GLOBAL CHINA
ASSESSING CHINA'S GROWING ROLE IN THE WORLD

DIGITAL COMPETITION WITH CHINA STARTS WITH COMPETITION AT HOME

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EXECUTIVE SUMMARY

The United States and China are engaged in a technology-based conflict to determine 21st-century international economic leadership. China's approach is to identify and support the research and development efforts of a handful of "national champion" companies. The dominant tech companies of the U.S. are de facto embracing this Chinese policy in their effort to maintain domestic marketplace control. Rather than embracing a China-like consecration of a select few companies, America's digital competition with China should begin with meaningful competition at home and the all-American reality that competition drives innovation.

America's dominant tech companies have seized upon the competition with China as a rationale for why their behavior should not be subject to regulatory oversight that would, among other things, promote competition. "China doesn't regulate its companies" has become a go-to policy response. When coupled with "of course, we support regulation, but it must be responsible regulation," it throws up a smokescreen that allows the dominant tech companies to make the rules governing their marketplace behavior.

At the heart of digital competition — both at home and abroad — is the capital asset of the 21st century: data. Initiatives such as machine learning and artificial intelligence are data-dependent, requiring a large data input to enable algorithms to reach a conclusion. China's immense population of almost 1.5 billion gives it an advantage in this regard. By definition, a population that approaches five times the size of the U.S. population produces more data. The previously "backward" nature of the Chinese economy has resulted in another Chinese data advantage: New smartphone-based apps, created in place of the digital integration that China previously lacked, produce a richer collection of data. This bulk and richness of Chinese data creates an inherent digital advantage when compared to the United States.

If the United States will never out-bulk China in the quantity and quality of data, it must out-innovate China. Here, the United States has an advantage, should it choose to take it. The centralized control of the Chinese digital economy is an anti-entrepreneurial force. In contrast, innovation is the hallmark of a free and open market.

But the domestic market must, indeed, be free, open, and competitive.

Currently, the American digital marketplace is not competitive. A handful of companies command the marketplace by hoarding the data asset others need to compete. As innovative as America's tech giants may be, they represent a bottleneck that starves independent innovators of the mother's milk of digital competition. If America is to out-innovate China, then American innovators need access to the essential data asset required for that innovation.

The nation's response to Chinese competition must not be the adoption of China-like national champions, nor the "China doesn't regulate its companies that way" smokescreen. American public policy should embrace the all-American concept of competition-driven innovation. This begins with breaking the bottleneck that withholds data from its competitive application. This does not necessarily mean breaking up the dominant companies, but it does mean breaking open their mercenary lock on the assets essential for competition-driven innovation.

This paper looks at how a handful of dominant digital companies have become *de facto* private governments making the rules for the new economy. It then explores how a national vision for competing with China begins with access at scale to the digital assets necessary for that competition. The paper concludes with a call for a national digital competitiveness plan built around the promotion of competition-driven domestic innovation.

INTRODUCTION

That China is a threat to the prevailing world order is a given.[1] What is too often overlooked, however, are the negative effects of how the "race with China" theme has been harnessed by large American tech companies as a smokescreen for activities that not only harm consumers, but also could end up disadvantaging the nation's international competitiveness, including in the field of artificial intelligence (AI).

CONDITIONING THE DISCUSSION

Spinning up the China bogeyman

To read the headlines generated by the tech companies, the solution to Chinese competition in fifth-generation (5G) wireless technology, blockchain, AI, and the protection of national security is to allow the companies to expand their already dominant marketplace positions and to resist regulation.

The China threat has become a go-to response to any suggestion of regulatory oversight. When it comes to the new 5G wireless technology, for instance, the "race with China" was enlisted to justify reducing competition from four major companies to three. As *The New York Times* described it: "Pitch Behind T-Mobile-Sprint Merger: Keep Up With China in 5G."[2] As Axios reported: "The companies shrewdly seized on all the fretting over China's threat to make the following case to telecom regulators: Sure, you'll lose one wireless competitor in the U.S., but you'll gain a stronger global competitor that can help the nation stay ahead of its 5G nemesis."[3] *(Disclosure: As Chairman of the Federal Communications Commission in 2014, the author rejected a similar merger proposal).*

A Bloomberg headline proclaimed: "Facebook Warns Washington That Beijing Wins If Libra Plan Fails."[4] Libra is a new blockchain-based digital currency developed by Facebook. The company sees great opportunity in leveraging the information it holds on 2.4 billion subscribers to move into the world of financial transactions. Regulatory intrusion into Facebook's cryptocurrency expansion would be a huge win for China, David Marcus, the executive leading the project, told Bloomberg: "The future in five years, if we don't have a good answer, is basically China rewiring [the financial system] with a digital renminbi running on their controlled blockchain." Not only would this create "a new digital reserve currency," but it would also have national security implications by leaving "a whole part of the world completely blocked from U.S. sanctions" as an alternative to military action.[5]

