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Time for a Digital-Cyber **Land Grant System**

Digital companies are in the news a lot these days, and not always for positive reasons. The media reports that Amazon was driven out of New York City; that Facebook paid a $5 billion fine for privacy violations and should, along with other social media companies, be more strictly regulated; and that super-wealthy internet elites are, at least in some minds, not paying enough in income or wealth taxes. All this news springs from an eroding fabric of public trust and vanishing opportunity in the fast-emerging digital system enveloping the nation's social, technical, and economic sectors.

But the punitive and reactive policies associated with these headlines are also evidence of a shortage of well-aimed, future-oriented ideas with which to help people build a better future for themselves. More people, more cities, and more states need better diagnoses of the problems being created by the emerging digital socioeconomic system and better policy tools to ensure greater opportunity and more widely spread benefits. Leaders are called to take action to increase people's understanding of the rapidly changing digital world, provide means for communities and individuals to better protect their privacy and their businesses from online threats, and create better jobs and more diversified regional economies.

Education will be at the center of such efforts. In the 1860s, President Abraham Lincoln created the land-grant university system to harness the nation's agriculture to new advances in science and technology. Today, the nation needs an advanced technology university system on a similar scale to catalyze the transition from a postindustrial economy, where many are left behind, to an inclusive digital economy. Leaders across sectors—in government, education, business, and philanthropy—must work together to build a new land-grant system for the digital age.

Concentrated gains, distributed misinformation

Society is now experiencing the emerging nexus of artificial intelligence, digital machines, and internet communications. But all is not well where cyberspace and the digital economy intersect at the level of regions, cities, and household economies. As the digital world grows, financial benefits accrue to only a small portion of the population, with large swaths of the country left behind or left insecure. Darkening clouds of hacking and privacy abuses, misinformation and disinformation, concentration of economic power, and lack of equal access are casting a shadow of social, economic, and political insecurity and inequality.

More accessible cybersecurity education can help people protect their communities and their businesses. Increased digital literacy and updated law and ethics classes can help citizens better cope with the tsunami of "fake news" and misinformation.

But most importantly, a new system of digital-cyber universities will help diversify the national economy and enable more regions to create and share in the digital wealth that is aggravating income inequality, in the United States and globally. Imbalances in wealth are expanding such that eight men—just eight—own more wealth than the world's poorest three billion people, a trend to which the digital revolution is a major contributor. Numerous forward-looking leaders, including some who spoke at the most recent Davos World Economic Forum, have warned of the potential destabilization of society. 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.

Although some of these challenges may be appropriately addressed through regulation and other policies, education is the essential tool to enable more citizens to think critically about, navigate, and prosper in the digital economy. Why is higher education so crucial? Colleges help create many key aspects of digital literacy. They equip future workers with new knowledge, skills, and abilities, and they are the source of civilizing mechanisms of law, policy, ethics, and literature. They train researchers and inventors who will help build the digital world in the future, while also creating the teachers of the teachers and regenerating the nation's learning culture. In short, colleges and universities are at the forefront of the digital age, itself born out of a university lab where the first internet message was sent on October 29, 1969.

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A national approach is essential. If one state invests substantially in the emerging digital-cyber programs and curriculum, a brain drain from staff and faculty of institutions in less-well-funded states will likely occur, further exacerbating interstate inequities. Indeed, this is already happening. Virginia won the right to host Amazon's second headquarters largely on the basis of a huge commitment to invest in digital programs at local universities in an array of fields, including computer science and software engineering, and at credential levels from short-term certificates to PhDs. But universities in neighboring states, such as Maryland, are already quietly reporting that their computer science faculty are being recruited away. Similarly, in the spring of 2019 the state of Washington passed a new law to tax its tech industry to better support emerging digital college programs, and the chancellors and higher education leaders in nearby states say they anticipate the poaching of their best professors as the newly funded programs are built. It is essential to think regionally and nationally, across socioeconomic, ethnic, and racial lines, to create a network of college and university programs that reach every part of the country.

