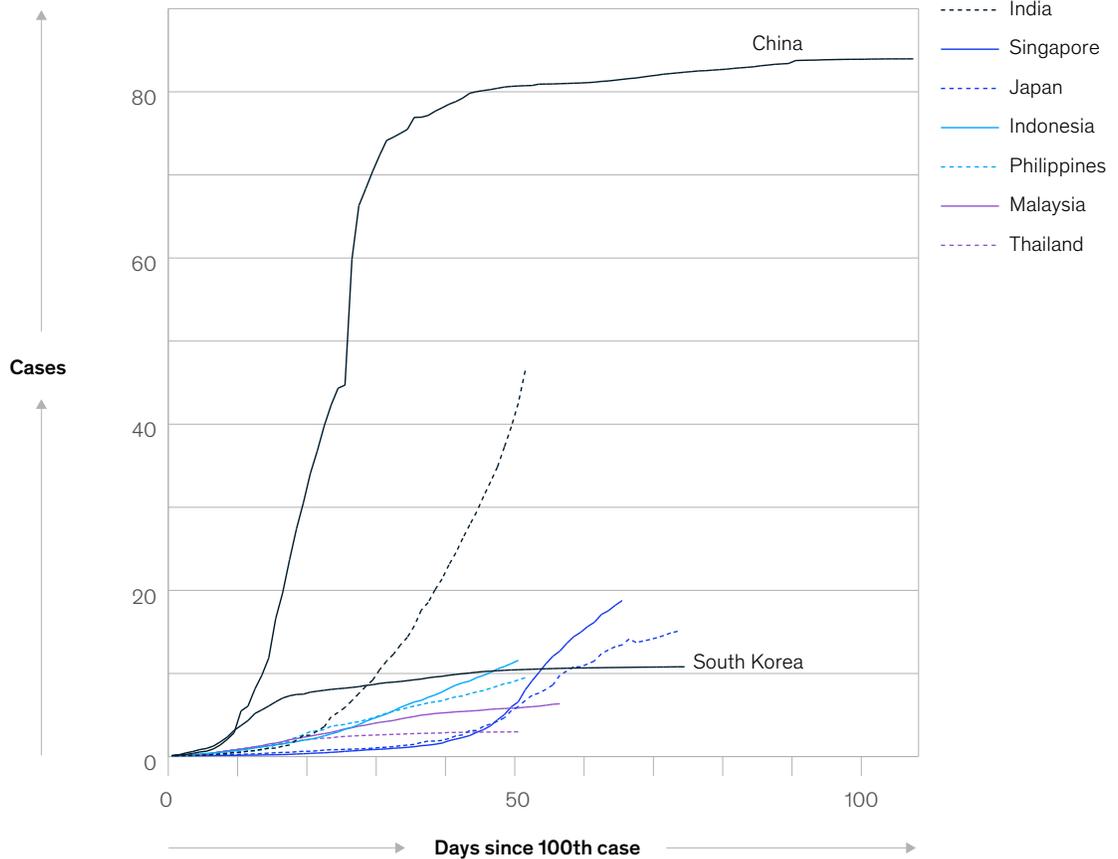
COVID-19 infections flattening. Based on World Health Organization data, the curve of cumulative confirmed COVID-19 cases started to flatten in China and South Korea within a month from start of the outbreak, measured as the 100th confirmed case in each economy (Exhibit 1).

In this article, we identify six ways in which Asian economies mobilized the region's growing technological capabilities to combat the pandemic. These responses highlight four characteristics of Asia's technological development that in much of Asia contributed to the speed and effectiveness of the response to the outbreak. Our aim is not to evaluate the measures taken by governments and businesses but briefly to survey examples of those

Exhibit 1

Some Asian countries mounted a rapid and efficient response to COVID-19.

Confirmed cases of COVID-19 in Asia as of May 5, 2020, not exhaustive, thousands

Source: WHO; McKinsey Global Institute analysis

Asia's use of technology was a major element in the relative speed of the region's response to safeguard health and livelihoods.

measures in the hope that this information may help guide the response of countries in and beyond Asia as they seek to contain the current and future pandemics.

We note that although we focus on technology for this article, it is not the only solution but part of a range of measures to combat this global humanitarian challenge. We also note that the use of technology in the unique circumstances of the COVID-19 pandemic does have risks. In the short term, those risks include data losses, data breaches, and the misuse of technology. In the longer term, risks include a deepening of the current digital divide as those with access to technology benefit while those who do not have access fall behind. Businesses and policy makers need to understand these risks and be proactive in managing them to ensure that technologies deliver positive impact across the community.

The COVID-19 pandemic is constantly evolving, and the data at the time of writing are insufficient for drawing any firm conclusions on the most effective way to combat it. We note, too, that because countries markedly differ economically and socially, solutions that appear successful in some may not be replicable in others. Further, some approaches, including contact tracing and the distribution of essential goods, may be difficult to implement in some areas, given constraints on technology and infrastructure. Asia is a highly diverse region with different levels of healthcare provision and digital capabilities, and some countries may struggle to contain the pandemic. In a globalized world fighting

a virus that does not respect borders, it is vital to exchange best practices and experiences in combating this common enemy.

