



The Pandemic is Accelerating Digital Transformation: What Could be the Downside for Humanity? And What to Do?

Mark R. Hagerott

Chancellor, North Dakota University System

Abstract

This essay calls attention to major socio-technical forces that are gathering momentum, accelerated by COVID-19, yet largely out of the public eye. Rapid digital technological change that concentrates power in the emerging realms of cyber space and robotics, is a transforming force that may damage human-centric systems and society. Paradoxically, currently conceived COVID mitigation policies when combined with power-concentrating digital technology may undermine social equality, labor markets, human community, health, and culture in the long term. Since technological systems create their own inertia and tend to 'lock in' early decisions, it is difficult to reverse mistakes. Leaders need to act early to reconsider the unintended second and third order effects of COVID responses that rely on digital technology. The essay lays out four policy recommendations, to include a new investment program for human-centric labor markets; investment in universities to help create humane digital society and to prepare the next generation to flourish in this transformed world; requests the newly elected American president to establish a national-level Task Force to develop new policies and ethics for the digital age; and lastly, a windfall profits tax on digital companies that benefited by the pandemic. The essay ends with a challenge to this generation of leaders to ensure the post COVID-era will privilege not the digital machines and the small group who own them, but promote a reinvigorated, natural, human society of all Americans.

Keywords: Digital transformation, humanity, intelligent machine, COVID-19

Human society faces disruption and tumultuous change far more unprecedented and historic than a pandemic¹. Rapid, digital technological change is the big story, the paradigm transforming narrative, the potential birth-pangs for a Post-COVID world that if we allow it, may privilege digital machine systems over humans and human-centric systems. Paradoxically, COVID mitigation policies may promote human welfare in the short term, but may undermine human community, health,

¹ McNeill, William H., *Plagues and People*, New York: Alfred A. Knopf, 1976

and culture in the long term. Furthermore, technological systems create their own inertia, and if not managed carefully, tend to 'lock in' early decisions and patterns of use, making it difficult to reverse mistakes. It is thus imperative that our leaders act now to reconsider the unintended second and third order effects of our COVID responses. Otherwise, harmful consequences for human-centric systems, humanity, and human values may occur and become 'locked in' and perhaps irreversible.

Do I exaggerate the portent of the challenge? Current events stand as a testament to massive scale and scope of the socio-technical forces in play, as well as the desperate, well meaning, but confused human reaction. Ponder with me the headlines. American cities burned, and a cacophony of voices called for radical action, some to remake our nation into a socialist state.² While warehouses, factories, and office spaces emptied of humans, computer servers and robots proliferated more widely. Internet traffic increased exponentially, pouring wealth into corporate digital data centers and cloud companies. COVID-stressed, human-centric companies face bankruptcy yet already massive digital companies hit record high capitalization. Congress considers bailing out some companies, but at the same time ponders the regulation or even break up of one or more digital giants.³ Years before the pandemic, and worsening now, our nation witnessed a rising level of youth depression, suicide, and loneliness as the use of digital devices and social media sites increased.⁴ Lastly, as digital systems grow, so does disinformation, fake-news, and cyber hacking, while the truth becomes opaque. How can we frame these events in a way that allows us to look beyond the daily headlines? What risks do these forces pose to human society and our families? How has COVID energized digitization, and most importantly, what should we do?

² The candidacy of Bernie Sanders, an avowed socialist, both in 2016 and 2020 provide the most compelling evidence of the desperate social reactions. But there is indeed something wrong for many Americans, before COVID. See: Desilver, Drew, *For Most U.S. Workers, Wages have Barely Budgeted for Decades*, by Pew Research Trust, see link: <https://www.pewresearch.org/fact-tank/2018/08/07/for-most-us-workers-real-wages-have-barely-budgeted-for-decades/>

³ US Department of Justice, on 20 October 2020, filed suit charging GOOGLE with anti-trust violations. See, "Justice Department Files Google Anti Trust Lawsuit," by Jason Bellini, *Wall Street Journal*, 20 October 2020.

⁴ Twenge, Jean M., *iGEN: why today's super-connected kids are growing up less rebellious, more tolerant, less happy-- and completely unprepared for adulthood and (what this means for the rest of us)*, New York: Atria Books, 2017.