Inspiration is to be found in the Land Grant College Act of 1862. Proposed by Representative Justin Morrill of Vermont and signed into law by President Lincoln, the legislation responded to the educational challenge of the Industrial Age by selling government-owned land on the opening frontier to create a network of new state universities. Now as then, the nation needs to tap its current wealth to address pressing national economic issues. To navigate the challenges of the Digital Age—to ensure that the benefits are broadly shared and the challenges broadly addressed by talent dispersed across every state—the nation needs to create a Digital-Cyber Land Grant university system. Just as the nation once had vast expanses of land to be tapped, today it has a wealth of bright minds and good teachers—and the potential leadership and investment capital of social media and other Silicon Valley companies. These companies can lead the way in equipping wide swaths of America to contribute to the digital future.

A system out of balance

How so? First, many places outside wealthy tech corridors, especially aging rural, industrial, and minority communities, are falling further behind as the internet disrupts their industries even as the digital economy creates near–trillion dollar companies concentrated on the coasts. And, as a recent *Atlantic Monthly* article argues, so are their colleges. These communities and institutions, including some in my state, North Dakota, where I am chancellor of the state higher education system, don't yet possess the financial means or human resources to catch up to the wealthy tech corridors. In my state we rely on a commodity economy that has experienced radical booms and busts, and during the most recent bust we lost multiple members of our digital expert faculty, including computer and digital scientists and roboticists, to institutions on the coasts.

Second, certain tax-related and professional practices have led to the concentration of digital expertise and wealth, both geographically in the tech corridors and in elite universities. The results of these practices can be clearly seen in the feedbacks between Silicon Valley and Stanford University. Technologies invented by Stanford faculty may yield revenue to both the college and the professors, as well as to venture capitalists in the Valley. These beneficiaries then receive a tax incentive to donate back to Stanford, which reinforces network and professional relationships and provides resources to recruit other researchers from other parts of the country. These practices need to change to be more

inclusive of regions throughout the country, so that people everywhere share more broadly in the emergence of the new digital economy and the high-paying jobs that come with it.

Third, there is a misalignment between what is being taught and what should be taught to create knowledge, skills, and abilities needed for individuals, their communities, and their businesses to engage safely in a twenty-first century economy increasingly interconnected to cyberspace. The shortage of cyber-certified and educated workers numbers in the millions. Many more high-quality programs in higher education are critically needed to train this workforce. Yet in the upper Midwest, only two community colleges have a campus program that meets the National Security Agency's minimum requirements for its certification in cybersecurity. Several states have no four-year campus programs in this area at all.

Finally, many state universities suffer from a shortage of faculty experts and knowledgeable support personnel needed for the emerging digital world. They need an infusion of new scholars and training for those already on campuses, so that they can more rapidly develop updated courses for students and conduct research to help their communities to prosper. Though some beneficiaries of the current situation may offer distance courses deployed from the tech corridors as a solution, this will not suffice. Research is showing that many students—including, notably, those from lower socioeconomic groups, veterans, and underserved minorities—often do not thrive in online-only educational programs. A physical presence and proximity to mentors and teachers are essential, especially for undergraduates.

Five key features

This nationwide Digital-Cyber Land Grant university system would form a network using advanced technology to deliver both technical and more general education on campuses located in underserved areas of the country. It would move beyond the limits of existing physical plants and the existing structures of faculty hierarchy and tenure to provide a wide range of skills and competencies to students and people in the workforce nationwide.

Key features of this proposed system include:

1. A hybrid campus, manifesting the best of both online and brick-and-mortar education, and offering technical curricula such as computer science and coding, artificial intelligence theory and applications, data analytics, computer and network security, and human hacking, as well as nontechnical curricula in the fields of cyber business, humanities, social sciences, and cyber law. Cybersecurity education should be perhaps the first among equals, for if the general public cannot securely and confidently participate online, growing numbers of people may decide to opt out of the opportunities of the digital economy, pulling back from socially valuable benefits of internet-enabled relationships.
2. An accelerated approach to tenure and promotion for younger cyber-computer science faculty, including those in the humanities, who focus on these new knowledge areas. Current practices require many years spent earning a PhD and then pursuing eligibility for tenure, lengthy time requirements that may prevent critically important knowledge holders from leaving industry or government and joining in this national education effort. Strategies are needed to make their participation less burdensome, particularly given the rapid pace of development of the relevant fields.
3. Innovative funding mechanisms that do not place further burden on hard-pressed states and students, but rather draw from the coffers of the social media giants.
4. Modification of federal tax incentives for contributions to university endowments so that the coming wave of wealthy internet philanthropists will have reason to provide support to the Digital-Cyber Land Grant universities and colleges.
5. Incentives for technology companies and leading high-tech universities to help staff and partner with the new universities' faculties and programs. For example, skilled company employees and entrepreneurs who assist the cyber land grants could earn faculty or staff rank at one of the institutions. Joint appointments could be offered to cyber-skilled faculty from leading universities who would teach or conduct research at one of the new institutions. And industry would benefit by taking a lead, as this program would deepen and distribute its tech talent pool and perhaps even lower labor costs, as much of the newly developed talent would live in lower-cost areas.