Asia's use of technology was a major element in the relative speed of the region's response to safeguard health and livelihoods (Exhibit 2). The following discussion of technology's contributions looks at three ways it helped preserve health and three ways it helped preserve livelihoods.
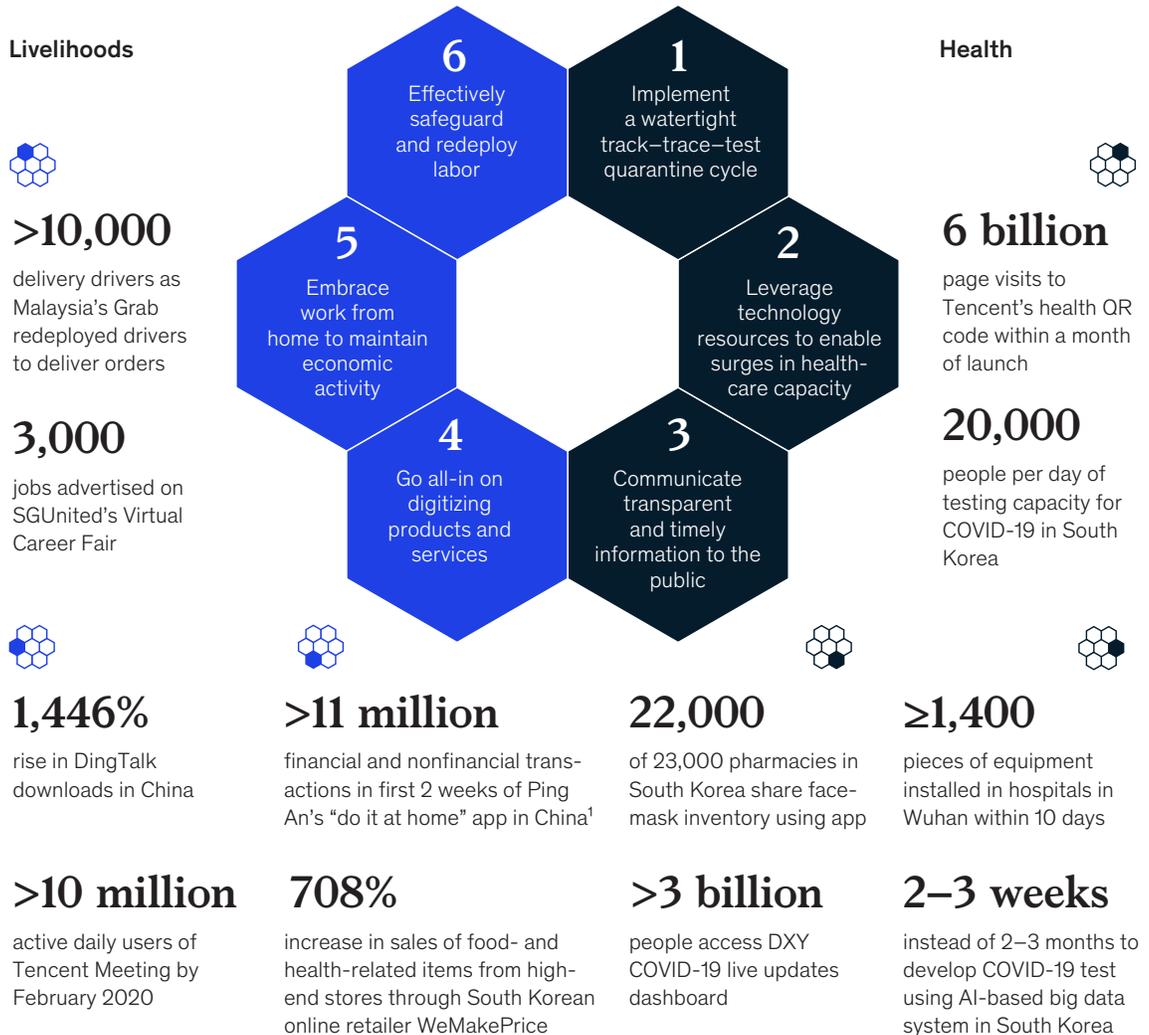
Technology's role in safeguarding health

In the effort to slow the spread of the virus and safeguard health, technology has played a key role in the implementation of physical-distancing measures, in the rapid increase of healthcare, and in the effective communication of information to citizens.

1. Implement a watertight track–trace–test quarantine cycle

In collaboration, public and private players have used digitization and data deployment at scale to contain the virus. Across Asia, governments put in place track-and-trace systems, often via apps on mobile phones. In South Korea, contact-tracing information is shared with the public through apps such as Corona Map and Corona 100m enabling people to avoid areas where they were more likely to be infected.[1] Similarly, the government of Singapore launched an app called TraceTogether, which uses Bluetooth signals to log when people have been close to one another and alert them if they have

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[1] Ivan Watson and Sophie Jeong, "Coronavirus mobile apps are surging in popularity in South Korea," CNN Business, February 28, 2020; and Song Baleun and Kim Minji, *Mobile apps, websites offer real-time data on COVID-19 outbreak*, Korea.net, March 10, 2020.

Exhibit 2

Six ways technology contributed to Asia's response to the COVID-19 pandemic.

Livelihoods

Health

6 Effectively safeguard and redeploy labor

1 Implement a watertight track–trace–test quarantine cycle

5 Embrace work from home to maintain economic activity

2 Leverage technology resources to enable surges in health-care capacity

4 Go all-in on digitizing products and services

3 Communicate transparent and timely information to the public

>10,000
delivery drivers as Malaysia's Grab redeployed drivers to deliver orders

3,000
jobs advertised on SGUnited's Virtual Career Fair

6 billion
page visits to Tencent's health QR code within a month of launch

20,000
people per day of testing capacity for COVID-19 in South Korea

1,446%
rise in DingTalk downloads in China

>11 million
financial and nonfinancial transactions in first 2 weeks of Ping An's "do it at home" app in China[1]

22,000
of 23,000 pharmacies in South Korea share face-mask inventory using app

≥1,400
pieces of equipment installed in hospitals in Wuhan within 10 days

>10 million
active daily users of Tencent Meeting by February 2020

708%
increase in sales of food- and health-related items from high-end stores through South Korean online retailer WeMakePrice

>3 billion
people access DXY COVID-19 live updates dashboard

2–3 weeks
instead of 2–3 months to develop COVID-19 test using AI-based big data system in South Korea

[1]Nonfinancial transactions include online medical counseling, traffic-violation inquiries, and shopping for disinfection-related goods.

Source: Press search; McKinsey Global Institute analysis

been near a person known to be infected with the virus.[2] By the start of April 2020, about a million people had installed the app on their smartphones in a country with a population of 5.6 million.[3]

Mass testing has played a pivotal role. South Korea launched drive-through testing at 50 government-endorsed locations across the country in 17 days.[4]

The testing process has been streamlined to take 15 minutes, and involves minimal direct contact, as the driver does not leave the vehicle.[5] A temporary negative-pressure room is attached to the drive-through locations to run polymerase chain reaction (PCR) tests 24 hours a day; a 98 percent accuracy rate was achieved. This approach enabled the country to test up to 20,000 people a day.[6]

[2] TraceTogether, https://www.tracetogether.gov.sg/.
[3] *20 April 2020 – one month on*, Team Trace Together, April 20, 2020. https://tracetogether.zendesk.com/hc/en-sg/articles/360046475654-20-April-2020-One-Month-On.
[4] Chang May Choon, "South Korea throws up innovative tech solutions in coronavirus fight," *Straits Times*, March 19, 2020.
[5] Millard Nathan, "South Korea turns to tech to take on Covid-19," *Asia Times*, March 12, 2020,
[6] Dasl Yoon and Timothy W. Martin, "How South Korea put into place the world's most aggressive coronavirus test program," *Wall Street Journal*, March 16, 2020.

Enabling heightened vigilance in a systematic and thorough manner also has been crucial. AI specialist SenseTime deployed contactless temperature-detection equipment to screen up to ten individuals per second in subway stations, schools, and public centers in Beijing, Shanghai, and Shenzhen.[7] Chinese ride-hailing firm Didi Chuxing in China required all drivers to wear masks during rides, which is verified through its open-source AI-driven facial-recognition technology.[8] (McKinsey recognizes that applications to supervise employees need to be based on broad consensus among them and in society more broadly, and that each organization needs to make decisions based on its specific situation).

