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Digital Policy for Physical Distancing: 28 Stimulus Proposals That Will Pay Long-Term Dividends

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The COVID-19 pandemic has revealed gaps in society's digital readiness for social distancing. If policymakers seize the opportunity to address these gaps, they can make it easier to manage the next pandemic while providing significant long-term social and economic benefits.

KEY TAKEAWAYS

- The continuing progress of digital technology makes social distancing mandates more feasible and less costly. But there are still major gaps that policymakers should address to make the process even easier.
- To maximize society's digital readiness, policymakers need to sweep away the regulatory underbrush that limits remote and automated digital functions in a wide array of industries, from health and retail to education and transportation.
- Governments should support the development of foundational digital platforms, including universal broadband, 5G, electronic IDs, electronic health records, big data systems, and mobile payments.
- Governments should increase funding to spur development and adoption of key technologies to enable more efficient and flexible production, including robotics, autonomous vehicles, 3D printing, AI, blockchain, IoT, and facial recognition.
- Governments should support digital transformation for remote activity in key sectors, including education, government, healthcare, transportation, retail, and manufacturing.
- Congress and the administration should ensure a fourth stimulus package includes a major push to increase digital resiliency to better prepare for future pandemics.

INTRODUCTION

It is not clear whether COVID-19 is a rare 100-year event or the new normal. Regardless, policymakers should err on the side of caution, and act as if it is the latter, especially if their response reaps benefits regardless of whether we face another pandemic that requires widespread and sustained physical distancing.[1]

While globalization and mass travel have contributed to the spread of COVID-19, the progress of digital technology has made it easier to effectively maintain a physical distance. But the current exercise in physical distancing in which most nations are engaged has exposed important gaps in societies' digital readiness. If policymakers seize the opportunity to address these gaps, they will make it easier for the world to manage the next pandemic (which we hope won't be soon) while also providing significant social and economic benefits. To that end, this paper identifies key steps policymakers can take not only to better support digitally enabled physical distancing, but also to spur technology-based automation to make the supply chains and transportation systems that serve as the main arteries of the economy more resilient. We identify three key areas for policy action: supporting foundational technology platforms, supporting targeted technology advancement, and enabling greater digital technology use in key sectors.

In 1997, Francis Caincross wrote an influential book, *The Death of Distance*, which chronicled and predicted how the Internet would allow people and organizations to more effectively communicate at a distance. Today, with mandatory physical distancing, a more up-to-date title might be "*The Creation of Distance*," as the Internet specifically—and information and communications technology broadly—plays a critical role in enabling society to operate more effectively with less face-to-face contact, whether working and learning from home, shopping online, or just more-easily passing the time at home with streaming video, reading e-books, messaging friends, taking exercise classes online, etc. To be sure, even in the worst pandemic, some face-to-face contact will still be required, if only for medical treatment and other key first-responder functions. But technology has progressed—and continues to progress—to make physical distancing mandates more tolerable and effective, and less costly. However, there are still major gaps and opportunities to make this even easier. To maximize society's digital readiness, policymakers must do two key things. The first is to sweep away—and keep away—the regulatory underbrush that limits remote and automated digital functions in a wide array of industries, from health and retail to education and transportation. The second is to actively support the development of key digital platforms, such as universal broadband and electronic IDs, and key technologies, such as autonomous vehicles (AVs), while supporting digital transformation in many sectors, including government and health care.

Digital transformation enables more remote activities, making physical distancing more likely and more productive. At the same time, technology offers the potential to produce certain outputs with fewer workers, enabling more resilience in supply chains, and reducing the trade-off between protecting health and the economy.

Congress and the administration have taken bold action in passing a $2.2 trillion dollar relief package that rightly focuses on the immediate crisis to help the economy, businesses, and individuals. As Congress considers another relief package, its focus should be on activities that can serve two main purposes: spurring economic recovery over the next 18 months while also

making the U.S. economy more resilient and better able to manage a crisis like this again. The proposals described below all serve these two goals.

DIGITAL PLATFORMS

At the heart of tech-enabled physical distancing and tech-supported automation are digital platforms and key applications, including platforms to transmit "bits"—especially wireline and wireless broadband networks—and key applications and inputs that underpin and enable a host of other applications, including robust availability of data, electronic IDs, and e-payment systems. In some cases, governments need to play more proactive roles supporting the private sector's efforts to expand access (e.g., rural broadband). In other cases, governments need to ensure regulation is not a barrier (e.g., overly stringent privacy regulations); and in still others, governments need to play a lead role (e.g., electronic IDs).

Universal Broadband Infrastructure

The U.S. federal government should ensure virtually everyone has adequate broadband in order to work and study from home.[2]

Problem: Broadband access is a crucial tool in maintaining economic activity during pandemic distancing protocols. Despite at least two decades of increasing broadband speeds and coverage, parts of the rural United States remain stubbornly unconnected; it costs more to provide broadband in these places than providers can earn back. According to the best data available today, over a quarter of rural Americans do not have access to broadband with speeds of at least 25 Mbps download and 3 Mbps upload.[3]

Solution: Congress should fund a one-time, large-scale injection of capital for broadband infrastructure in areas of the country in which it is too costly for private providers to both serve and attempt to transition away from recurring annual support. Ideally this will be a new, unique deployment fund doing away with some the red tape of today's Rural Utility Service or Universal Service Fund that inhibits broad participation by large operators with better economies of scale. Money should be allocated through a technology-neutral reverse auction, with a focus on achieving reasonable speeds in unserved (not underserved) areas, as determined by a robust mapping process. There are always up-front judgment calls on what level of funding is necessary to achieve a certain type of broadband performance in a given area, but an auction mechanism with a challenge process can quickly make those difficult decisions.[4] Because remote work, particularly video conferencing, can require higher upload speeds than normal, any program should ensure adequate upload as well as download capacity.