Marcus' argument takes a page from the playbook — or more appropriately, briefing book — of his boss, Facebook CEO Mark Zuckerberg. Testifying before the U.S. Senate in April 2018, Zuckerberg warned of the "real and strategic threat" of Chinese tech companies.[6] An Associated Press photo of the notes before him as he testified was even more explicit: "Break up FB? US tech companies key asset for America, break up strengthens Chinese companies."[7]

"Mark Zuckerberg says breaking up Facebook would pave the way for China's tech companies to dominate," the respected tech blog Recode Decode headlined.[8] Zuckerberg said in an interview: "If we adopt a stance which is that, okay, we're going to, as a country, decide that we're going to clip the wings of these [American] companies, then there are plenty of other companies out there that are willing and able to take the place of the work we're doing … And they don't share the values that we have." Google CEO Sundar Pichai was less subtle about equating regulatory oversight with national security. He told CNN: "I worry that if you regulate for the sake of regulating, it has a lot of unintended consequences … [including] implications for our national security."[9]

Of course, no one is talking about regulation simply "for the sake of regulating." The tech companies would like us to believe in a binary reality: the necessity to choose between national security and protecting competition and consumers. The responsible alternative is to recognize the legitimacy of both sets of concerns and develop a national strategy to do something about both.

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The result of the China bogeyman strategy is to create a false narrative. Across the spectrum of digital activities, tech companies are exploiting an international challenge to constrain the kind of governmental oversight that promotes domestic competition. The result not only hurts consumers, but also hurt's competitive innovation and thus America's ability to enhance national security and to compete abroad. We should have more faith in American capitalism. We don't become stronger or more innovative by outsourcing innovation with China-like policies to anoint national heroes.

"Move fast and break things"

"Modern technology platforms such as Google, Facebook, Amazon and Apple are even more powerful than most people recognize," Eric Schmidt wrote in 2013 when he was executive chairman of Google's parent, Alphabet, Inc.[10]

Yet, for the first decades of the digital era, the tech industry insisted that government oversight of that power would harm their digital magic. The wonderous new products and services of the digital age, they argued, were made possible by the "permissionless innovation" that would be crushed by regulation. As a result, there is no broad-based supervision of digital marketplace behavior.[11]

The "don't touch us, we're too important" argument continues today. In mid-2019, Eric Schmidt reiterated the theme in a slightly updated manner. "These platforms are enormously powerful and they are free to consumers … I would be very careful about directly affecting the structure of the industry because the benefit of broad access to these platforms has brought innumerable benefits." [12]

The practical effect of the Silicon Valley slogan "move fast and break things" has been "move fast before they catch on to what's happening and do something." As digital capabilities erased many of the technical constraints that had determined analog era behavior, the digital companies made their own behavioral rules simply by assertion. As they did this, the representatives of the public interest slapped a couple of wrists, but basically stood by and watched. I vividly recall testifying before Congress and being told not to harm "permissionless innovation" by "regulating the internet."

The consequences of such abstinence from oversight are now becoming manifest in their effect on competition and consumers. As a result, legislators and regulators have finally begun to awaken to the need to establish policies that protect the public interest. The tech companies have not been ignorant of this awakening.

"My position is not that there should be no regulation," Mark Zuckerberg testified in his 2018 appearance before Congress. "I think the real question … is what is the right regulation, not whether there should be or not."[13] The nuanced definition as to what is "right," of course, is a determination the companies reserve for themselves.

Digital policy in the United States is stuck in neutral as the companies and the policymakers debate what is the "right" regulation. The longer the policy limbo lasts, of course, the longer the digital companies continue entrenching their unsupervised restructuring of economic activity and consumer rights.

Although the Trump administration has made high-profile announcements of investigations of digital companies, these should not be confused with meaningful results, even if they end up with new headlines about follow-on actions. The activities of the Federal Trade Commission (FTC), Justice Department, and the Federal Communications Commission (FCC) are constrained by statute, judicial decision, leadership, or all the above. Most importantly, the United States Congress is immobilized. While 79% of Americans support a federal privacy law, for instance, Congress is frozen between the digital companies' desire to preempt the actions of foreign governments

and American states with a uniform national policy, and just how much of those foreign and state regulations the companies are willing to accept.[14] The broad regulatory oversight of the digital economy is an idea absent follow through.

> **"'Move fast and break things' is working for the companies, but not necessarily for the country.**

"Move fast and break things" is working for the companies, but not necessarily for the country. The strategy to set the rules privately while warning against government regulation may play to the anti-government sentiment of the Trump administration, but the absence of government leadership is a recipe for falling behind.

It's not just about bigness

Using the China bogeyman as a threat is an inspired strategy for the big digital companies. It allows the companies to portray their size and the vast amounts of data they store about individuals as a national asset and an antidote to the big firms and big data of China. Any suggestion of enforcing statutes created to protect marketplace competition, they can argue, thus becomes an effort to destroy the nation's best opportunity in the "China race."