Quarantine measures have been strictly enforced. Governments have been using a range of digital and mobile tools. In China, internet and digital companies Alibaba and Tencent created a national health QR code to quickly collect data on an individual's movements and generate decisions on whether and how strictly that individual should be quarantined.[9] This "traffic-light" code determines the degree to which citizens may move around (green) or the type and length of quarantine required (yellow or red). At the entries to office buildings, schools, shopping malls, buses, and trains, individuals scan their national health QR code and are granted entry only when their code is green. Within a week of the code's introduction, 100 Chinese cities were using it, with adoption rates as high as 90 percent in the city of Hangzhou.[10] To enforce quarantine, Hong Kong uses electronic wristbands and an accompanying smartphone app on arriving passengers to make sure they are staying at home.[11] Similarly, in Singapore, stay-home notices (SHNs) are enforced through phones' GPS, or citizens can send photos of their surroundings to confirm their location.[12] People issued an SHN receive text messages at various times during the day and are then required to update their location within an hour through their phone's GPS location service via a unique web link provided in the text message.[13]

Central to enabling the track–trace–test quarantine cycle in Asia is the sharing of public and private data, which raises concerns about data privacy. McKinsey recognizes there are risks associated with these practices and that each country needs to take into account its specific circumstances in making these decisions.

2. Leverage technology resources to enable surges in healthcare capacity

In many instances, resources have been rapidly pooled, and best-in-class technologies have been used to ramp up healthcare, treatment capacity, and public protection. In Wuhan, China, hospitals, with the support of Lenovo engineers solving IT problems around the clock, completed the installation and commissioning of more than 1,400 pieces of equipment within ten days. In addition to expanding bed capacity, Wuhan had an online remote-diagnosis center equipped with 5G technology up and running by February 27; this center allowed senior medical experts in different cities to help treat COVID-19 patients in Wuhan. Ultra-high-definition images and data can be transmitted between Wuhan and other major cities at high speed through 5G, enabling high-quality online discussions and real-time consultation on the online platform.[14]

Companies repurposed existing solutions and reprioritized capacity in order to fight the pandemic. Foxconn created a production line for manufacturing two million surgical masks a day to ensure that it had a two-week stock of masks available at all times. The company also installed

[7] "SenseTime 'Smart AI Epidemic Prevention Solution' Helps Control Coronavirus Cross-infection," *SenseTime*, February 14, 2020.

[8] Sun Henan, *Didi uses AI facial recognition to ensure its drivers wear masks*, KRAsia, February 20, 2020.

[9] *Frequently asked questions on the Health QR Code international edition*, Ministry of Foreign Affairs of the People's Republic of China, 2020, https://hr.cs.mfa.gov.cn/help_h5/help-h5/index.html.

[10] Paul Mazur, Raymond Zhong, and Aaron Krolik, "In coronavirus fight, China gives citizens a color code, with red flags," *New York Times*, March 2, 2020.

[11] Uptin Saiidi, "Hong Kong is putting electronic wristbands on arriving passengers to enforce coronavirus quarantine," CNBC, March 18, 2020.

[12] "Everything you need to know about Stay-Home notice," Government of Singapore, March 19, 2020.

[13] Aqil Haziq Mahmud, "More than 7,000 stay-home notices issued for COVID-19; checks done through GPS, photos," *Channel News Asia*, March 12, 2020.

[14] "China's high-tech hospital safeguards patients, medics," *The Star*, March 12, 2020.

Transparent, timely communication has been important for ensuring that citizens and businesses make informed decisions, and technology has been critical to this.

temperature sensors and developed an app that alerts workers if they have been in close proximity to infection hot spots.[15]

To provide continued access to essential primary health services during the pandemic, the Australian government announced in March 2020 that it would provide 669 million Australian dollars to expand Medicare-subsidized telehealth services.[16] Australians can have medical consultations via telephone or videoconferencing, services aimed at releasing pressure on hospitals and simultaneously reducing human interactions to protect citizens. Insurers and providers have expanded their capacity to deliver services remotely.

Innovations have shortened research-to-market cycles in critical healthcare technologies. In South Korea, Seegene developed an artificial-intelligence (AI)-based big data system and successfully designed a COVID-19 diagnosis test within two to three weeks by exclusively using genetic details without a sample; developing the test manually would have taken two to three months.[17] In China, pharmaceutical companies have leveraged their growing research and innovation capabilities to race toward finding a coronavirus vaccine. After analyzing case reports from Wuhan and identifying a correlation between the severity of COVID-19

cases and the cytokine release syndrome (CRS) by analyzing case reports from Wuhan, I-Mab Biopharma took only about one month to file for approval to conduct clinical trials in the United States of a potential cure.[18]

3. Communicate transparent and timely information to the public

Transparent, timely, omnichannel communication has been important for ensuring that citizens and businesses make informed decisions, and technology has been critical to building this capability. In South Korea, 22,000 out of 23,000 pharmacies across the country contributed data to a government-run initiative in which Naver, Kakao, and other software developers used open-application software to create apps for reporting the inventory of face masks at pharmacies, for instance.[19] This initiative reduced crowding at pharmacies and helped ensure physical distancing by ending the uncertainty that had been causing hundreds of people to gather outside pharmacies at times when new stocks of face masks were expected to arrive.[20]

In Singapore and Australia, the government provided updates on the coronavirus situation via an official WhatsApp channel.[21] Singapore's Ministry of Health provides daily updates on confirmed

[15] Luke Dormehl, *From infrared scanners to tracking apps: How Foxconn is dealing with coronavirus*, Cult of Mac, February 13, 2020.
[16] Prime Minister of Australia, *$1.1 billion to support more mental health, medicare and domestic violence services*, media release, March 29, 2020
[17] *Seegene, CNN spotlighted "How this south Korean company created coronavirus test kits in three weeks"*, Seegene, March 12, 2020.
[18] Eric Ng, "Chinese biotechs, flushed with funds and armed with ideas, join the ace to fine a coronavirus cure as pandemic ravages the world," *South China Morning Post*, March 28, 2020.
[19] (The) World Smart Sustainable Cities Organization (WeGO), *Mask rationing system & mask inventory apps, Republic of Korea*, http://we-gov. org/wego-smart-health-responder/mask-rationing-system-and-mask-inventory-apps-1/?ckattempt=3.
[20] Andrew Jeong, "South Korea rations face masks in coronavirus fight," *Wall Street Journal*, March 15, 2020.
[21] *Gov.sg WhatsApp subscription*, Gov.sg, 2020, http://go.gov.sg/whatsapp; Medha Basu, "Exclusive: How Singapore sends daily Whatsapp updates on coronavirus," *GovInsider*, March 3, 2020; and "Australian Government WhatsApp channel for COVID-19," Australian Government Department of Health, https://www.health.gov.au/resources/apps-and-tools/australian-government-whatsapp-channel-for-covid-19.

cases, including patients' age, travel history, and contact with previously confirmed cases.[22] These channels have helped to disseminate public-health directives on, for instance, physical distancing and hand-washing techniques, and they also counter fake news.[23] In China, DXY, an online platform that connects that country's healthcare professionals, in one day launched a coronavirus dashboard with live updates on the number of cases and a map-based visualization.[24] As of mid-March, the dashboard had been accessed by more than three billion. DXY has added functions such as online diagnosis and a section debunking fake news. Major apps including Alipay and WeChat added services such as Yikuang that used Tencent data to map neighborhoods with confirmed cases, including the latest official count of such cases.