Robust 5G Deployment

Governments should work to accelerate a broad deployment of the next-generation mobile platform.

Problem: Current 4G networks, while much better than 3G networks, are subject to technological limitations that can impede remote work, telemedicine, and innovations such as high-performance robotics and the automation that will make our economy more productive and resilient to future crises. 5G technology can go a long way in addressing these challenges. However, local governments sometimes unduly limit deployment, scarce spectrum availability affects performance, and the business case for investing in 5G may be thin given the high capital

costs and perhaps limited ability to increase revenues enough for the investment to pay for itself.[5]

Solution: Compared with previous wireless networks, 5G will require smaller and less obtrusive, but much more numerous, cell sites. This "densification" justifies a rethinking of rules around local access to poles and rights of way, as well as support for build-outs in rural or otherwise high-cost areas to speed the deployment of 5G. The United States also needs to allocate more mid-band spectrum for commercial mobile use.[6] State and local governments should do all they can to enable 5G build-out, while the federal government should do the same, including by allocating more spectrum, limiting restrictive local government policies, and spurring 5G use wherever it makes sense in federal agency applications. Finally, Congress should provide incentives for the initial 5G build-out by providing a tax credit for all capital expenditures directly related to 5G investment made between now and the end of 2021.

Universal Broadband Adoption

The U.S. federal government, in coordination with state and local authorities, should work to increase adoption, including through expanding the Federal Communications Commission (FCC) Lifeline program.[7]

Problem: While roughly 93 percent of the population has access to robust broadband, far fewer—roughly 70 percent of American households—actually subscribe to an Internet connection to their home.[8]

Solution: We should work toward a future in which society is able to organize itself under the assumption everyone has an easily available Internet connection. While many Internet service providers have programs to help low-income families with adoption—and virtually all have expanded these programs during the COVID-19 crisis—a full solution requires federal support.

In particular, policy should be tailored to address specific barriers to adoption, which include a perceived lack of relevance/interest, digital literacy, or affordability of connection and devices.[9] When it comes to affordability, Congress should reform the FCC's Lifeline program to expand and improve subsidized broadband options for low-income users, including allowing households to have two connections (e.g., one mobile and one fixed broadband). Ideally, any additional relief package would include general fund support for such an expansion and be designed for broad participation by operators, not restricted to only designated Eligible Telecommunications Carriers (ETCs).[10]

Virtual and Augmented Reality

The U.S. federal government should support the development of VR and AR technologies, while also adopting these technologies where appropriate.[11]

Problem: One challenge to physical distancing, even with fast and reliable broadband, is that digital interactions are still for the most part limited to two-dimensional images on a computer screen. Virtual and augmented reality technologies (termed XR, or extended reality) can close this gap. Virtual reality can create an immersive experience, allowing individuals to maintain better connections with friends and family even when they are physically distant, improve the quality of remote conference and meetings, and allow for virtual travel and entertainment. Virtual reality and augmented reality can also support distance learning, worker training, and scientific

research. For example, a VR company Nanome is making its technology available for virtual 3D modeling of the coronavirus, so that researchers working at home can better understand its structure.[12]

Solution: A number of companies are focused on development of XR technologies and applications. However, additional funding for computer science research on XR can help spur even more innovations. In addition, XR applications can help many government agencies better accomplish their missions, especially when working remotely or when employees cannot travel. The White House Chief Technology Officer should convene a working group of XR experts and government agency personnel to identify promising applications and determine ways to accelerate their adoption.

Electronic IDs

The U.S. federal government should offer secure electronic identification to any U.S. resident who wants one, enabling more remote, online activities.[13]

Problem: Few people have the ability to prove their legal identity online, which makes it more difficult to securely complete a variety of transactions, such as signing a contract, opening a bank account, or accessing government services, entirely online. This lack also makes it difficult for the U.S. Treasury Department to send electronic payments to Americans' mobile phone financial apps during the economic crisis because it cannot be assured of the recipient's identity.

Solution: Many nations are investing in electronic identification (e-ID) systems that allow individuals to legally prove their identities, or attributes about their identities, online. The U.S. government should spur the supply of e-IDs by directing a federal agency to offer them to U.S. residents, for a nominal fee. Both the State Department and the Department of Homeland Security have systems and processes already in place that could easily be adapted to issue e-IDs—either as standalone products, such as smartcards or software certificates for mobile phones, or on existing identification documents, such as passports. Doing so would not only improve societal functions during a time of physical distancing, but boost productivity and convenience the rest of the time as well.