Sheryl Sandberg, Facebook's chief operating officer, played this card on CNBC: "While people are concerned with the size and power of tech companies, there's also a concern in the United States with the size and power of *Chinese* companies, and the realization that these companies are not going to be broken up."[15] That Chinese companies "are not going to be broken up" is hardly the basis for a strategy blueprint for the United States. It is, however, a brilliant deflection to focus attention on the companies' bigness rather than their behavior.

The size of a company is not the exclusive measurement in the application of the antitrust laws. What is illegal under the antitrust statutes is to monopolize a market using exclusionary means and thus impair legitimate competition. Standard Oil and AT&T weren't broken up because they were big, but because they used their control of critical assets to control markets. The critical capital asset of the 21st century is data; how tech companies control that asset is a behavioral issue that manifests itself in corporate size.

Antitrust and other statutes are not just about breaking up big companies; they also are a tool for dealing with the behavior of dominant companies. When tech company spokespersons focus their messaging on breaking up companies, they succeed in redirecting attention to matters of corporate size and away from the behavior of those companies. Key amongst the anticompetitive behavior of the digital companies is the monopolization of the digital information they have collected about each of us. It is a behavior that strengthens their dominance by denying others the raw material necessary to innovate and compete.

Keeping the focus on bigness and breakup is a sleight of hand that keeps the discussion on favorable ground for the companies. The companies (and their lawyers) know that breaking up a corporation is a remedy only after the company is found to have violated the antitrust laws. Such a determination and the complexity of an antitrust case will delay any final action for years and in the end will have a low probability of success. The breakup of AT&T took nearly 10 years from the initial suit to the actual breakup. The success of any break-up lawsuit would ultimately be decided by the current Supreme Court, where a majority appears supportive of the entrenched (if recently seriously challenged) economics of the Chicago School that a narrow application of the "consumer welfare" (principally measured by price) should be the basis of antitrust enforcement.

It is the behavior of the dominant tech companies to monopolize data that provides the critical ingredient that makes them big. As much as the companies would like the policy debate to focus on "break them up," getting to the core of their power requires "break them open" so that the critical asset they now control can be available for innovative competition.

The featured race: Artificial intelligence

Lurking in all discussions about competing with China for digital superiority is the development of machine learning and artificial intelligence.

No less a keen international observer than Vladimir Putin has declared of AI: "Whoever becomes the leader in this sphere will become the ruler of the world."[16]

In October, 2015 the power of AI became manifestly obvious when AlphaGo, the AI system developed by DeepMind Technologies (later acquired by Google's parent company Alphabet) defeated a human champion of the Chinese board game Go, the most complex game in the world.[17] Many have described it as China's "Sputnik moment" — an awakening to the technical superiority of a foreign competitor.

One year after AlphaGo's win, the Obama administration released the report "Preparing for the Future of Artificial Intelligence," along with recommendations for an "Artificial Intelligence Research and Development Strategic Plan" of federally-funded AI research and development.[18] A year after the Obama initiative (October 2017), Chinese President Xi Jinping announced a national effort "pushing for deep integration between the real economy and advanced technologies including internet, big data, and artificial intelligence."[19]

China has established a national goal of becoming the world leader in AI by 2030.[20] Under the Trump administration, however, "statements about AI have essentially been rhetorical," as Harvard's Graham Allison has observed.[21]

In its first budget — entitled "A New Foundation for American Greatness" — the Trump administration cut resources for agencies whose work has traditionally supported AI research and high-performance computing.[22] Fortunately, the Trump fiscal year 2021 budget, while continuing to cut overall federal research and development (R&D) spending, increased funding for AI.[23] Yet, as Rep. Anna Eshoo (D-CA) has noted: "Even with this increase, the municipal government of Shanghai has committed to invest more in nondefense AI R&D than the entire U.S. federal government."[24]

In late 2019, with typical fanfare, President Trump announced his American AI Initiative.[25] Shortly thereafter, in January 2020, his administration published a set of AI regulatory principles.[26] Key to those principles was limiting regulatory "overreach."[27] "If we are too heavy-handed with artificial intelligence, we end up stifling entire industries," U.S. Chief Technology Officer Michael Kratsios explained about the principles.[28]

> **"Corporate spin to protect dominance has thus bonded with the anti-regulatory orthodoxy of the Trump administration to become national policy.**

Corporate spin to protect dominance has thus bonded with the anti-regulatory orthodoxy of the Trump administration to become national policy. The "permissionless innovation" message Big Tech sold in the early digital era, combined with the updated "China doesn't do that to their tech companies" messaging, is apparently the national plan.

COMPETING WITH CHINA

The capital asset of the 21st century

In the industrial era, marketplace dominance was driven by control of hard assets such as coal, oil, and minerals. In the 21st century, economic activity is increasingly driven by soft digital assets that are created, collected, and communicated by small microprocessor computers.

In the industrial era, the companies with the most assets could control markets. In the 21st century, the capital asset has become data, but the use of such assets to control markets is unchanged.