Technology's role in safeguarding livelihoods

Technology has also played a broader role in transforming the way in which work is performed, thus safeguarding livelihoods and economies. Three major areas of impact are digitizing products and services, working from home, and safeguarding workers.

4. Go all-in on digitizing products and services

A main strategy for fighting the COVID-19 pandemic around the world has been an attempt to reduce transmission of the virus by enforcing physical distancing. As many governments in Asia and beyond ordered the temporary shutdown of stores and offices, remote delivery of products and services from groceries to education and finance became the norm. Companies in the region have enabled this switch by offering deepening and widening digital services.

Some technologies enhanced the online-to-offline experience and were deployed to support people's livelihoods. Within days, Lazada, a leading e-commerce platform in South East Asia, onboarded farmers and wholesalers who were wasting their products due to shortened operating hours of brick and mortar stores, enabling them to sell direct to consumers online. These new sellers reported a four- to fivefold increase in the volume of orders received, reflecting both broader geographical reach by being online and the fact that customers were receptive to buying fresh ingredients via the internet.[25] Traditionally analog real estate companies embraced digital interaction channels to great success. Beike, a leading property platform in China, used a combination of "virtual showrooms" and online consultations via WeChat. These measures increased the efficiency of sales staff, and customers appreciated the increased transparency and comprehensiveness of the information provided. Sales staff used these virtual channels to sell 1,068 homes in one 1,472-unit development in just under nine minutes.[26] When customers moved online to make purchases during the COVID-19 outbreak in South Korea, online retailer WeMakePrice reported a 708 percent jump in February 2020 year-on-year sales of food and health-related items from high-end retailers (including AK Department Store, Hyundai Department Store, and Lotte Outlet).[27]

Education and job search increasingly went online, too, as adult learners and students self-isolated. Atlassian, an Australian software provider, made its Trello Business Class free for one year to help teachers deliver education remotely.[28] In Singapore, all continuing-education and training courses from April 7 (planned to last until May 4) were conducted through virtual classrooms and other forms of e-learning.[29]

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[22] *Updates on COVID-19 (coronavirus disease 2019) local situation*, Ministry of Health Singapore, April 18, 2020, https://www.moh.gov.sg/covid-19.

[23] Ibid.

[24] See *COVID-19 global pandemic real-time report*, DXY, https://ncov.dxy.cn/ncovh5/view/pneumonia; and *The epidemic map of the popular network, a group of professionals behind the 3 billion access*, DATA New Business, March 16, 2010, https://www.thepaper.cn/newsDetail_forward_6535842.

[25] Hazlin Hassan, "Coronavirus: Famers dump their stock after police impose restrictions at wholesale market," *Straits Times*, March 30, 2020.

[26] *China housing challenges: VR viewing, live streaming help during epidemic*, CGTN, March 5, 2020.

[27] "Online sales increase at WeMakePrice due to COVID-19 in South Korea in February 2020," Statista, March 27, 2020, https://www.statista.com/statistics/1103042/south-korea-online-sales-growth-of-high-end-retailers-due-to-covid-19-at-wemakeprice-by-category/.

[28] Scott Farquhar, *We're making our remote-friendly software products available for free*, Atlassian, March 18, 2020.

[29] "Continuing education and training courses to move online under new COVID-19 measures," *Channel News Asia*, April 5, 2020.

In financial services, DBS Bank announced that it would offer free coronavirus-related insurance to address a lack of coverage for pandemics. It rolled out this scheme to existing customers in Hong Kong, India, and Singapore, inviting them to sign up using an online form. At its peak, the plan experienced 52,000 sign-ups per day in Singapore alone.[30] Rizal Commercial Banking in the Philippines experienced a 259 percent increase in new sign-ups to its "bank from home" online banking service in the first three days after quarantine measures were put in place on March 17, 2020.[31] Similarly, Ping An Bank in China introduced a "do it at home" app that enables customers to conduct financial services on their mobile device. In two weeks, the app reportedly completed 11.67 million transactions for three million customers.[32]

Beyond banking apps, online entertainment services have proved very popular. Cloud raves became very popular in China during the period of physical distancing. Around 2.3 million clubbers joined Beijing club SIR TEEN's cloud rave on February 10, 2020. Shanghai club TAXX earned $104,000 in tips with 71,000 viewers paying through the app in one livestream.[33]

Other online services designed to support people during the pandemic also have sprung up. One example is an online substitute for families visiting the graves of family and friends during China's Qingming Festival in April; this year, these visits must be undertaken digitally. Users of this app can order the cleaning of a grave and may receive photographic proof that this has been done or opt to livestream the cleaning. Funeral company Fu Shou Yuan International, which operates in more than 30 Chinese cities, launched its own online tomb-sweeping service on its website on March 12. In its first week, the site had about 87,000 visitors.[34]

5. Embrace work from home to maintain economic activity

Because of enforced physical distancing, remote working suddenly had to become the norm, and businesses embraced teleconferencing tools to an extent never seen before. In parallel, the fact that so many employees could not be physically present in offices accelerated the digitization of operations and processes.

Use of online communications such as teleconferencing soared during the COVID-19 crisis as offices closed across Asia. DingTalk and Tencent Meeting were the most downloaded apps in China in March 2020.[35] Specifically, DingTalk experienced 1,446 percent year-on-year growth in downloads, and Tencent Meeting had more than ten million active daily users by February 2020.

The pandemic accelerated digitization of business operations and processes. Singapore-based DBS accelerated the digitization of 11 common trade financing solutions to reduce the need for physical over-the-counter (OTC) transactions. From March 2020, the bank used the CamelONE portal provided by vCargo Cloud to settle trade financing transactions. Other efforts by the bank to reduce reliance on OTC transactions included increasing the number of free FAST bank transfers from 30 to 50 and offering a collateral-free loan that customers can apply for entirely online. If applicants qualify, disbursement occurs 24 hours after the acceptance of loans up to 200,000 Singapore dollars.[36]

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[30] "DBS extends enrolment deadline of its free 30-day COVID-19 relief insurance cover for customers in Singapore to 31 March 2020," DBS, March 17, 2020.