Mobile and Remote Payments

Congress should accelerate the adoption of mobile payment technology by standardizing banking regulations at the national level, enacting fintech regulatory sandboxes to encourage new services, and allowing mobile payment options for government services, such as transit.[14]

Problem: The United States significantly lags behind other countries such as China in adopting mobile payments.[15] Many financial transactions, including retail payments, take place using cash or other in-person exchanges, which creates a risk of disease transmission. One reason mobile payments have not advanced in the United States as fast as in other countries is the United States does not have a digital single market for payments and other interstate financial products.[16] Lack of harmonization and coordination between states on financial regulation creates excessive costs for fintech companies operating across jurisdictions.

Solution: Mobile payments allow consumers to purchase goods online or at a retailer, pay bills, and transfer money using a mobile device. Greater adoption of mobile payments would allow

individuals to remit payments without making physical contact with others, thereby reducing the risk of passing on infections. Moreover, widespread use of mobile payment systems would allow governments to quickly and easily send payments to residents in times of economic crises, as we are in now. By standardizing national-level banking regulations, encouraging new services through fintech regulatory sandboxes, and facilitating mobile payment options for such government services as transit, Congress can significantly help advance mobile payment technology. Standard rules would make it easier to scale up mobile payment solutions, as would regulatory sandboxes to allow companies to create new services that do not fit neatly into existing regulatory frameworks, while still receiving oversight. Finally, by expanding government use of mobile payments in high-contact applications such as public transit, the government could reduce potential vectors for spreading infection.

Privacy Regulation

Congress should pass legislation to create a national data privacy framework that allows organizations to share personally identifiable information with government authorities and qualified researchers during pandemics for public health purposes.[17]

Problem: Data can play a role in pandemic response by allowing authorities to track the spread of the disease, measure the level of compliance with stay-at-home orders, and identify individuals who may have crossed paths with an infected individual (i.e., contact tracing). But many of these useful data-driven public health interventions during a pandemic are complicated by the lack of a national data privacy framework that would enable organizations to collect and share this type of information with government and researchers. In addition, some government officials are reluctant to release critical public health information to the public because of concerns about violating privacy laws.[18] Moreover, stricter limits on data collection, as various state and federal laws have proposed, could make it more difficult to collect consumer data or reuse it for public health purposes, as we are seeing now in Europe as the General Data Protection Regulation (GDPR) is limiting needed data sharing to respond to the crisis.[19]

Solution: Congress should establish a unified national approach to privacy by preempting state laws to make it easier to create national datasets that can be used to organize a nationwide response to a pandemic. Moreover, such legislation should provide explicit carve-outs to obtaining consent for data uses that are in the public interest, including responding to public health emergencies. The COVID-19 crisis should be a reminder that privacy laws focused on only protecting individual rights can overlook important societal and communal values. The goal should be to balance privacy with innovation by minimizing compliance costs and restrictions on data use. Legislation also should address concrete privacy harms rather than hypothetical ones, improve transparency requirements, and strengthen oversight and enforcement through the Federal Trade Commission (FTC). Congress should not include data-minimization requirements, universal opt-in rules, purpose-specification requirements, limitations on data retention, a right to deletion, a private right of action, or privacy-by-design requirements.

Electronic Health Records

Congress should establish new minimum standards for certified electronic health record (EHR) systems that integrate new data collection, reporting, and interoperability requirements to address the needs of public health officials during a pandemic.

Problem: Existing EHR systems do not provide important capabilities needed during a pandemic. At the patient level, health care providers cannot easily track where patients have traveled, which has been a key element to understanding health risks—although this information could be integrated into EHR systems. At the population level, EHR systems do not provide a way for public health officials to obtain information on a large number of patients, nor do they provide a way to report such real-time information public health officials are seeking as the exact number of patient infections or deaths, or underlying medical conditions.[20]

Solution: Congress should direct the U.S. Department of Health and Human Services (HHS) to develop new requirements that incorporate feedback from the Centers for Disease Control and Prevention (CDC) and other public health officials on improvements they would like to see from EHR systems and integrate them into its standard for a federally certified EHR system. Having more information in EHR systems will be necessary to develop new analytical tools to detect and monitor future pandemics. Moreover, these EHR systems will need to be interoperable so government officials can analyze data from them across all states.

Data

Congress should establish a pandemic data task force to identify key gaps in national data infrastructure that could undermine future responses, such as a lack of standards between state Information Technology (IT) systems.

Problem: Challenges obtaining data have undermined some of the government's efforts to respond to the COVID-19 pandemic. For example, the CDC was unable to secure the data it wanted from commercial airlines to track where passengers were coming from and whom they traveled with.[21] Too many government data-collection efforts, especially at the state and local levels, do not adhere to national standards, which results in inconsistent and incomplete datasets, and make it more difficult to conduct real-time monitoring of health, social, and economic conditions at either the national or regional level during a pandemic.

Solution: Congress should establish a task force to identify the various challenges inherent to collecting and using data to inform responses to future pandemics, and propose actions for Congress and the administration. For example, Congress should require states to adhere to federal data standards for any federally funded state IT systems so data from prescription drug monitoring programs, longitudinal education databases, and law enforcement records is collected in a uniform manner—thus making it possible to analyze data across states in an easier and less time-consuming manner. Creating more federal data standards would make it both easier to aggregate data across state lines, and possible to build analytics tools that could be used in any state.