Market analyst IDC has calculated that 40 zettabytes of digital information will be created this year.[29] Forty zettabytes (40 followed by 21 zeroes) is the equivalent of creating seven million new Libraries of Congress — every day![30] Slightly less than half that information is consumer-generated.

It is that consumer-generated information that becomes the essential digital asset for the companies that deliver services to our computers and smartphones. It allows (among others) Google to refine our searches and target advertising, Facebook to know who our friends are and target advertising, and Amazon to know what we buy and target advertising. It is also the digital asset that feeds software algorithms to enable artificial intelligence and machine learning.

The operational reality of the digital economy is how digital assets behave differently from traditional industrial assets. Industrial assets such as coal, oil, and ore are finite and typically consumed when used. In contrast, digital assets are inexhaustible and iterative. The usage of digital assets not only does not consume them, but also produces a new digital product that, in turn, creates more data to be harnessed into another offering, that produces more data to power a new offering in a never-ending process.

The different characteristics of digital assets has amplified industrial-era economic concepts. The effect of this, according to Nobel economics laureate Jean Tirole, is "a small cohort of technology firms now guards the door to the modern economy."[31] Traditional economic concepts such as economies of scale and network externalities have combined with the characteristics of digital assets to create a new reality.

That big digital companies should benefit from economies of scale only stands to reason. The cost of servers, for instance, declines on a per user basis as those users increase in number. Cloud computing similarly declines at scale in what some have dubbed "Bezos's Law."[32]

Dominant providers are also able to enjoy a kind of data-driven consumer lock-in. Economists call this kind of gravitational pull "network externalities" or "network effects." Facebook, for instance, has very direct network effects: We go to it because that's where everybody else is. Google and its subsidiary Waze are examples of indirect network effects where the value of the results increase as the number of users increases.

Data assets also have a marginal cost approaching zero. Once it is collected and used the first time, the cost to reuse the data is de minimis. The ability to reuse the asset at virtually no cost is the great wealth-creation machine of Big Tech (imagine if Detroit could produce car after car without having to purchase the raw materials for each).

Data assets are also "non-rivalrous." An industrial asset such as oil is "rivalrous" in that when one party uses it the asset is denied to another. The inexhaustible nature of non-rivalrous data challenges the old ideas about assets, their market behavior, and property rights. A ton of coal is a private asset that is used once and gone. Data, on the other hand, is used, reused, and used again and again. If the example of a private asset is coal, the metaphor for data is a public asset similar to roads and bridges, or sewer and water systems that are constantly being reused.[33]

All of these data characteristics — inexhaustible, iterative, non-rivalrous, *de minimis* marginal cost — should mean that data assets have potential beneficial applications beyond any asset class we have seen before. Unfortunately, the dominant digital companies neuter these beneficial characteristics by monopolizing the asset for themselves.

In their monopolization of critical assets, Big Tech has become a digital clone of industrial-era monopolies built upon creating bottlenecks to limit access to necessary assets. At a time when the inexhaustible and iterative nature of data — if it were made openly available — could create a new class of public benefits, the dominant digital companies behave like industrial barons to hoard the digital asset so that only they may enjoy its benefits.

China's data assets

China's population — approaching a billion and a half people — and its reliance on digital technology have resulted in an unrivaled data creation ecosystem and a competitive advantage. It is not just the quantity of data that creates a competitive opportunity for the Chinese, but also the qualitative difference between data produced in China and data produced in the United States.

When China's digital activities were not much more than clones of U.S. apps, the quality of the data on both sides of the Pacific was essentially equivalent. Around 2013, however, China's relative lack of economic infrastructure

suddenly became an advantage. The reality that few Chinese carried credit cards, for instance, meant that mobile payment systems developed and grew faster than in the U.S., creating a flood of new — and different — data.

"Backwardness" had become a boon, as when the absence of automated patient management systems in Chinese hospitals stimulated mobile apps for scheduling medical appointments — and, again, created new data. The data from the Chinese smartphone app WeChat — a kind of mélange of Facebook, Amazon, PayPal, Open Table, and other U.S. apps all integrated into a single platform — combined to create even different, and richer, data.

Chinese data harvesting is about both consumer and enterprise information. In many local governments, district managers are measured based on the results from digital sensors throughout their area of responsibility. Shanghai, for instance, measures police activity based on the location and activity reports generated by radio chips worn by officers, while chip-equipped bikes and parking enforcement are similarly tracked digitally. Chips are even placed in wheelchairs to (among other things) identify points where individuals with disabilities have a hard time getting around. Shanghai even monitors manhole covers to track utility work and its resulting risks to pedestrians and auto traffic.

The Chinese data advantage, therefore, is not just the amount of data, but also the diverse quality of that data. It is a diversity that helps AI algorithms "learn." While using such a term anthropomorphizes computer algorithms, it is nonetheless appropriate since those algorithms seek to produce results similar to the neural networks that govern human learning. The mysterious interconnection of rules, pattern recognition, feedback, and external input and output results in what we call thinking in humans. Throw enough data at a powerful computer and ask it to find patterns based on basic rules, and the computer appears to "think." The more diverse that data, the greater the algorithm's ability to "learn."[34]

Out-bulk or out-compete?