[31] "More Filipinos turn to digital banking amidst COVID-19 lockdown," *Fintech News*, March 24, 2020.

[32] Jacob Dahl, Vito Giudici, Sameer Kumar, Vishal Patwari, and Gabriele Vigo, "Lessons from Asian banks on their coronavirus response," McKinsey & Company, March 2020.

[33] Sophia Ankel, "Clubbers in China are going to 'cloud raves' on TikTok because coronavirus quarantines mean thay can't party for real—here's what they're like," *Business Insider*, February 24, 2010.

[34] "Tomb Sweeping Festival: China pays 'virtual' respect to ancestors," BBC News, April 4, 2020.

[35] Rita Lao, "China roundup: Amid coronavirus, tech firms offer ways to maintain China's lifeblood," *TechCrunch*, February 23, 2020; "International version of Tencent Meeting goes online in over 100 markets, offering users free meetings for up to 300 participants," Tencent Cloud, March 20, 2020.

[36] "DBS rolls out digital solutions to give businesses "Contact-free" banking options for greater peace of mind during Covid-19," DBS, February 26, 2020.

Technology has helped reskill workers in order to meet large shifts in the types of demand during the pandemic and help people remain employed.

6. Effectively safeguard and redeploy labor

Across Asia, companies and governments used technology to safeguard and redeploy labor. Using technology to safeguard jobs has meant redefining work routines. Grab improved food-delivery hygiene practices in Singapore and Malaysia. The company provided its delivery partners with free masks via GrabBenefits, introduced policies to mandate hand sanitization and sealed packaging in its partner stores, and introduced contactless delivery options such as leaving food deliveries hanging on door handles and notifying customers to collect the goods.[37] In addition, hospitality companies in Singapore are using the lull in business to retrain existing workers and accelerate their digital transformations.[38] To this end, they are making use of the government's four-month digital marketing place-and-train program that will equip workers with digital marketing, content creation, and web-analytics skills.[39]

Technology also has helped reskill workers in order to meet large shifts in the types of demand during the pandemic and help people remain employed. Workforce Singapore, a government statutory board under the Ministry of Manpower, created the SGUnited Jobs Virtual Career Fair to advertise 3,000 temporary public- and private-sector positions that were immediately available, thereby helping citizens to find jobs online.[40] Grab reskilled its driver-partners across Southeast Asia, enabling them to fulfill delivery orders through its GrabMart and GrabAssistant services in order to serve citizens unable to commute. This shift increased the pool of delivery drivers by 15 percent in Singapore and by tens of thousands in Malaysia.[41] Freshippo, Alibaba's grocery delivery subsidiary, hired workers from shuttered restaurants and retail outlets. The company simplified operational procedures so that newly hired workers needed only two hours of training before using their existing supply chain and logistics skills in an e-commerce environment.[42]

Asia's technology-enabled response is rooted in capabilities developed prior to the crisis

The speed at which some Asian governments and businesses responded to the pandemic has been distinctive. In Wuhan, the capital of Hubei Province and the epicenter of China's COVID-19 outbreak, the government more than tripled the number of hospital beds for coronavirus patients to more than 23,000 beds within a month.[43] South Korea reduced contact-tracing time from 24 hours in early February to less than ten minutes at the end of March by

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[37] *COVID-19 Update 3: Protecting our partners' well-being*, Grab, March 26, 2020.and *Grab Announces Additional COVID-19 Support Measures*, Grab, March 30, 2020

[38] Joanna Seow, "Firms with staff on flexi-work for at least 1 month can apply for grant," *Straits Times*, April 8, 2020.

[39] *Annex B: Media factsheet on digital marketing place-and-train programme*, Workforce Singapore, February 22, 2020, https://www.ssg-wsg. gov.sg/content/dam/ssg-wsg/ssgwsg/news/pdfs/22_Feb_2020/Annex%20B.pdf.

[40] Joanna Seow, "10,000 new jobs could come from ICT, cleaning and logistics," *Straits Times*, March 28, 2020.

[41] For Singapore, see Zhaki Abdullah, "Delivery slots run dry as more turn to online grocery shopping amid COVID-19 concerns," CNA, March 31, 2020. For Malaysia, see Ben Tan, "Grab drivers roped in to support food and mart delivery service," *Malay Mail*, March 24, 2020.

[42] "How Alibaba's Freshippo adapted to keep delivering in virus-hit China," Reuters, March 23, 2020.

[43] *Health Commission: In one month, the number of beds in Wuhan has increased to 23,000*, Beijing Daily Client, http://www.bjd.com. cn/a/202002/28/WS5e58efa4e4b05d1eff0b372e.html.

employing a digital-surveillance system that consolidates information from 27 public and private organizations.[44] Using security-camera footage, credit-card records, GPS data from cellphones, and car navigation systems, the government has been able to pinpoint exactly where a person was before their symptoms became evident. It can specify a location as detailed as an individual seat in a movie theater.[45]

The speed and efficacy of responses in Asia were achievable because of technological capabilities that the region had been developing prior to the crisis. Here we highlight four types of capabilities:

(1) a high rate of capacity building; (2) digitally adaptable populations; (3) rapid digitization by businesses; and (4) strong public–private collaboration.
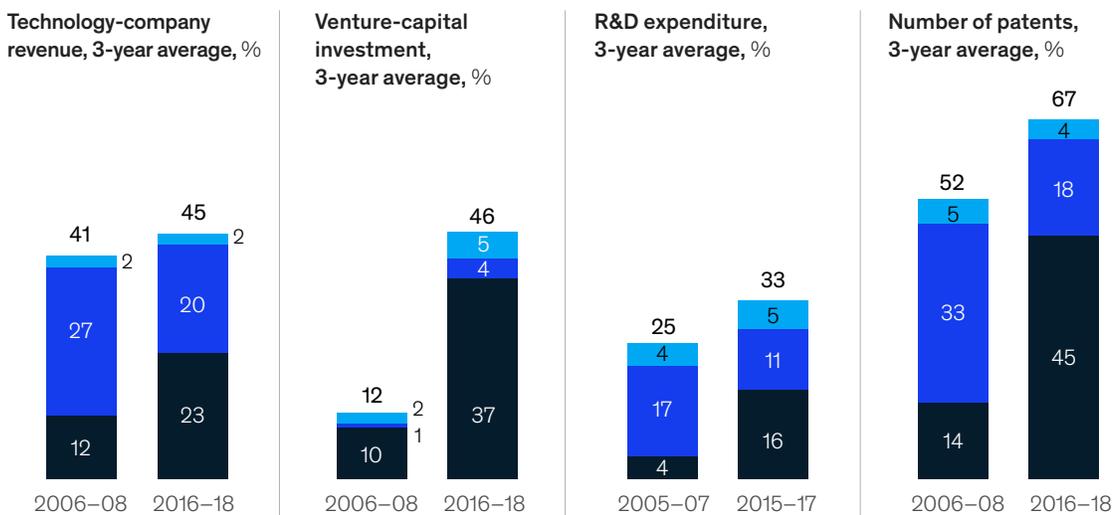
High rate of capacity building