TECHNOLOGY DEVELOPMENT

Thankfully, the world is beginning to transform into a new kind of digital system, one that will not only build on existing devices and systems, but also increasingly incorporate emerging technologies such as sensors, robotics, and artificial intelligence (AI) as they improve in price and performance. This next digital economy will be significantly more connected (with many more things and many more types of things networked in more advanced wireless, satellite, and wireline networks), more automated (as devices and systems enable more work to be done by machines), and smarter (as algorithms play increasingly important roles in sensing—and making sense of—all this). These technologies will underpin efforts not only to automate many functions but to increase production flexibility so factories can more easily switch to producing such items needed during crises as ventilators.

Robotics

The U.S. federal government should launch an Apollo-like program to dramatically accelerate robotic development, investing $5 billion per year for research and development (R&D).[22]

Problem: A key challenge of the pandemic is ensuring the health of frontline care workers. To the extent they can perform certain tasks in the caring for those with the virus, robots will help limit its spread and better protect frontline workers, including nurses and health aides.

Solution: Robotics are the ultimate in physical distancing, as they do not get sick. Robots could help deliver food and tests to patients in hospitals. They could help care for the elderly in nursing homes.[23] They could administer tests such as throat swabbing and taking people's temperature. They could handle contaminated waste, and disinfect areas. One robotic application that uses UV light to disinfect rooms is already being implemented in China and Europe.[24] Remotely operated robots could also be used to do "hands-on" work in other applications such as manufacturing and in power plants. Robots are also helpful in enabling more-flexible production systems. In the past decade, robotic technology has improved, but there is still a need for significant R&D to fulfill its promise. Congress should allocate at least $5 billion per year, to be invested by a variety of federal agencies—including the departments of Energy (DOE), Defense (DOD), and Agriculture (USDA), and the National Science Foundation (NSF)—to support not only university and federal lab research grants, but also direct, co-funded, competitive grants to companies developing robotics technology. Many of the technologies needed for robotics to help with pandemic response are "dual use" technologies that would help enable a wide variety of robotic applications.

3D Printing

The federal government should significantly expand funding for the development of 3D printing and related technologies that would provide more flexibility to U.S. manufacturing, enabling them to more easily shift production to items needed in national emergencies.

Problem: It is expensive for society to stockpile all the items needed during a pandemic or other kind of national emergency. But not having this needed equipment—in the case of COVID-19 this includes masks, gloves, ventilators, and other medical equipment—costs lives. Unfortunately, given current production technology, it can take too long for manufacturers to

shift production and ramp up needed supplies. And as we have seen with China, other nations can limit exports to the United States.

Solution: Historically, much of manufacturing has been mass production, wherein companies spend time and money designing a particular product and buying or developing specialized production technology to produce it. Manufacturing experts have talked for decades about the potential of flexible production: the ability of firms to quickly and inexpensively shift from making one product to another. Technologies such as computer-aided design systems and flexible machine tools are important to this process, but additive manufacturing, a form of 3D printing, will also play a key role.[25] For example, a 3D-printing company Formlabs is working to receive a Food and Drug Administration (FDA)exemption to 3D-printed swabs used in COVID-19 testing.[26] Other companies are working on 3D-printed masks, face shields, ventilator valves, and even testing booths.[27] These technologies will also make it easier to move production back from places such as China, as flexible production technologies can be more competitive in higher cost regions such as the United States.[28] While these technologies have improved, scientific and engineering research is still needed to improve process controls, tolerances, and finishes, and the range of materials able to be used, as well as the speed of systems.[29] To help advance the technologies, while also enabling U.S. companies to be more competitive, Congress should significantly expand funding for 3D-printing R&D, both at agencies such as the National Aeronautics and Space Administration (NASA), DOD, DOE, and NSF, but also at the America Makes Institute, one of the Manufacturing USA Institutes.[30]

Artificial Intelligence

The White House should establish a task force of commercial, academic, and government stakeholders to identify and expand opportunities to use AI for physical distancing.[31]

Problem: Greater use of AI could enable many important changes necessary for physical distancing. For example, AI could help model and predict the spread of disease, and help doctors monitor patients remotely, triage new patients, optimize the delivery of key medical supplies, and interact through chatbots with infected or potentially infected individuals at hospitals, retail stores, and other locations. However, there is no organized effort to leverage AI to pursue physical distancing, which is resulting in missed opportunities.

Solution: A task force can identify the key priorities for using AI for physical distancing, evaluate any potential constraints or barriers, and issue recommendations for how the private sector, government, and universities could support these efforts—as well as any necessary recommendations to Congress, including for additional funding of AI research.

The Internet of Things

Congress should develop and fund a globally competitive smart-cities program and national Internet of Things (IoT) strategy.[32]

Problem: When governments implement new policies, such as stay-at-home orders, they struggle to understand the impacts these decrees have on their communities. As a result, they are forced to make—and stick with—important policy decisions because evidence about the efficacy and unintended consequences of their policies are often not known until much later.