Because of China's huge population and high digital usage, it will probably always beat the United States on the availability of raw data. If the United States cannot overcome those basic advantages, it is time to change the rules of the engagement. In a December 2019 article titled "Is China Beating America to AI Supremacy?," Graham Allison and a mystery tech collaborator suggested such a new construction.[35] We need to define the challenge not so much in terms of *implementation* where China's vast data gives it an advantage, but by an American advantage: *innovation*. Centralization may aid *implementation*, but it will retard *innovation*.

To think we can out-bulk China's data supply is to deny demographics and usage patterns. What we can do, however, is out-entrepreneur China.

The centralized control of China creates an anti-entrepreneurial force. While the Chinese culture has historically been quite entrepreneurial, the Chinese government's current control of the population works against that tradition. Because hierarchical operations have little room for creativity, a popular Chinese expression is: "The more you try, the more you fail." The "more you try" to think creatively outside the hierarchy-dictated orthodoxy, the greater the personal risks, a China-based digital consultant explained to me. The attitude of Thomas Edison's "I have not failed 10,000 times, I've successfully found 10,000 ways that won't work" does not find a home in the top-down environment of China.[36]

We need to take advantage of the American entrepreneurial spirit. The freedom to try and fail and to try again is as American as baseball. The beacon of opportunity this represents to the world is a national asset. But we need to have the digital tools to take advantage of those opportunities.

If America is going to out-innovate China, then American innovators need access to the essential capital asset of the 21st century: data. The large digital companies are wildly powerful and profitable not only because they have siphoned great amounts of personal data from consumers, but also because they then assume the role of gatekeeper to block access to that data.

"Even well-intentioned gatekeepers slow innovation," Amazon founder and CEO Jeff Bezos wrote in his 2011 letter to shareholders.[37] He was describing the benefits of openness in the fledgling Amazon Web Services, yet it is an important message if America is to out-innovate

China. Competition with China is advanced by picking the lock of gatekeepers and opening the flow of digital assets to competition-driven innovation in the U.S.

Give me the tools

Far from the "let us grow our dominance" message of Big Tech, we should be encouraging innovation through domestic competition. Competition is not only the hallmark of a free and open market, it works! Separate and apart from geopolitical considerations, market dynamism is inherently good. When specifically considering China, marketplace competition drives the kind of innovation that is necessary to protect American leadership.

If "winning the 5G race" is a concern, for instance, look at what China just did to increase competition in its 5G market. T-Mobile and Sprint claim it is necessary to reduce competition from four to three national providers in order to compete with China. Yet, the Chinese government made the opposite decision, recently expanding the number of 5G licenses from three to four.[38] (As this paper was written, a court upheld the Trump administration's decision to allow T-Mobile and Sprint to merge which they subsequently did.)

When China authorized a fourth 5G competitor, the government provided it with the necessary raw materials: airwave spectrum. If the digital market in the United States is to be more competitive, it requires the raw material of data.

Open access to critical assets is a proven policy. The internet's very existence is arguably the result of just such an opening up of assets that were being hoarded by a dominant company.

AT&T, the dominant network for most of the last century, created one of the world's great centers of innovation, Bell Laboratories. The transistor, laser, cellular phone, modem, solar cell, and other technological breakthroughs happened at Bell Labs. But because AT&T controlled the patents protecting these developments, many discoveries were kept locked away lest they conceivably impact the business plans of AT&T. One example is illustrative of the disconnect between innovation and dominance. A Bell Labs engineer named Claude Hickman developed magnetic tape and built the first telephone answering machine. AT&T ordered cancellation of the project because management feared that the ability to leave a message would decrease the number of telephone calls.[39]

The great breakthrough occurred in 1956, when AT&T settled an antitrust suit filed by the U.S. Department of Justice. One of the terms of that consent decree was AT&T's agreement to license its patents.[40] Innovations such as Hickman's would now be available for others to use. In what is called a compulsory license, the approximately 8,600 pre-decree patents were licensed for free. The patents that followed would be open upon payment of a reasonable fee.[41]

Included among the now-open patents were two technologies seminal to the development of the internet: the transistor and the modem. The transistor — a small sandwich of silicon and resistors — replaced the vacuum tubes being used for on/off binary switching in the era's giant computers. It is the heart of the microprocessors that have driven the digital age. Gordon Moore, a co-founder of Intel, described the opening of AT&T's patents as: "One of the most important developments for the commercial semiconductor industry," a decision that allowed the semiconductor industry "to really get started."[42]

The transmission of the internet's digital signals also was a result of openness policies. Bell Labs' modem technology converted digital signals to analog so they could be transmitted over the analog telephone network (the word "modem" is a contraction of modulate-demodulate for its ability to turn digital pulses into analog signals and back again).[43] Our early internet experiences were screeching modems connecting digital computers to the analog telephone network for transmission to distant computers.