Asia has been aggressively developing and deepening its digital infrastructure. Over the past decade, the region accounts for the highest share of global growth in key technology metrics—namely, technology-company revenue, venture-capital funding, spending on research and development, and number of patents filed (Exhibit 3).
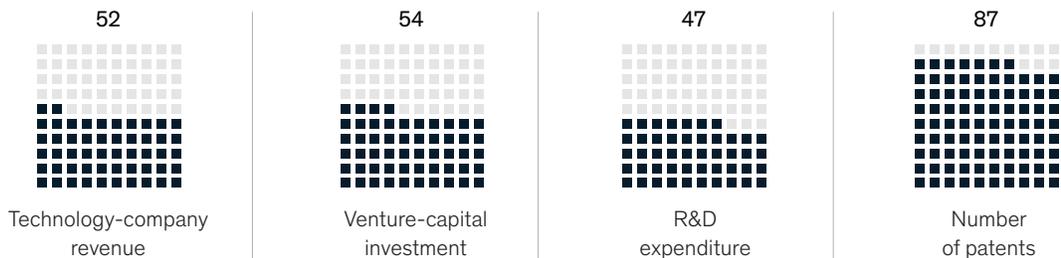
Exhibit 3

Over the past decade, Asia posted the biggest shares of global growth in key technology metrics.

Tracking Asia's share of global technology growth ■ China ■ Advanced Asia[1] ■ Rest of Asia

Technology-company revenue, 3-year average, %

Venture-capital investment, 3-year average, %

R&D expenditure, 3-year average, %

Number of patents, 3-year average, %

Asia's share of global growth, %

Technology-company revenue	Venture-capital investment	R&D expenditure	Number of patents
52	54	47	87

Note: Totals may not sum, because of rounding.
[1] Includes Australia, Japan, New Zealand, Singapore, and South Korea

Source: Preqin; WIPO; World Bank; Corporate Performance Analytics by McKinsey; McKinsey Global Institute analysis

[44] Park Han-na, "Seoul to launch 10-minute contact-tracing program," *The Korea Herald*, March 26, 2020.
[45] Nathan Millard, "South Korea turns to tech to take on Covid-19," *Asia Times*, March 12, 2020.

Both public- and private-sector players invested in ambitious infrastructure projects in light of rising demand for digital capabilities. One example is China's installation of five million 3G/4G base stations (as of 2018).[46] A different type of capability building was South Korea's Personal Information Protection Act (PIPA), which came into force in 2011. The act, which imposes strict compliance requirements on entities that collect personally identifiable information, also incorporates a public-interest override.[47]

Such proactive investment and forward thinking about legislation enabled Asia's response to the pandemic. Chinese telecom companies quickly recognized when network congestion was slowing internet speeds during the lockdown, and they deployed an additional 257 mobile base stations in 56 days to maintain connectivity.[48] The South Korean authorities used PIPA's public interest override and, in 52 days, launched the previously described platform that integrated information from 27 organizations and dramatically reduced contact-tracing time.[49]

Asia has a track record of improving capacity established in response to previous crises. For instance, South Korea authorized the private sector to conduct testing after facing shortages of testing capacity during the 2012 MERS pandemic when only government entities were allowed to carry out tests. For COVID-19, private laboratories account for 90 percent of the country's testing capacity. It is reasonable to expect that Asian countries will continue responding to the experience of this current pandemic to fine-tune responses and close gaps in capacity and execution capabilities so they will be better prepared for future crises.

Digitally adaptable populations

In Asia, 54 percent of the population is currently online.[50] The region accounts for 50 percent of global internet users (two billion individuals) and 58 percent of growth in the absolute number of internet users (734 million) between 2014 and 2019.[51] Asia's digital population has embraced technology across sectors, and user engagement is high. In this diverse region, there are many multilocal digital applications. Alipay, Meituan, and Grab are "digital ecosystems" that cover a large number of sectors in one application. Ride sharing is hyperlocal with Didi Chuxing, Ola, and Gojek tailored to local transport challenges in China, India, and Indonesia, respectively, and therefore enjoying high levels of user engagement.

Asia has been able to leapfrog swiftly and successfully to digital solutions in some cases because of a lack of legacy structure. Mobile telephony is an example. Many parts of Asia bypassed fixed telephone lines and moved straight to mobile phones. Today penetration of mobile applications in Asia is higher than in the rest of the world (Exhibit 4). Evidence is now emerging that Asia is likely to forgo credit card payments in favor of e-wallets; the latter now account for 49 percent of the value of China's e-commerce transactions.

The high use of online and online-to-offline services by Asian consumers and businesses was an important factor in helping companies adapt to new ways of doing business. For instance, many e-commerce and banking companies already had a sizable online customer base and well-developed capabilities before the pandemic, and they used these capabilities to broaden offerings and deepen penetration. China's national health QR code