Solution: The private sector is developing connected technologies to support smart homes, smart cities, and smart infrastructure, but these advancements are only piecemeal and fragmented. Increasing adoption of IoT devices is necessary to generate key datasets that could help communities better respond to a pandemic, such as smart thermostats to track public health trends and fitness trackers to understand how people's fitness habits, sleep behavior, and overall health indicators change during a pandemic. Local governments can also use connected technologies to better manage public services and resources, thereby improving their resilience in times of crisis, whether it be a health epidemic, terrorism, or natural disaster. Congress should allocate at least $2 billion for smart city funding. When the U.S. Department of Transportation (DOT) held a smart city challenge in 2016, it had almost 80 cities compete for a $40 million grant. In the process, many cities developed detailed plans for how they would invest additional funding to become smart cities. Congress should authorize a new round of funding to make resources available on a competitive basis for up to 10 large cities, 20 medium-sized cities, and 30 small cities to receive grants to invest in smart city infrastructure (ideally digital infrastructure that would boosts resiliency). DOT could build off of its prior smart city challenge to quickly conduct and complete a review of this competitive process.

Blockchain

Congress should fund a government blockchain pilot projects program to expand the number of blockchain initiatives at the local, state, and federal levels.[33]

Problem: Many transactions, such as buying or selling property, require using a trusted intermediary such as a bank or a government agency, which creates a constraint during physical distancing when these institutions are unavailable.

Solution: Blockchain is a technology that creates a distributed digital ledger that allows multiple parties to engage in secure, trusted transactions with one another without an intermediary and without physical contact. Blockchain enables many important types of services such as cryptocurrencies, smart contracts, and decentralized marketplaces. By investing in blockchain pilot projects, government agencies can accelerate the deployment of this technology, thereby creating more opportunities for automation and digitalization in the economy.

Facial Recognition and Other Contactless Biometrics

Congress should mandate all government agencies use contactless biometrics, such as facial recognition, wherever feasible.

Problem: In recent years, government agencies have begun to use biometrics to more securely authenticate individuals, such as to ensure travelers match their passports at ports of entry. However, many of these applications, such as fingerprint scans, use techniques that require many individuals to touch the same surface repeatedly, thereby creating a potential avenue for spreading disease.

Solution: Congress should require all government agencies to implement contactless biometrics wherever feasible to reduce the potential spread of infections during a pandemic. At a minimum, this should include airports, border crossings, and federal government buildings. In addition, Congress should direct the National Institute of Standards and Technology (NIST) to start testing and reporting on the accuracy of thermal imaging cameras that can remotely monitor people's

body temperatures, which could be used to reduce risks from in-person testing and increase convenience for travelers returning from locations with a travel advisory.

DIGITAL SECTORAL TRANSFORMATION

There is a need—and an opportunity—to digitally transform many sectors of our economy to ensure they are more resilient and can function in more automated ways to reduce exposures to communicable viruses, while allowing individuals the ability to obtain more goods and services remotely during times when physical distancing is required.

K-12: Universal Access to Computing Devices

Government should make sure children have the necessary tools to do schoolwork at home during times of physical distancing.

Problem: The need for widespread physical distancing as schools throughout the nation have closed highlights a key challenge: Many students lack broadband and device access at home. Roughly 1 in 5 teens report having trouble completing online homework because of a lack of connection or device.[34] About 40 percent of teachers report that many of their students do not have a computer or the necessary access to do their homework.[35] As a result, in a time of physical distancing, many schools are faced with a tough choice: either continue teaching with remote technology tools, realizing some kids will be left behind, or stop teaching altogether.

Solution: Most households with school-aged children have broadband available, but some lack the resources to subscribe or purchase computers. Congress should support, through general funds, a program whereby schools are able to purchase computing devices (either laptops or tablets, depending on the age of the children) for all students qualifying for free or reduced-cost lunch programs. These devices could be loaned out to students during the school year to enable them to do homework, and during times of school closure due to national emergencies such as the coronavirus to engage in home schooling. At the same time, tools within the FCC's E-Rate program could be expanded to reimburse schools for Wi-Fi hotspots or wired broadband installation kits to provide connectivity for students in their homes.[36] The FCC arguably has the authority to do this today, but Congress should clarify and put the funding source on surer footing.

College and Universities

Congress should establish a process to accredit organizations that provide certifications, encourage federal agencies to accept alternative certifications in lieu of degree requirements, and allow students to use federal aid for alternative learning options, such as massive open online courses (MOOCs).[37]

Problem: Too few colleges or universities provide education remotely, including through MOOCs—top-quality courses offered online to tens of thousands of students at a time—which makes it difficult for students to continue learning during a time of physical distancing. And while most colleges scramble to shift to online classes, the process is not without difficulty. One key reason for the lag in embracing online learning during "normal" times is colleges and universities hold a unique franchise: They are responsible for educating students and granting them degrees. Schools thus lack incentive to help students learn outside their own classrooms, including through online means, even if doing so would lower costs or be more effective.

Solution: The rise of online learning, particularly the emergence of MOOCs, allows students to learn remotely, usually at a much lower cost than conventional in-class learning. But despite the early excitement about MOOCs, they have not taken off. The core reason is colleges and universities have few incentives to let their students "buy" a competitor's product (e.g., a MOOC), so they use their degree-granting authority to allow only their own university's classes to count toward a diploma. Breaking this logjam requires the federal government to promote alternatives to traditional college diplomas that allow individuals to more effectively demonstrate educational mastery to prospective employers. This would give students the freedom to pursue their own best options, including MOOCs, for learning. Among the steps for Congress would be to mandate the United States Office of Personnel Management not require college degrees for federal employment, while also enabling more online learning to qualify for federal aid.