The Pandemic is Accelerating Digital Transformation

A Framework to Display how Technology is Disrupting our Society

The most powerful force of change, and a threat to the well-being of much of human-centric society if left unmanaged, is the uncontrolled, accelerating invention, adoption, and concentration of power associated with digital technology. A multitude of increasingly intelligent digital inventions, robotic and in cyber space, pile one upon another, exerting social-economic change on a grand scale, at the *macro level* of how work and social interaction is carried out. Digital technology is changing the very structure of life and society and economy, and as recent evidence is showing, actually reducing human-centric wellbeing and even future business and commerce.

To be sure, changing technologies have reshaped society and economies in the past. At the small scale, or *micro level*, a person is compelled many times in their lifetime to adapt to one technology or another. One can think of the shift from manual to automatic transmission in the car; from train to airline travel; from handwriting to typewriters; from factory floors full of wrench-turning workers to factories where humans operated wrench-turning machines. All these cases, humans were present and still in control. But something began to change at the socio-economy's *macro-level* as technology began to digitize. Our socio-economy has been inundated with waves of digital innovations. Typed letters were replaced by email, and now intelligent email assistants draft letters. Factories and warehouses with intelligent robots hold few if any human workers, and therefore, they remain dark while the machines work. Offices were once full of humans thinking and working with desktop computers and spreadsheets, but now the data is analyzed in "the cloud" by increasingly intelligent 'self-learning' algorithms. Friends used to be those of our physical neighborhoods and schools, but now can be anywhere, or may not be human at all as in the case of "Alexa". Games used to be played on game boards in a basement, but now are massive multiple player games simultaneous across the globe, where you can play against artificial algorithms without human competitors. With the explosion of advanced digital technology, literally trillions of chips, sensors, computers, autonomous machines, and what may be a Turing-like breakthrough in AI, we are witnessing *Macro* change, the emergence of new artificial worlds. Reduced to its simplest, a planet that was dominated by a realm of human-centric activity is now being joined by two other realms of activity. The other realms are that of the autonomous or near autonomous intelligent robotic and that of the entirely virtual, non-tactile, realm of cyberspace or internet, an interlocking triad I call the Human, Robotic, and Cyber "Realms."

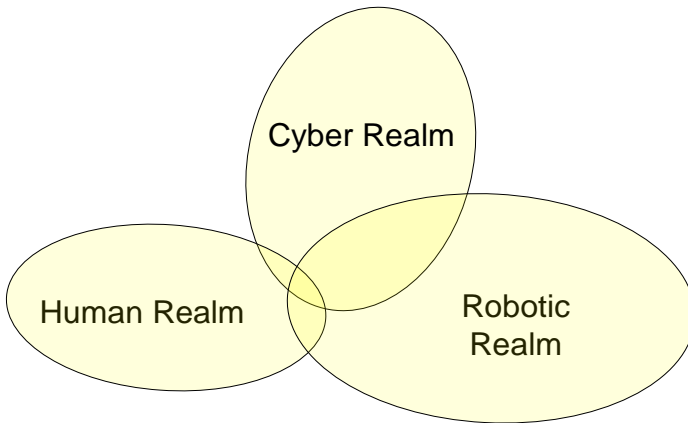
Pictured in Figure 1 is a two-dimensional rendering of the three Realms: the Realm of Human-centric activity, the Realm of Robotic systems, and the Realm of Cyber Space.⁵ Until the very recent past, human-centric social, economic, technological, and military systems dominated the world, and while natural systems of plant and animal life existed, they continued to exist at the will (or some would say, whim) of Human-centric systems. But Human-centric technology was generally limited to augmenting natural human capabilities to act with greater precision or at a distance (e.g., the typewriter enhanced human written communication on paper; the telephone carried the human voice at greater distances than one could yell; the ship and plane and train carried humans and cargo, but were piloted by humans). Humans provided the highest-level cognition of systems, even if machines did more of the heavy lifting, carrying, and transmitting of human processed information. But the invention of intelligent and speedy computer processors, combined with advanced engineering, have created the two digital Realms of activity. The socio-economic-military activity emerging between artificial actors in these two Realms *can now occur with little or no direct human control*. The emergence of the Realms of Robotic systems and Cyberspace are moreover near simultaneous and will both challenge the privileged place of Human-centric systems that has defined history to this point.⁶

The emergence of these two digital Realms was perhaps inevitable. And, the benefits of these two new Realms should be acknowledged. Much of the work done in these Realms by advanced robotics and AI infused cyberspace, no number of humans could have done by themselves or with human-directed machines. If that is as far as the implications went, humans would be fine... but... there is more.