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[46] *Statistical report on internet development in China*, China Internet Network Information Center, January 2018.
[47] Helen Chan, "Pervasive personal data collection at the heart of South Korea's COVID-19 success may not translate," blog, Thomson Reuters, March 26, 2020.
[48] *Central enterprises accelerating the donation of medical drugs to develop and produce more than 2.5 billion yuan*, Yicai, https://www.yicai.com/news/100509786.html.
[49] Park Han-na, "Seoul to launch 10-minute contact tracing program," *The Korea Herald*, March 26, 2020.
[50] Population based on Internet World Stats, https://www.internetworldstats.com/stats3.htm, January 31, 2020.
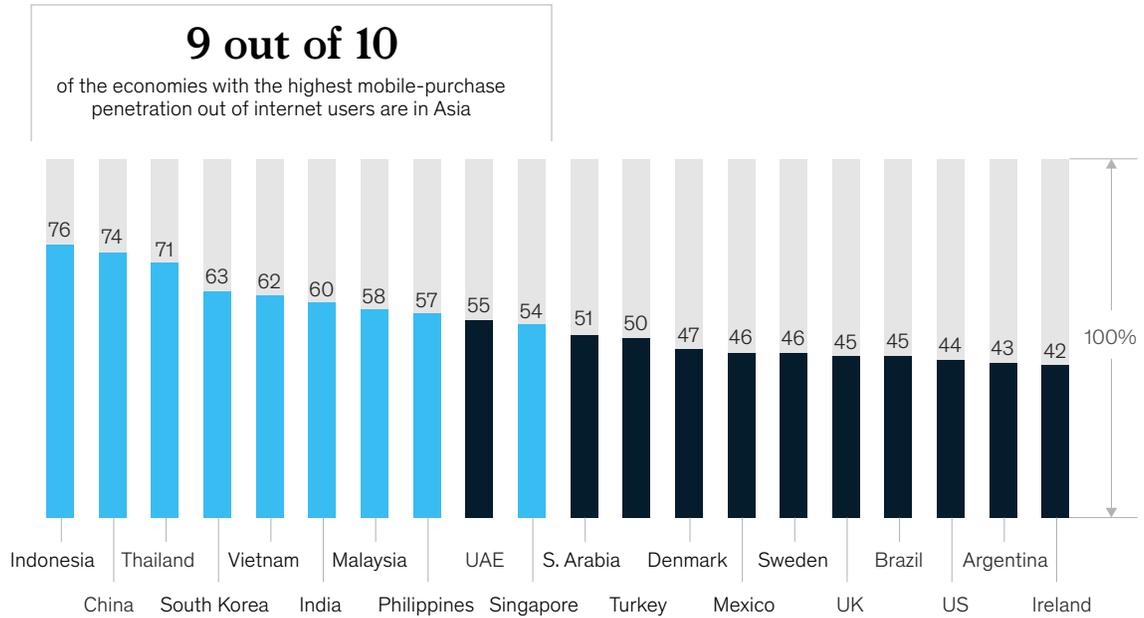[51] World Telecommunication/ICT Indicators Database 2019 (23rd edition, December 2019), https://www.itu.int/en/ITU-D/Statistics/Pages/publications/wtid.aspx.

Exhibit 4

Asia has achieved high penetration in mobile commerce.

Internet users making purchases via mobile phone in 2019, %

■ Asia ■ Non-Asia

9 out of 10

of the economies with the highest mobile-purchase
penetration out of internet users are in Asia

| Indonesia 76 | Thailand 74 | Vietnam 63 | Malaysia 58 | UAE 55 | S. Arabia 51 | Denmark 47 | Sweden 46 | Brazil 45 | Argentina 43 |
| China 74 | South Korea 71 | India 60 | Philippines 57 | Singapore 54 | Turkey 50 | Mexico 46 | UK 45 | US 44 | Ireland 42 |

100%

Source: We Are Social; McKinsey Global Institute analysis

was implemented on well-established—indeed, ubiquitous—apps such as Alipay and WeChat. This enabled the rapid adoption of the QR code system that reached 100 cities within a week of its launch.

Digitized business environment

Asian businesses, particularly consumer-facing ones, had a strong track record of diversifying the ways in which they engage with their customers through digital channels, fed by and continually shaping Asia's digitally adaptable population. Pre-COVID-19, services industries were already highly digitized. For example, across Asia in 2018, digital banking transactions were 1.6 to 5.0 times as frequent as branch transactions.[52] Likewise, in China, an estimated 87 percent of airline ticketing and 77 percent of rail ticketing was carried out online in 2019.[53]

Businesses in the region were already well positioned to stay relevant to customers when the COVID-19 outbreak occurred. They were able to build on a solid foundation of omnichannel engagement. There have been many instances of creativity and resourcefulness in how businesses have leveraged emerging channels to expand their influence. For example, in China over the past two years, an increase in providers of short-form online videos such as Douyin and livestreaming, such as Taobao Live reflected the rising popularity of new types of social media and has provided businesses with new growth opportunities. In 2019, merchants on Taobao Live gained more than 100 million fans, with over 50 percent of them experiencing sales growth through the platform. These platforms are also growing quickly: on China's annual "double 11" shopping day in 2019, Taobao Live experienced

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[52] *Asia's digital banking race: Giving customers what they want*, McKinsey & Company, Global Banking, April 2018.
[53] iResearch Consulting Group, "China online tourism industry report: Quickened pace of going online," *Travel Daily*, January 9, 2019 https://www.traveldaily.cn/article/126746.

more than 20 billion renminbi of transactions; sales in the first hour alone were higher than the entire day in 2018.[54] This established way of shopping meant that during COVID-19, the customer base was already there, enabling businesses to shift resources into such channels successfully. Shanghai-based beauty brand Forest Cabin is one success story. Instead of being hit with falling discretionary spending during the COVID-19 outbreak, the company achieved 45 percent growth in sales by retraining their staff within two weeks to sell exclusively via livestreaming.[55]

The ubiquity and diversity of online services meant that even subsectors that had traditionally relied on face-to-face interactions were able to migrate online relatively easily during the COVID-19 outbreak. For instance, some real estate players moved completely online with virtual showrooms powered by augmented reality. Taking their cue from consumer sectors, some suppliers of agricultural technology in China used livestreaming sessions to sell products and provide technical support. One supplier estimated that one livestream had the equivalent impact of 500 on-site talks, the traditional way of engaging farmers.[56] Some farmers took to WeChat groups to discuss everything from how to best grow a particular type of melon to what financing option to choose and how to sell directly to consumers. As well as businesses that have always sought to diversify their ways of engaging customers, the COVID-19 crisis has also set apart businesses that recognized the importance of being resourceful and inventive, and sustain this mindset after the crisis.

For larger enterprises, the ability to provide digitized and omnichannel offerings is anchored on the digital maturity of their own operations. Asian businesses have embarked on digitization at a considerable pace. A 2018 Microsoft study found that 85 percent of the surveyed organizations in Asia—Pacific are already in the midst of their digital transformation journey, compared with only 29 percent one year earlier.[57] The COVID-19 crisis has pulled forward certain aspects of digitization such as remote working. For instance, India's leading IT company TCS has set itself a goal of having only 25 percent of its employees on site by 2025, a target that appeared unlikely to be hit before COVID-19.[58] Today's digitization appears to be only a starting point. As companies emerge from the pandemic and prioritize optimizing cost structure and embedding long-term resilience, digitization of enterprises will be a critical enabler. Asian businesses will need to redouble their efforts.