Telework

All levels of governments—local, state, and federal—should develop and implement policies to enable widespread teleworking.

Problem: Too few governments and agencies within governments are fully prepared to enable much of their workforce to telecommute. Some lack laptop computers. Some have failed to move to the cloud, so file access becomes a problem. Some lack enterprise-grade, stable, and secure digital systems.[38] Others have restrictive policies. Notably, on January 20 of this year, the Trump administration retracted its telework policies, making it more difficult for federal workers to telecommute.[39]

Solution: To the extent employees can work from home during enforced physical distancing, this is critical to reducing the economic impact of a pandemic. Due to improvements in technology, many jobs, even customer-service jobs, can be performed remotely at home. While there appear to be few barriers to the private sector moving in this direction, not enough governments have embraced this technology. Governments need to ensure they have the technology systems and organizational procedures in place to enable widespread telework. Doing so would also have benefits long after physical distancing is lifted, as telework has been shown to improve productivity, cut costs, and improve employee morale.[40]

Smart Factories

The U.S. federal government should launch a $500 million U.S. Manufacturing Digitalization Investment Fund to dramatically accelerate the transformation of America's manufacturing base into smarter factories.[41]

Problem: Smart, digitally enabled factories that could operate with far greater degrees of autonomy could help reduce the need for human intervention on the manufacturing floor, while having the potential to boost overall U.S. manufacturing productivity by as much as 25 percent. Yet many manufacturers, particularly small and mid-sized ones, don't have access to the up-front capital needed to invest in these potentially productivity- and safety-enhancing technologies.[42]

Solution: New digital technologies promise far more productive manufacturing. Consider a model manufacturing facility Siemens has built in Amberg, Germany, that leverages over 1,000 networked manufacturing units automatically coordinating with one another to retrieve and fabricate components without human oversight. The facility operates 75 percent autonomously,

allowing its human employees to focus on operating computer systems and monitoring the factory floor.[43] In times of pandemic, such smart factories could maintain high levels of output of critical products with only a modicum of human intervention. Yet studies have found that truly achieving the potential of digital manufacturing will require upgrading about 40 to 50 percent of the current asset base across U.S. manufacturing industries.[44] That challenge becomes particular acute for small to medium-sized (SME) manufacturers, an estimated 25 percent of which struggle to cover their basic working capital costs, let alone upgrade to smart factory technologies.[45] To address these challenges, Congress should establish within the Small Business Administration a Manufacturing Digitalization Investment Fund that provides low-interest loans to American SME manufacturers to help finance up-front investment in digital manufacturing technologies and solutions. Congress should double the funding of NIST's Manufacturing Extension Partnership to enable them to work in concert with MxD, a Manufacturing USA institute focused on digital manufacturing, to bring digital solutions to a much greater number of small manufacturers. Congress should provide incentives for the initial smart factory investments by providing a tax credit for all machinery and software capital expenditures by manufactures between now and the end of 2021.

Autonomous Vehicles

The U.S. federal government should work with states to coordinate and streamline regulatory approaches to AV testing and deployment, accelerate more widespread adoption of AVs, as well as outlaw state efforts to ban them.[46]

Problem: Ride sharing has become an essential component of American mobility, with an estimated 700 million ride shares transacted over the past year. But ride sharing puts both the driver and rider at risk in times of pandemic, whereas AVs could enable physical distancing while providing safer and less-expensive mobility options.[47]

Solution: AVs are poised to increase the safety of American mobility by eliminating human error, which causes 93 percent of traffic accidents. In addition, ride sharing would remove the risk of disease transmission from driver to passenger in case of pandemic, thus providing a far safer mobility option.[48] Unfortunately, some have called for bans on AVs either due to safety concerns or to avoid job loss.[49] For instance, in 2018, four Minnesota state legislators proposed a bill that would ban AVs until the technology is proven safe.[50] In 2017, the Upstate Transportation Association, a group that represents the taxi industry, urged New York State to ban self-driving cars for 50 years due to fears over ride-sharing services deploying AVs and thereby causing massive job loss. The president of the association even argued, "It doesn't do anything for the local economy to have driverless cars."[51] Likewise, Chicago lawmakers introduced an ordinance in 2016 to ban AVs on Chicago streets, arguing that they're a "job killer."[52] Federal policymakers should use the opportunity presented by the coronavirus crisis to sweep away regulatory barriers to AV development and deployment, creating a national framework that speeds the way toward testing, certification, and deployment of AVs.

Autonomous and Semi-Autonomous Freight Trains

The Federal Railroad Administration (FRA) should continue to allow freight rail companies to move to one-person trains, preempt states from mandating two-person crews (which seven have done), and ultimately work toward allowing fully autonomous freight trains, provided they demonstrate needed safety.[53]

Problem: Freight rail is an essential national service, both in times of pandemics and otherwise. Yet most freight rail trains still operate with two-person crews: an engineer and a conductor, usually working in very close quarters—although on most trains the seats for the engineer and conductor are separated by more than 7 feet. One-person crews or autonomous trains would reduce the risk of spreading disease among train crews and would make the system more resilient in times of pandemics.