⁵ I will use the term Cyber instead of Virtual or Internet, but they could be used interchangeably.

⁶ This framework has been presented in multiple venues the past 15 years, to include award winning articles on defense strategy (2006); Naval War College (2007); CNA Corporation (2007); presentations at universities in France (2011), Yale (2013), and Annapolis (2014); University of South Dakota (2019); the Geneva Convention CCW (2014); Pentagon (2012), Navy senior leaders (2015), Army senior engineers (2014), National Security Agency/US Cyber Command (2014); Naval Post Graduate School (2016); US TRANSCOM (2017); US Chambers of Commerce annual meeting (2015); TEDx (2016); and a variation of this framework published in American and European edited volumes. This framework was presented most recently at Northern Plains Ethics Institute in November 2019, on the eve of COVID pandemic. COVID adds new urgency to explain what is happening, hence, this essay.

The Socio-Economy has Three Realms. With COVID, the ^{Unclassified} Robotic and Cyber Realms growing at expense of the Human



Only with increased Government, Business, and Philanthropic investment in education, social programs, as well as informed Human-Centric policy, can we re-balance the Realms to benefit and protect Human systems during COVID and in the future.

^{Unclassified}

Figure 1: Graphical Depiction of Three Realms: Human, Robotic, and Cyberspace

Implications of the Two Digital Realms? ... is Society more Equitable? are Children Healthier? are Humans more valued or devalued?

Society is now experiencing the symptoms that accompany the emerging nexus where the Human Realm overlaps with two new Realms, Robotic and Cyber. Most humans are only now becoming dimly aware that many of the social distress symptoms afflicting our nation arise out of being human in proximity to emerging digital technology. What are some of the most visible symptoms of this emergence?

Record shattering socio-economic inequality is the most obvious indication. To those who control the rights and patents to digital machines and algorithms, the amount of wealth and power being created is eye popping. Financial benefits accrue to only a small portion of the population, with large swaths of the country left behind or left insecure. Imbalances in wealth are expanding such that eight men—just eight—own more wealth than the world's poorest three billion people combined, a trend to which the digital revolution is a major contributor. The per capita income of the tech hubs is

swelling, and their associated universities' endowments bulging with record billions.

In contrast, where cyberspace and digital machines intersect with regions, cities, and households outside the tech hubs, signs of distress mount. Darkening clouds of hacking and privacy abuses, misinformation and disinformation and lack of equal access cast a shadow of social, employment, and political insecurity. The workers and wages outside of the tech hubs and digital professions are coming under increased pressure, and there is no certainty that an advanced digital economy can absorb the human work force, a possibility considered by Brynjolfsson and McAfee in "The Race Against the Machine."⁷ Moreover, the rise of digital giants such as Google and FACEBOOK has not been healthy for start-up businesses, and entrepreneurship rates in the United States have been declining since the 1990s. Conditions are such that numerous forward-looking leaders, including some who spoke at the Davos World Economic Forum, have warned of the potential destabilization of society.