As the dominant companies of the digital era hoard their data assets, it is important to remember remedies similar to those imposed on AT&T in the mid-1950s and the benefits of such policy. How open access to critical assets drives innovation was dramatically illustrated when in the first five years of the compulsory licensing of AT&T's patents, new patents — principally from young companies — increased 25% in the fields with the open licensing, as opposed to technologically similar fields without such openness.[44] After that, the innovation just kept growing.

While it is not axiomatic that a smaller company is more innovative, the strategy of "let a thousand flowers bloom" does apply. The dominant Big Tech companies were themselves once small startups. Absent important assets, however, whether those flowers ever bloom becomes problematic.

"We need to democratize AI and the data on which it relies," wrote Microsoft president Brad Smith.[45] At one point in its history, Microsoft also tried to maintain the monopoly status of its software. The non-rivalrous nature of data harnessed in open source code and innovation in applications ultimately led it to embrace openness. The one-time champion of closed data applications now asks: "What if we could create an open-data revolution that would do for data what open-source code had done for software?"[46]

The future of American digital innovation is currently controlled by a handful of companies acting as bottlenecks to the innovative use of the 21st century's most defining asset. If the United States is to successfully compete with China in the digital era, American policy must develop solutions that permit entrepreneurs to scale through access to the data that is presently denied them.

A NATIONAL DIGITAL COMPETITIVENESS PLAN

Responding to "Sputnik moments"

In 1957, the Soviet Union's launch of Sputnik put the United States behind a global rival in a "space race." The response was a strategic national vision and a plan for its implementation.

China's "Sputnik moment" came in 2015, when America's AlphaGo beat a human Go champion. The Chinese government's response was a simple and direct national vision for AI: to become the world leader by 2030.[47]

The United States does not have a similar national AI vision. "Continued American leadership in Artificial Intelligence is of paramount importance to maintaining the economic and national security of the United States," according to President Trump.[48] Yet, current U.S. policy, as explained by the Chief Technology Officer of the United States, is three principles: "Ensure public engagement, limit regulatory overreach, and promote trustworthy technology."[49] The difference between the Chinese and American policies is stark — one is a national management goal, the other is a homily.

Significantly, the administration's homily is rooted in limiting regulation that could unleash competitive innovation. Eric Schmidt, former Google CEO and current Defense Department adviser, has been blunt in his assessment of the American response to Chinese competition. "Ultimately," he wrote, "the Chinese are competing to become the world's leading innovators, and the United States is not playing to win."[50]

One — of many — ways in which the United States can play to win is by the government opening access to the digital tools that will stimulate innovation among multiple companies.

Exponential innovation

> **"The U.S. solution to competing with China cannot be to centralize innovation around a handful of Silicon Valley giants.**

The U.S. solution to competing with China cannot be to centralize innovation around a handful of Silicon Valley giants. Centralized power is not only dangerous, but it is also inefficient. The assertion that only the big companies have the capability to compete with China is both a history-denying attack on competition-driven innovation and a strategic risk.

The history is not even that old. America's dominant tech companies, just a short time ago, were themselves small, innovative enterprises. The up-from-the-garage-and-dorm-room start-up tales of such companies are legendary. What these up-from-nothing stories have in common is that the innovators had access to the necessary assets to fuel the development of their ideas.

Intel grew from an eight-person startup in large part because of the policy decision to make Bell Labs' transistor patents openly available. Google's algorithm grew out of a grant from the National Science Foundation.[51] The map and direction apps on every smartphone come from a constellation of Global Positioning Satellites (GPS) maintained and paid for by the Department of Defense.[52]

Relying on the dominant digital companies creates two additional strategic risks. The first is the "eggs-in-one-basket" exposure. The other is the denial of necessary resources to those who can mitigate the first risk.

The dominant tech companies certainly have the digital assets, capital, and other resources necessary to push innovation forward. But what innovation? The companies' fiduciary responsibility is to their shareholders, not something broader. In a March 2020 speech, the U.S. deputy attorney general cited economic research that "an incumbent's incentive to innovate is lessened because the resulting innovation replaces existing profitable sales ... innovations are more likely to come not from a monopolist, but from an outsider without existing sales to replace."[53]

The experience with the 20th century's dominant tech company, AT&T, graphically illustrates this point. Innovation under corporate control is innovation for corporate benefit. This is not evil, simply an exercise in fiduciary reality. To have America's competition with China controlled by limited fiduciary interests, however, is not necessarily in the overall national interest.

Beyond the risk of the dominant companies making innovation decisions based on self-interest is the nature of the global economy itself. The argument that Big Tech is the *alternative* to China only works if these same companies are not in *alliances* with China. As the dominant companies increasingly view themselves as international players, the pressure builds for them to have a "China strategy" that, intentionally or not, accrues to the benefit of China.[54] Google has announced an AI center in China.[55] Amazon is the second largest cloud service provider in China, after Alibaba.[56] Apple, of course, famously builds its hardware in China. These are not untoward acts; however, when the United States builds its plan for competing with China around companies doing business in China, such reality becomes relevant.