Solution: Both here and in Europe, particularly on routes running through rural areas and on tracks equipped with the latest safety features, many trains already run safely with only one crew member. In addition, autonomous trains are already commercially viable and in use in urban subway systems around Europe.[54] A key reason for this trend is the industry has been investing in such new technology for safety systems as positive train control, which monitors speed restrictions, communications, and track signals to prevent collisions. This is one reason FRA withdrew a notice of proposed rulemaking last year that would have mandated two-person crews. The agency admitted it did "not have information that suggests that there have been any previous accidents involving one-person crew operations that could have been avoided by adding a second crewmember."[55] It ruled that a blanket crew-size requirement is not needed. Despite this, at least seven states have mandated two-person crews. Crew sizes are better left to FRA, which regulates train safety nationally. Given the railroad industry's national scope, and the inefficiency introduced by different state mandates, FRA's action should preempt state mandates.[56] FRA has explicitly stated its intent to challenge states that pass crew mandates, and its position is likely to be upheld in court. Moreover, the technology being developed for fully autonomous and safe trains is likely to reduce freight costs while increasing transportation resiliency—so federal regulators should allow freight rail companies to implement it once it has proved to be safe.

Sidewalk Delivery Robots

Governments should facilitate the use of autonomous delivery devices.

Problem: A number of jurisdictions have limited the use of sidewalk delivery robots, which can play a key role in reducing exposure to viruses such as COVID-19, by both making it easier for people to stay in their homes, and limiting exposure of delivery drivers.

Solution: With physical distancing, home delivery of goods becomes increasingly important. One technology to do this is sidewalk delivery robots: autonomous devices that can deliver items to people's residences. Yet some cities have severely limited their use. For example, San Francisco temporarily banned delivery robots on most city sidewalks in 2017. The city's supervisor, Norman Yee, who proposed a complete ban, stated that "our sidewalks should be prioritized for humans." While San Francisco ultimately passed legislation to create a permitting process that

allows such robots on their sidewalks, the application and permit-extension fees for each robot are more than $1,400. In addition, permits are only good for 180 days and can only extend for 180 more.[57] In late 2019, New York City, one of the places hardest hit by the coronavirus, issued an order requiring FedEx to stop delivery-robot pilot projects.[58] Madison, Wisconsin, is also considering a ban.[59] These regulatory approaches are in direct contrast to the approach taken by several states (e.g., Virginia, Idaho, and Ohio) that permits the use of delivery robots—which can also improve consumer experiences through more same-day deliveries, more flexible delivery hours, and lower delivery costs.[60]

Accessible Voting

Congress should require states to provide universal no-fault absentee voting.

Problem: Only 28 states plus the District of Columbia offer no-excuse absentee voting, but casting ballots in person is not feasible during a pandemic.

Solution: Congress should allocate at least $1 billion for states to make improvements to election technology. These funds should be made available as grants to all states that agree to adopt universal no-excuse absentee voting—i.e., wherein voters can opt to vote remotely without needing to provide a reason. Allowing vote-by-mail or other forms of remote voting would facilitate participation in elections even in cases of pandemics or other emergencies. States should be free to use these funds to modernize any of their election technologies, including to improve security, as long as they offer universal no-excuse absentee voting.

E-Government

Establish a telework and remote-service delivery mandate for federal, state, and local government, and provide sufficient funding to enable this transformation.

Problem: Too many government agencies, at the federal, state, and local levels, are using systems that are old, not citizen-friendly, and expensive to maintain—all of which makes engaging in telework or seamlessly delivering services online more difficult. For example, many of the Social Security Administration call centers are down due to the coronavirus, even though the technology to enable call-center workers to work from home is easily available—and many similar private companies, such as banks and insurers, are operating seamlessly with their workforces at home.[61] Likewise, a number of state unemployment insurance websites have crashed during the crisis, even though these systems could have been engineered to operate seamlessly when facing surges in use.[62]

Solution: Government agencies often do not upgrade IT systems the same way many businesses do, making it more difficult for them to deliver services online or to enable work from home for their employees. Instead, they spend large shares of their budgets patching and maintaining systems that are long past their sell date. During the coronavirus pandemic, many government agencies have simply shut down with no viable alternative to deliver services online. Others have attempted to offer services online but failed to do so adequately, as their websites crashed under large surges in traffic. To address this problem, government agencies should modernize their IT systems, including but not limited to investing in both cloud-based IT systems that offer mobile-friendly online services to government customers, and remote work capabilities for employees and contractors. Congress should establish a one-time e-government modernization fund for

federal, state, and local agencies to upgrade their IT to modern standards—and in order to qualify, their agencies would be required to act within the next six months.

Health Care

Congress should establish a national license for telehealth all states must accept, and require insurers to cover telehealth treatments.[63]

Problem: Patients have limited telehealth options because state licensing restrictions prevent health care providers from offering out-of-state services, while insurance reimbursement policies often do not cover telehealth services.