Who will pay?

In the 1860s, the machines and techniques of the Industrial Revolution were engulfing the nation's economy and society, a revolution of science and mechanical engineering knowledge. But how could the nation pay for the educational programs to create the knowledge and skilled workers needed in the increasingly mechanized factories and farm fields?

Fortunately, the land of the upper Midwest and West was opening to settlement, and the federal government used the proceeds from sales of large tracts of land it owned to establish new land grant colleges, as well as to retool existing colleges, to help meet the needs of agriculture and industry, and, interestingly, to bolster military education for the national defense. These sales paid for the land grant universities of today, which include the likes of Cornell, the University of California, Berkeley, and many of the venerable state universities of the Midwest. In my view it was the single most profound educational initiative in the nation's history.

Today, the space opening up for education is not the three-dimensional space of new land, but the fourth-dimensional "land" of cyberspace. But where will the money come from to fill the educational needs created by the emergence of this new dimension? The foundation of the internet, upon which the social media giants derive their wealth, was built by a US government program funded by taxpayers. Some people argue that a share of the value of this cyberspace should have been retained through the patent system. However, due to a lack of vision, the federal government gave away the very algorithmic ground of the internet without the informed consent of the rightful owners, the American people.

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This lack of vision may be understandable: who could have predicted that a government-funded communications invention would become the foundation of the emerging digital economy whose pervasive unintended consequences need now to be addressed? But we have a clearer view today. And what we can see is that wealth created from the new cyberspace, especially by social media companies, can and should be used to fund the accelerated development of cyberspace education programs for minority, rural, and postindustrial populations nationwide.

I propose a couple of options for implementing this proposal. One is a data dividend paid by social media companies to states based on how much data they extract from their residents. Another is an education tax levied on at least some of the new internet-facilitated wealth. Given the substantial negative consequences of social media on the nation's citizens, children, and democracy, levying an educational tax on the massive social media corporations makes sense morally, not unlike the taxes levied on gambling, cigarettes, and alcohol.

In the end, the rationale of this initiative is not punitive but rather centered around a social obligation of companies, which with government help make untold billions, to reinvest some of those gains in the future of the nation. By leading this charge and helping to fund the Digital-Cyber Land Grant system, the social media companies will also expand their work force, increase their access to researchers and inventors, and gain more of society's—and, not to be overlooked, Congress's—goodwill. Through this investment, more Americans will have fuller access to cybersecurity education with which they can help protect their communities and their businesses. Society will have greater collective digital literacy to navigate an age of data. This will help diversify the national economy and enable more regions to create and share in the digital wealth that is now emerging, just as the land grants of 1862 helped the nation's farmers and inventors flourish in the Industrial Revolution.

The future is digital, and all Americans should reap the benefits of the internet age. Every region, state, and city must have the knowledge and resources to weave a better future in the emerging digital socioeconomic system. Lagging regions and groups require a new or radically reformed education system, in both substance and scale, to participate in the opening of the digital frontier of cyberspace and the growing Internet of Things. The urgency of the challenge is hard to exaggerate. The Trump administration, Congress, state governments, Silicon Valley elites, and higher education should come together to create the Digital-Cyber Land Grant university and college system. Just as the land-grant system transformed higher education to catalyze agricultural and industrial capacity across a growing nation in the nineteenth century, so can a digital-cyber land grant system provide the educational foundation needed to ensure economic and democratic vitality and security for the entire nation in the twenty-first century.

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