Also alarming, we are seeing a rapid increase in child depression and suicide, a major shift that scientists increasingly associate with the widespread penetration of society by the highly advanced communication and computational device, the smart phone, and the growth of social media sites.⁸ A multitude of the digital creators, the insiders of these companies, have recently argued that we, our children, our families, our fellow Americans are NOT customers but are the product; that our information given freely away is being monetized for the benefit of the few at the cost of the many. This possibility has been documented recently in a Netflix special, "Social Dilemma."⁹ The insiders confess that they and their digital social media companies took deliberate action that risked further digital addiction especially of teen users, purposely diverting a

⁷ Brynjolfsson, Eric and Andrew McAfee, *Race Against The Machine: How the Digital Revolution is Accelerating Innovation, Driving Productivity, and Irreversibly Transforming Employment and the Economy*, Cambridge: Digital Press, 2011

⁸ Twenge, Jean M., *iGEN : why today's super-connected kids are growing up less rebellious, more tolerant, less happy-- and completely unprepared for adulthood and (what this means for the rest of us)*, New York: Atria Books, 2017. Again, the U.S. Department of Justice, in a Republican Administration no less, has filed an anti-trust lawsuit against GOOGLE of the Alphabet Corporation, in October 2020.

⁹ Links to this report can be found here: <https://www.netflix.com/title/81254224>

The Pandemic is Accelerating Digital Transformation

teen's time and energy to internet content and away from healthier physical or cognitive activities.¹⁰

Lastly, human-centric cultural values, the values attached to humans and human life, is being affected by the emergence of these two realms of intelligent machines. And, history shows, the cultural effects may be radical. Consider the changes to the once dominant natural-human economy before Industrialization. Humans, nature, and animals were closely connected by work, but also by culture. We all know the paradigm-shifting rise of mega cities and the decline of rural areas, and the associated changes to family bonds, marriage, size of families, and church. But also interesting is to reflect on human attachment to animals, in particular, the human-horse relationship that existed in our nation in the last century. The fact that horses were conscious beings, and as we see from so many movies and books, valued in our culture and deeply connected to humans, all meant very little when confronted with industrialization and resulting changes in work efficiency of tractors, and later, trucks and automobiles.¹¹ City and highway ordinances and norms changed radically to make horses unwelcome in proximity to most humans, no matter how attached the owners were to their favorite mount. Thus, when we consider whether conscious humans could ever be devalued by the efficient but nevertheless *unconscious* machines, we should remember the shift in values in the rural and human-animal centric culture. And, to be clear, I am not suggesting that government policy will overtly value machines over human laborers, but rather, cultural norms will be reshaped by those who control digital technology, and the longstanding value of many human beings may be devalued.

How has COVID changed or accelerated this trajectory?

As we assess the effects of technology in the time of COVID-19, it is important to acknowledge that technology has provided enormous medical benefits as the world fights the pandemic, especially for elderly persons or persons with comorbidities who may require hospitalization. And for those quarantined at home or dorm, digital technology has helped reduce isolation while providing

¹⁰ A former internet startup executive, Tristan Harris, has begun a movement in Silicon Valley, around the idea of reducing the exploitation of humans and especially teens. See his website, <https://www.humanetech.com/>

¹¹ The plight of the horse in the Industrial Age is addressed by numerous books, but the connection to the devaluation of conscious beings in favor of efficient machines is made stark in recent work by Yuval Harari. See *Homo Deus: A Brief History of Tomorrow*, London: Vintage Books, 2017.

social outlets, distance learning, and tele-health. But what of the other effects, first order and beyond?

With the pandemic, the shift in resources from direct contact, human-centric systems to those more technological has accelerated. COVID, as did pandemics in the past, attacks individual humans, and predictably, government mitigation strategies dramatically reduce Human-Human contact. Unlike 1918, digital technology today makes possible social distancing and depopulating workplaces on an epic scale, pushing humans apart more frequently and at greater distances. Let us explore this dynamic a bit more as it pertains to effects of wealth inequality; employment and workplace; community vitality and physical health; trends for addiction; and, the long-lasting impacts on cultural values:

Wealth and Income Inequality

While many of Big Tech's helping hands have been wonderful in the short term, our society has handed back enormous wealth into these hands, resulting in a massive shift in resources. By some reports, as tens of millions of people were losing their non-digital jobs due to COVID, the number of billionaires in the United States increased rapidly, the direct and indirect beneficiaries of the rapid shift of more resources to the digital economy.¹² As the *Wall Street Journal* recently reported, the capitalization of advanced tech companies now makes up more of all stock markets than at any time since the Dot Com mania.¹³

Employment and Workplace Effects

The workforce with limited digital skills is shouldering the main effects of COVID. These employees are on the proverbial front line, both of exposure to the disease, but also the disruption to employment caused by the drop in economic activity in the Human Realm. We all can see the FAANG¹⁴ stocks grow at record pace, and while FAANG hires, millions of customers (people) retreat from human-centric industry such as hotels, restaurants, airlines, and tens of thousands of these frontline workers lose their

¹² Izabela Cardoso & Fernando Teixeira, BBC Reel, "Should We Have Billionaires", 28 October 2020.