Solution: Regulatory barriers limit the deployment and adoption of provider-to-patient telehealth capabilities. Telehealth services allow patients to see health care providers from their home or other remote location, creating the potential for more convenience for patients, lower health care costs, and better balance between supply and demand of health care services across the nation. Moreover, telehealth services reduce contact by allowing patients with chronic health conditions, including mental health, to continue to see providers during a pandemic. While some states, such as Maine, have relaxed telehealth restrictions during the coronavirus crisis, they have done so only temporarily and on a limited basis.[64]

Drones

The Federal Aviation Administration (FAA) should accelerate its efforts to review applications for commercial drone delivery services and work with the private sector to enable residential delivery by 2021.

Problem: A variety of businesses would like to provide residential drone delivery services, but must first receive FAA approval to operate.

Solution: Drone delivery is one important method of providing contactless delivery. The FAA Reauthorization Act of 2018 requires the FAA to create rules for autonomous drone (unmanned aerial vehicle) delivery. The FAA requires most drone operators to obtain a special exemption waiver for any flights that take place at night, are beyond line of sight of the operator's or an assistant's unaided sight (i.e., without using binoculars or built-in video cameras), or are involved in package delivery. The FAA approved the United Parcel Service (UPS) to begin making commercial deliveries to hospitals using drones in October 2019—the first major approval for commercial drone delivery in the United States—but still imposes restrictions on drone delivery in heavily populated areas and to residences. Moreover, UPS obtained its certification by seeking approval under Part 135 of the Federal Aviation Rules, a more complex portion of the rules not designed primarily for drones.[65] To expand the set of drone operators providing commercial delivery, the FAA should change its rules for Part 107, which is more appropriate for most drone operators, to allow for commercial delivery and operation beyond line of sight.

Enabling E-Commerce

Local, state, and federal policymakers should resist special-interest lobbying attempts to have government limit self-service retail options.[66]

Problem: Some governments limit or even ban self-service retail, even though such transactions limit virus transmissions.

Solution: By definition, self-service functions limit human contact that can contribute to spreading communicable diseases such as the coronavirus. Being able to procure gas, check out groceries, order a hamburger, buy stamps, pay tolls, have your eyes examined for contact lenses, and get cash through self-service applications all enable physical distancing. Moreover, self-service functions are often more convenient and lead to lower prices. But a number of jurisdictions limit self-service, sometimes under pressure from companies and unions. For example, New Jersey has banned self-service gas stations, while Oregon limits their use.[67] At the same time, many nations ban them outright.[68] Other jurisdictions have attempted to limit self-service checkout in grocery stores.[69] Unions and others have worked to limit Amazon Go, Amazon's cashierless grocery stores.[70] Optometrists have worked to limit the ability of contact lens wearers to use kiosks to identify the size of lenses needed, or to purchase them online.[71] Elected officials at all levels of government need to resist efforts to limit self-service technologies and applications. Moreover, FTC's Bureau of Consumer Protection should step up its efforts to weigh in when states and local governments consider such anti-consumer actions. Finally, states and the federal government should increase the minimum wage, as there is strong evidence this encourages the application of self-service technologies.[72]

Cashless Stores

State and local governments should overturn all bans on cashless stores.[73]

Problem: Some states, such as New Jersey and Michigan, as well as such cities as Philadelphia, have passed laws prohibiting retailers, restaurants, and other consumer-facing businesses from refusing to accept cash.

Solution: Cashless stores offer a host of benefits to businesses, including faster processing and reduced theft. Paper currency can also be dirty, and to promote good hygiene during the COVID-19 pandemic, CDC recommends individuals limit handling cash.[74] Moreover, despite most consumers preferring such cash alternatives as credit cards, the United States lags behind other countries in adopting non-cash payments.[75]

CONCLUSION

John F. Kennedy once stated, "When written in Chinese, the word 'crisis' is composed of two characters. One represents danger and the other represents opportunity." Indeed, all too often it takes a crisis to galvanize policymakers to action. Sputnik spurred massive U.S. investment in technological innovation in the 1950s. September 11 was a wake-up call to secure American borders and transportations systems, and increase U.S. intelligence capabilities. There is no doubt COVID-19 will also serve as a cautionary tale, at least for the need to strengthen and make more resilient our public health care systems. But it should also be a warning to strengthen and make more resilient U.S. systems and sectors through the increased and better use of technology to both enable more productive physical distancing and increase productivity and flexibility of key productive systems, including transportation and manufacturing. Clearly, additional support for public health systems and drug development are needed. But so too is support for digital transformation.

Some will argue we don't need to do these things, or that we can't afford them. Given Congress just appropriated over $2.2 trillion for relief efforts, the sum of the initiatives proposed here are significantly less expensive. More importantly, these investments would have the added benefit

of boosting U.S. gross domestic product growth through better and more efficient education, health care, manufacturing, transportation, and more, while making the economy and society more resilient should we face another similar crisis. In this sense, these investments provide a rare win-win opportunity.

Finally, others will argue that at a time when tens of millions of Americans are out of work, we can't afford to support policies to boost productivity. This is entirely backward. Now more than ever, America needs higher productivity in order to make up for the trillions in lost output. Moreover, as the Information Technology and Information Foundation (ITIF) has long shown, the economic research clearly shows there is no negative relationship between productivity growth and unemployment rates or job growth.[76] Boosting productivity increases wages or reduces prices, which spurs more spending, and in turn creates more jobs.

To summarize, it is time for Congress and the administration to make a major push in helping to increase digital resiliency to better prepare for possible future pandemics.

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ENDNOTES

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