"Big companies are what are investing in technologies like AI the most," Google CEO Sundar Pichai told CNN. "As a company we now invest sometimes thinking 5 to 10 years ahead without necessarily worrying about short term profits," he said. Such investments are, indeed, important, but "thinking 5 to 10 years ahead" is not unique to large companies; it is what innovators and venture capitalists do as a matter of course.[57]

The challenge for those innovators and their investors is that while capital can buy creativity, intelligence, and computing power, they are disadvantaged when the data they need is being hoarded by the dominant companies.

Big Tech's bottleneck on the data necessary for AI is not in the national interest. The dominant companies cite their data hoards as a critical asset for the United States and a reason why government policy should be hands-off. If that data is a critical national asset, however, why should only a handful of companies be allowed to control that asset to the detriment of smaller, innovative companies?

From "break them up!" to "break them open!"

Eric Schmidt recently wrote: "Despite earnest efforts, the tech community has not demonstrated convincingly that it can regulate itself."[58] A longtime proponent of the "permissionless innovation" line of thought, he added: "The wide-ranging societal impact of A.I. in particular warrants government involvement."[59]

The "government involvement" Schmidt is promoting is government support of "institutional capacity in labs and research centers." He is, of course, correct. As commercial offspring of government-supported original research, the digital giants of today — including his alma mater Google — demonstrate how government funding primes the pump of innovation.

Government regulatory intervention can also prime the pump of innovation. As the U.S. Court of Appeals for the Seventh Circuit wrote in a February 2020 decision: "The harms that typically flow from a competitive market shifting to total control by a monopolist include ... reduced innovation."[60]

The time has come to cease using China either as a role model for favored companies and/or an excuse to rationalize the market dominance of digital giants. The nation's response to China must not be the adoption of China-like national champions, nor the "China doesn't regulate their companies that way" smokescreen. American public policy should embrace the all-American concept of competition-driven innovation.

> **American public policy should embrace the all-American concept of competition-driven innovation.**

Government support of competition-driven digital innovation begins with breaking the bottleneck that withholds data assets from their competitive application. The internet itself is the result of the interconnected sharing of independent networks; it is time to similarly open up and interconnect the data assets necessary for the creation of innovation-driving competition in the services using those networks.

Google CEO Sundar Pichai, addressing the innovative benefits of a large company such as his, has correctly observed that "scale does offer many benefits."[61] As a matter of national policy, we should not only be taking advantage of the scale of the dominant companies, but also expanding the scaling opportunity even more through interconnected data accessibility for all American innovators. We have seen how network effects mean that products improve when they are based on more data; open data interoperability can apply similar benefits of network effects to innovation.

The defense that only the big digital companies have the scale necessary for breakthroughs in areas such as AI overlooks the fact that there is even greater scale available if the data is not locked up and hoarded by the big companies. Sharing is a defining characteristic of the digital era, from sharing software as a service (SaaS), to sharing computing power in cloud services. It should be a national priority to scale innovative activities by unlocking the necessary digital assets that are being held by a handful of dominant companies. What America needs when confronting China is unconstrained innovation that comes from unconstrained competition built on at-scale access to the essential digital assets.

Realizing such unconstrained innovation will require new public policies. Such policies should not be fixated only on corporate size. We need to move beyond "break them up!" to policies that "break them open!" The national policy should be to make the digital assets that have been locked away by the dominant companies openly available to innovators — and in a manner that protects individual privacy.

Antitrust statutes should not be ignored. As previously discussed, however, we should not be blind to their limitations. Whether it is a Bell Labs-like opening of closed assets, or a breakup, government action requires a finding of antitrust misconduct and resulting adjudication. As we have seen, the Chicago School's "consumer welfare" interpretation of the statutes is a tiny eyelet in a very thin needle through which such a determination must pass. Beyond prevailing jurisprudence, however, there is the simple matter of time. If an antitrust action takes upwards of a decade to resolve, there is a high likelihood that by the time it is finally concluded the fast pace of technology has made it moot.

Lawmakers have more flexibility in the actions they can take. Congress makes the rules. Legislation can — and should — reach the conclusion that to deal with data bottlenecks and enhance innovation the national policy should identify data with important public attributes and mandate its sharing. It is down this path that the European Union appears to be heading.[62] By the end of 2020, the EU plans to have drafted new legislation that reportedly will require big companies to share data with smaller rivals.[63] Also under consideration is leveraging the large amount of data produced by European industry into pools that can be shared among companies and economic sectors to aid in the development of AI.[64] Once again, it is the EU, not the United States, that is leading the world in policies dealing with the impact of digital technology on the marketplace and innovation.

If judicial remedies are slow and problematic; and American legislative initiative is absent, it falls to regulatory bodies to be the last stand for oversight to

protect competition and innovation. While new and clear-cut statutes would be best, existing statutes do empower administrative agencies to reach the conclusion that data bottlenecks constrain competition and to propose solutions.