¹³ Ramkumar, Ramith, "Tech's Influence on Market Eclipses Dot-Com Bubble Peak", *Wall Street Journal*, Oct 16, 2020.

¹⁴ FAANG: FaceBook, Amazon, Apple, Netflix, and Google.

The Pandemic is Accelerating Digital Transformation

jobs or fall ill.¹⁵ Shopping goes virtual at a record pace. Department stores and malls, also a physical meeting place for humans, empty out and record numbers file for bankruptcy. But on the flip side, Amazon and others like it, companies built around increasingly robotic warehouses and internet checkout counters, become among the most valuable companies in history.¹⁶ Robots can do more of the work, not just in massive warehouses, but we are now seeing the rapid adoption of robotics in fast food and restaurant service, perhaps permanently displacing human connection and jobs.¹⁷ Human-centric systems come under pressure and may fail and NEVER COME BACK, while digital tech companies grow stronger. This dichotomy holds portentous implications for the longer term.

Community and Health Effects

Given the option of digital technology, churches, hotels, in-person friend groups all come under pressure, or in the best case, migrate to cyberspace of "ZOOM" or social media companies. While many physical sports programs and physical campuses stand largely empty, distant education and E-sports flourish. The longer-term effects on health and young people's adoption of more sedentary patterns of activity may well increase obesity and other ailments. And, what about sleep? As corporate headquarters are shut down,¹⁸ and digital workers can "work from anywhere," the effects on geographic Time Zones and sleep cycles of employees may further decouple from natural circadian cycles. Will workers geographic time clock and sleep cycles be respected, or will they be expected to conform to the location of the disaggregated

¹⁵ Reed, Dan, *As Layoffs of 30,000 Workers Begin, the Airlines will Never Be the Same*, Forbes, 1 October 2020, see link: <https://www.forbes.com/sites/danielreed/2020/10/01/airline-layoffs-american-united-southwest/>

¹⁶ Lord and Taylor, in business since the early 19th century, was just one of the victims of Covid. See, <https://www.cnn.com/2020/08/27/business/lord-and-taylor-store-closures-bankruptcy/index.html>

¹⁷ There are almost too many articles to cite. To start with, see TIME Magazine report of August 2020, <https://time.com/5876604/machines-jobs-coronavirus/>

¹⁸ REI is one of many companies closing or rethinking the need to concentrate workforce and executive teams in geographic headquarters. See Forbes report here: <https://www.forbes.com/sites/retailwire/2020/08/18/rei-sells-its-headquarters-others-should-take-notice/?sh=355de7873166>

headquarters which may be the home of the CEO? Worse yet, will employees lose their refuge of home and the weekend, and be on call 24 hours a day, as long as they sleep with their smart phone?

Addiction, Depression, and Loneliness

The shift of time spent, energy, employment, and money from the Human Realm to the profiting Robotic and Cyberspace are clear, but we are only dimly aware of the second and third order effects of this shift on the human spirit, peace of mind, and thus depression and loneliness and addiction. There are early indications that the isolation caused by COVID has in fact increased such negative social outcomes.¹⁹ As progressively more people spend more time physically isolated but “connected” online, it is almost a certainty that this trajectory will continue to more social media addiction.