Strong public–private collaboration

Some Asian governments have been vital catalysts to the development of technology in recent years, steering its commercialization and execution. On commercialization, governments can create a large market through procurement that, in turn, can facilitate long-term private-sector investment. In China, the government has worked closely with technology companies to steer the commercialization of AI. The government's stated aim is to develop a domestic AI industry worth nearly $150 billion by 2030.[59] The government accounts for about one-third of the revenue of China's top AI start-ups.[60] It has used AI technology in many of its public services, such as disseminating AI-powered trash bins to sort and organize waste automatically.[61]

On execution, India's government, for instance, has been rolling out its Aadhaar program of giving citizens unique biometric digital identities; as of April 2020, more than 1.2 billion people had registered.[62]

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[54] Yang Jie, 2019 "Double Eleven" Taobao live broadcast led a transaction of nearly 20 billion yuan," *China Securities Journal*, November 12, 2019, http://finance.eastmoney.com/a/201911121289642792.html.

[55] Christine Chou, "Brands turn to livestreaming as China returns to work," Alizila, February 24, 2020.

[56] Liu Gaoyang, "'One live broadcast of top 500 lectures': The 'digital' transformation of spring cultivation under the epidemic accelerated," *Xinhuanet*, March 20, 2020, http://www.xinhuanet.com/politics/2020-03/19/c_1125732879.htm.

[57] *Unlocking the economic impact of digital transformation in Asia Pacific*, Microsoft Digital Transformation Study 2018, March 2018.

[58] Kritika Saxena, "Explained: Why TCS's '25% workforce in office' plan may redefine the way IT sector works," Microsoft News, https://www.msn.com/en-in/money/in-depth/explained-why-tcss-25percent-workforce-in-office-plan-may-redefine-the-way-it-sector-works/ar-BB13g0pa?li=AAggbRN.

[59] "National AI plan to drive development," *China Daily*, October 22, 2019.

[60] Based on press search.

[61] Lin Shujuan and He Qi, "AI provides virtual hand in sorting trash," *China Daily*, August 18, 2019.

[62] Unique Identification Authority of India, https://uidai.gov.in/aadhaar_dashboard/index.php. Also see *Digital India: Technology to transform a connected nation*, McKinsey Global Institute, March 2019; and *Digital identification: A key to inclusive growth*, McKinsey Global Institute, April 2019.

India considers digital ID to be a strategic tool for delivering government services, managing fiscal budgets, and increasing financial inclusion. The government of India has also integrated its national digital library into a single web portal and launched its mKisan portal to provide crucial information and services to farmers in their own languages and dialects.[63]

The sustained involvement of Asian governments in the development of technology in partnership with the private sector in recent years was an important foundation for collaboration during the COVID-19 crisis. One example is the national health code in China, developed by the government working with Alibaba and Tencent; another is South Korea's app tracking stocks of personal protective equipment. In both cases (and in many others), businesses worked with government to safeguard the health of their communities.

Three sets of questions can guide preparations for the "next normal"

Technology can make a difference in how effectively businesses and society respond to risks of global pandemic. It is worth reflecting both on how effectively companies and societies have executed against the technology playbook and on whether the fundamental capabilities are in place the next time they are needed. Companies were pushed during the pandemic to take unprecedented measures, in many cases demonstrating considerable resilience, social responsibility, and speed.

Not every company responded, and the effort to build the capacity to do so is significant. To take one example, the impact of the COVID-19 pandemic reinforced the pressure to digitize even in industries that have traditionally been more resistant to digital adoption, offering organizations an opportunity to accelerate digital transformation. However, McKinsey research has shown that more than 70 percent of digital transformations fail to scale up.[64]

As organizations emerge from the pandemic and prepare for recovery, there are broad questions that businesses and government can ask themselves as they prepare for the "next normal."

How well did your organization use technology in the crisis?

The six types of intervention deployed in Asia may provide organizations grappling with the COVID-19 crisis some pointers for possible paths ahead.

— *Track trace and test.* Were you able to monitor possible exposure by your communities, customers, and employees to COVID-19? What technologies were of most benefit, and which could be adopted in the future?

— *Build healthcare capacity.* How effective was employee protection in your organization? How can you ensure that operations continue effectively in the context of physical distancing? What resources can you adapt and redeploy to meet changing organizational and community needs? How can your organization contribute to accelerating time to market of innovative healthcare solutions?

— *Communicate transparent and timely information to the public.* How did you get the word out and listen to the audience? Did your dashboards work?

— *Go all-in on digitizing products and services.* How well did you move your services online? Where were the bottlenecks in your physical processes? How did the shift to a more digitized world affect your physical footprint?

— *Embrace work from home to maintain economic activity.* Could you work from home? What happened?

— *Effectively safeguard and redeploy labor.* What arrangements were in place to redeploy and

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[63] "Brief overview of the mKisan Portal," Department of Agriculture & Cooperation and Farmers Welfare, Ministry of Agriculture and Farmers Welfare, Government of India, https://www.mkisan.gov.in/aboutmkisan.aspx.

[64] Subu Narayanan and Michael Coxon, "It's the last IT/OT mile that matters in avoiding Industry 4.0's pilot purgatory," McKinsey & Company, October 8, 2018.

reskill workers? What kinds of processes and assets can you build to ensure a smooth process for redeploying labors?

Do you have the fundamental capabilities in place to leverage technology?
Consider the types of capabilities that enabled Asia's response:

— *Technology innovation capacity.* Which technology innovations that were developed during the pandemic should continue, and how can you apply them in your organization? How should your level of technology investment change as a result of what was learned in the pandemic? How does this compare with that of peer competitors?

— *Digitally adaptable consumers.* How did your organization leverage technology to adapt to and, in turn, shape changing consumer demand and the business environment? Are you leading or lagging the market?

— *Digitized business environment.* How digitized and technologically enabled are your supply chains and downstream partners? What can you do to help them become more resilient?

— *Public–private partnership.* What type of public and private collaboration worked the best? How should your organization contribute?

How will you go forward?
Consider how the answers to the previous questions will shape your plans:

— How can you launch a plan-ahead team to get ahead of the next stage of crisis? How can the team work across multiple time horizons?[65]

— How can you build speed and adaptability into your organization to respond rapidly and effectively as a norm for future crises?

— What made it possible to implement decisions rapidly, and which part of your organization can benefit from such speed in the long run?

Throughout the crisis, Asian governments and businesses have adapted their technological capabilities and have innovated relatively quickly to play their part in fighting the pandemic. In the process, they may have gained experience and learned more about what works (or doesn't yet work) that they may be able to deploy if future public-health crises occur. They have experienced the power of collaboration and the broad usefulness and effectiveness of digital technologies. A forthcoming McKinsey Global Institute discussion paper will explore Asia's growing technological capabilities, including how technology may help different sectors recover from the pandemic and capture new opportunities.

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[65] Martin Hirt, Sven Smit, Chris Bradley, Robert Uhlaner, Mihir Mysore, Yuval Atsmon, and Nicholas Northcote, "Getting ahead of the next stage of the coronavirus crisis," McKinsey & Company, April 2020.