Cultural Values

Changing cultural values, not unemployment or distorted financial markets, may be the most important *long-term* effects of accelerated digital transformation. We already discussed the changes to the once dominant rural and horse culture that existed in our nation before industrialization. In the rush to battle COVID by allowing digital machines to mediate human community on a massive scale, it is possible our cultural defenses against future intrusive technology may be weakened.²⁰ Policy, law, ethics, and norms are the building blocks of culture, and may already be in transition by the rushed reaction to respond to the pandemic. In a reinforcing loop, policies and norms now being adopted may further replace human connection with technology, and perhaps even devalue human contact. The proliferation of more robots in restaurants, a place where humans “break bread”, may be an early example of culture in flux. The massive expansion of distance learning at the expense of in-person

¹⁹ Pinsky, Drew, Presentation at “Recovery Reinvented”, Bismarck, ND, October 2020.

²⁰ An early visionary on the potential threat to human culture by rapid technological change was Neil Postman, former Dean of Columbia’s School of Journalism. See his book, *Technopoly: The Surrender of Culture to Technology*, New York: Alfred A. Knopf, 1993. See especially chapter 5, “Broken Defense”.

The Pandemic is Accelerating Digital Transformation

human contact in the classroom, especially for K12 school children, may be a second early sign of cultural deformation. And, who can miss the empty sports stadiums and possible longer-term implications. Will fans prefer to skip the tailgaters and crowded stadiums, and instead enjoy the game experience mediated by a smart phone? But if this challenge isn't urgent enough, another factor need be considered: the likelihood that our rushed COVID reactions may effect irreversible change that is suboptimal for human-centric culture in the longer run.

The Danger of Inertia and Irreversibility of Socio-Technical Systems

Some readers and leaders, overwhelmed by the crush of immediate challenges, may not want to consider the longer term second and third order consequences of our COVID response. They may prefer to "let our children figure out the balance between good and bad." But to focus only on the short term is quite frankly an evasion of a most profound socio-technical responsibility. Since the beginning of the Industrial Revolution, when technologies began to have societal-wide implications, the first generation of humans to use a new technology shouldered disproportionate responsibility for the 'good and bad' balance that ultimately locked in for the long term. Technological systems have a strong tendency to develop inertia, to 'lock in' during the early stages, a fact discovered some years ago in the study of information machines - the QWERTY keyboard of the 1860s typewriter still defines our smart phones today - and the placement of road and power systems.²¹ Thus, the professoriate, political classes, clergy, business leaders, NGOs, and indeed every "customer" or human product, and especially parents, are now responsible to think for the long term, for generations to follow. Which brings us to our next question. What to do?

What to do and How to Create a More Human-Centric Future?

Before I discuss recommended actions, I need to address the digital advocates who believe no action is required to promote human-centric systems. Some Silicon Valley leaders believe that current market forces and unmanaged

²¹ For historical examples and theories of the strong tendency of technological systems to 'lock in' or gain 'technological momentum', see works by Paul David, "QWERTY", available on the internet here: <https://econ.ucsb.edu/~tedb/Courses/Ec100C/DavidQwerty.pdf> See also Thomas Hughes, *Networks of Power*, on the momentum of technological systems. See Langdon Winner, *Autonomous Technology*, on the tendency of humans to reverse-adapt their value and culture to these systems once they gain momentum.

technological trends most certainly improve human welfare, and that recent COVID shocks to human-centric systems will produce universally positive and needed structural changes.²² But they are wrong. The systems now coming to dominate our economy, accelerated by COVID, cannot *naturally reprioritize human welfare*. Why not? They are not human in their nature, but innately inhuman and unnatural. The existence of two artificial, unnatural Realms of digital machines that do work and come between humans and thereby displace natural human contact is absolutely unprecedented in history. In the last pandemic, human-centric systems maintained their centrality of social and economic life, because there was no alternative to intelligent humans. In 2020, trillions of intelligent machines, AI, machine learning algorithms, and robots are emerging. Stated another way: in the 1918 post pandemic recovery, humans had to come together, to communicate or work at a modest distance. Now, technology can take the place of human contact and displace vital human institutions, at a distance and in cyberspace. Thus, to improve human welfare, we need deliberate action by the leading organizations, federal, state, business, and philanthropy, to promote human reconnection. So, what should they do?

First, expand support to human-centric jobs and companies. The levers of government and business need to encourage the resumption of *natural, in-person human contact* and connection and direct investment in human centric companies (e.g., restaurants, theaters, retail stores with foot traffic, gyms, airlines, hotels, tourism, etc.). There is indeed a calculated risk to bring people back together earlier rather than later. Currently the risk-benefit calculation has been biased toward physical spread of the virus, aggregate economic metrics and, in some corners, political agendas. Models do not account for longer term effects. Without deliberate investment in human-centric jobs and companies, structural changes put in motion *by government policy* during the pandemic may gain unstoppable momentum, to the detriment of our society.

Second, support the human 'caring economy' and reconsider our models and metrics for a healthy society. Aggregate demand and GDP numbers are inadequate metrics for human wellbeing, a critique that has been gaining

²² At a recent Singularity University session on human workforce on October 21, 2020, Dr. Homi Kharas of Brookings suggested that COVID is accelerating humanity down the preferred path of development. I found such a comment alarming and value-laden, to say the least. Then another panelist, Dr. Wolfgang Fengler drew an analogy to how his mother was a typist, and how the word processor saved her so much time, therefore, technology will just keep making things better for humanity. These comments left me speechless in the chatroom...where to begin to engage such short-sighted thinking?

The Pandemic is Accelerating Digital Transformation

credibility well before COVID.²³ Our government's policy models are woefully inadequate to capture the second and third order societal effects, beginning with mental health but also community vitality. Our government and businesses must support the physical, natural human community interaction, perhaps to include direct payments or subsidies to churches, community groups, and other civic organizations that promote human contact, once the short-term crisis is past.

Third, we need a major, new national investment program in both K-12 and higher education that focuses on the digital transformation of our society and economy. We need more people to understand the digitizing world, to be able to compete for good, digital jobs, but also to help "civilize"²⁴ these digital machines. There are currently federal legislative proposals to massively expand advanced technology R&D, but this concentrates control in Washington DC, and spending flows mainly to universities in large urban areas. Moreover, it neglects the Humanities and thus does little to help universities, students, and faculty to help think thru and to "civilize" the machines.²⁵ An alternative proposal that the next Administration in Washington may consider has been published nationally multiple times, my proposal for a state-centric, Digital-Cyber Land Grant system of colleges and universities.²⁶ This proposal would build out the existing Land

²³ For a recent discussion of the inadequacy of reducing measures of wellbeing to GDP and employment calculations, see Michael J. Sandel, *What Money Can't Buy: The Moral Limits of Markets*, New York: Farrar, Straus, and Giroux, 2012

²⁴ This was a challenge to our ancestors when the macro-changes engulfed society moving from agriculture to industrialization, a shift to many non-digital machines. See John Kasson, *Civilizing the Machine: Technology and Republican Values in America, 1776-1900*, New York: Penguin, 1976

²⁵ It is especially important that rural and outlying states receive their share of the massive research monies now poised to flow to universities, that may amount to over \$100 billion as the NSF is restructured (the *Endless Frontier Bill*, proposed by Senator Schumer, link here: <https://www.schumer.senate.gov/newsroom/press-releases/with-the-support-of-new-yorks-leading-tech-innovators-schumer-announces-bipartisan-endless-frontier-act-bolstering-us-leadership-in-scientific-research-and-innovation-dramatically-increase-investment-in-building-new-tech-hubs-in-upstate-ny>). It is heartening that the federal government and congressional leaders appreciate the magnitude of the challenge of AI/networks/robotics, but most of those resources are slated to be invested in already large urban areas, large universities. Furthermore, there is little money assigned to the humanities/liberal arts at universities, where the civilizing process happened when the Land Grant system of colleges and universities were established in response to the last great MACRO technological event, the Industrial Revolution.

²⁶ See the Winter edition of the National Academies of Science, Engineering, and Medicine, Issues.org, and proposal by Dr. Mark Hagerott, "Time for a Digital Cyber Land Grant System", link here: <https://issues.org/time-for-a-digital-cyber-land-grant-system/> See also *The Chronicle of Higher Education*, by Mark Hagerott, "Time for Silicon Valley to Help Rural America: Here's How." See special edition of the *Chronicle*, published September 2018, link here: <https://www.chronicle.com/article/silicon-valley-must-help-rural-america-heres-how/>

Grant universities and other campuses, with support for both digital MACHINE programs and the HUMANITIES. Additionally, each state should consider what we are doing in North Dakota, creation of a state digital academy like our own Dakota Digital Academy, a collaborative effort of all existing campuses to promote understanding of the digital world, to prepare for the changed work place, but also to help civilize the digital Realms as they emerge in their communities.

Fourth, we must resist the distortion of human-centric culture, a distortion arising from our urgent response to the first order effects of the COVID crisis. Our leading cultural institutions, government, business, academia, religious, labor groups, non-profits, must come together to develop the policy, law, ethics, and norms which will “civilize” the increasingly capable machines and intelligent algorithms that will populate the Realms of Robots and Cyberspace. But how to pull these disparate organizations together? The next administration in the White House (and perhaps the Governors in each state), should convene a task force on *Human Vitality in the Age of Digital Machines*, to develop the needed policies and laws that will protect our human-centric culture. This effort must be deliberate and long-term, because COVID is just one shock to the system, the first of many to come. As the pace of technological change accelerates into the future, such a deliberative effort must be sustained so that humans consciously shape technology rather being shaped by short term responses to episodic events.

Lastly, assuming the Federal Government cannot print money forever, there may be a need to identify new financial sources to support the human-centric economy and institutions in the medium to long-term. It may thus be time to consider a “wind fall profits tax” on digital and social media companies as a means to provide support to that part of the economy that is human-centric. If such a tax sounds radical, consider that Bill Gates, one of the most thoughtful and generous of our tech elites in the world and perhaps in history, suggested it may be time for a tax on robots to support human society.²⁷

Conclusion

A pandemic is not unprecedented in and of itself. But paradigm-changing digital technology, combined with the shock to humanity brought on by COVID, carries almost unfathomable consequences for the longer term. Words struggle to convey the magnitude of the challenge. Technological breakthroughs of the past couple decades have created change at the MACRO level, the emergence of two,

²⁷ Waters, Richards, "Bill Gates Calls for an Income Tax on Robots", *Financial Times*, 19 February 2017, link here: <https://www.ft.com/content/d04a89c2-f6c8-11e6-9516-2d969e0d3b65>

The Pandemic is Accelerating Digital Transformation

artificial realms of Cyberspace and the Robotic. In a desperate attempt to mitigate short term problems of COVID, more energy and money has shifted into the digital Realms, at the expense of natural, Human-centric systems. The challenge of civilizing the digital Realms for the benefit of nature and humans cannot be passed to our children, since technological systems have a proven habit of gaining inertia, 'locking in' the policy and investment mistakes of early decisions. The challenge is upon this generation of leaders to ensure the post COVID-era will privilege not the digital machines and the small group who own them, but promote a reinvigorated, natural, human society of all Americans.

Dr. Mark Hagerott serves as the Chancellor of the North Dakota University System, an eleven campus system with two research universities. Previously, he was a member of the faculty of the United States Naval Academy, where he served as both an historian of technology, and as distinguished professor and deputy director of the Center for Cyber Security Studies.

Prior to his transition to an academic career, Hagerott held multiple technical leadership positions. A certified naval nuclear engineer, he served as chief engineer for a major environmental project de-fueling of two atomic reactors. Hagerott also managed tactical data networks and the specialized artificial intelligence AEGIS system, ultimately rising to ship command. He also served as a White House Fellow, and in addition to his undergraduate degree from Annapolis, he holds a master's degree from Oxford University where he studied as a Rhodes Scholar, and a doctorate in history from the University of Maryland.

Chancellor Hagerott's research and writing focus on the evolution of technology and education. He served on the Defense Science Board summer study of robotic systems 2014-2015 and as a non-resident Cyber Fellow of the New America Foundation, 2015-2017. He was among the first military professors from the United States to brief the Geneva Convention in 2014 on the challenge of lethal robotic machines and argue the merits of early arms control measure. In addition, his proposals for national education reform in response to digitization and artificial intelligence, have been published in The Chronicle of Higher Education, by the National Academies of Science, Engineering, and Medicine, and have been presented on Capitol Hill and the White House.