An interesting illustration of the pro-innovation effects of regulatorily-imposed data sharing has been the U.K.'s Open Banking Initiative. Adopted in January 2019, it mandates that the major financial institutions open their customer data (with customer consent) to third parties wishing to use that data to offer alternative services to those consumers. At the close of the program's first year, approximately 200 companies had stepped up to offer such innovative services.[65] It is a concept that is gaining traction around the world, including a report by the Trump Treasury Department with recommendations "that would improve consumers' access to data and its use by third parties."[66]

One of the most innovative regulatory ideas came from a speech by the FTC's director of the Bureau of Competition, Ian Conner, in February 2020.[67] While discussing the agency's potential options for dealing with previously approved mergers, Conner observed: "Simply unwinding the deal may not be enough to restore the competition that would have existed but for the challenged transaction." Then he elaborated, "particularly when dealing with data, it may be possible to both retain and divest an asset: databases, for example, can be copied, with one copy divested and one retained."

There it is: the recognition by a responsible U.S. regulator that data assets can be openly shared and that such sharing can lead to increased competition.

How could open data work?

At the root of Ian Conner's "it may be possible to both retain and divest an asset" is the non-rivalrous nature of digital assets: that use by one entity does not prevent its use by another. For those who still see the world through industrial assumptions about rivalrous assets, it is an unnatural realization.

Thus far, policy discussions have had difficulty disengaging themselves from industrial assumptions—much to the great advantage of the digital companies. It is only human nature to define tomorrow in terms of what you knew yesterday. However, if we are to drive domestic digital competition to out-innovate China, we must reorient our industrial-age thinking to embrace policies that take advantage of the non-rivalrous nature of data.

Open access to the data necessary for innovation at scale it is not about *taking* assets, but about *sharing* assets.

The dominant digital companies engage in a kind of digital alchemy when they take our personal information, convert it into a corporate asset, and then lock that data away for their exclusive use. Effective domestic digital competition that drives the innovation necessary to compete with China requires unlocking that data to realize its non-rivalrous benefits.

Mark Zuckerberg, of all people, has shown us the pathway to a shared data economy. Writing in a March 2019 Washington Post op-ed, he proposed that "regulation should guarantee the principle of data portability." Such data portability, he explained, means: "If you share data with one service, you should be able to move it to another."

Embracing regulation to require data portability, then defining the data asset as "shared," is seminal. In Zuckerberg's description, "you share data" with platforms such as Facebook. Under such a construction, it is not data that is "owned" by Facebook but is "shared" with Facebook. When the data asset is "shared," its non-rivalrous nature permits it to also be shared with others, rather than bottled up by Facebook. In such a construction, non-rivalrous data with important public attributes should not be viewed through the lens of "ownership," but rather in terms of "sharing rights."

Industrial assets typically derive their value through being a singularly exploitable, rivalrous, private good. Digital assets, in contrast, are different in two characteristics. Data's non-rivalrous nature allows it to be reused across multiple activities. And, as a result, digital assets have a broader and deeper impact on human well-being than other assets. It is good public policy, therefore, to see that digital assets are used as often and as broadly as possible.

The purpose of this paper is to discuss the importance of open data-driven domestic digital competition as a means of competing with China. The specifics of such policy belong elsewhere. However, the example of the U.K.'s Open Banking Initiative can be informative. In that example, the U.K. government required the major financial institutions to establish an industry-led entity to develop common and open standards for the open sharing of data, protection of security, and management of the necessary interfaces (APIs). That open data program is then overseen by a government agency with regulatory powers.

Any such open data requirement must, of course, bring with it the necessary protections of personal privacy and assurance that the data will be securely held. The Open Banking Initiative does this and imposes regulatory oversight of such protections. The computer science capabilities that opened this Pandora's box in the first place should also be harnessed to enhance privacy and security. Techniques such as "differential privacy," for instance, clone one set of data into another with the same statistical patterns but without the personal identifiers. Blockchain, similarly, provides very detailed control over who is allowed access to what data and the tracking when such access occurs.

Opening access to critical assets drives innovation. Yes, the details of such an initiative — from the specifics of its implementation to the protection of personal privacy — are challenging. Such a challenge, however, should not inhibit us from seizing the moment.

CONCLUSION

Maintaining the status quo ante is not the solution to competing with China. Since the beginning of the digital era, the information-based companies have been making the rules and resisting government oversight. To no one's surprise, these rules have allowed the companies to capture and hoard the critical asset of the 21st century.

The dominant digital companies argue that their size and data hoards make them the logical answer to China because they can exploit those data deposits to make investments that will only pay off in the future rather than generate current returns to shareholders. Yet, investing into the future is precisely what innovative companies and their backers do. But the entrepreneurs and researchers are being starved of the data assets necessary for that innovation. As was seen when AT&T was forced to open its patents, innovation grows dramatically when small companies are given the tools.

Time is awastin'. The digital policy of the United States is stuck in neutral. It has been two years since Mark Zuckerberg's eye-opening testimony in Congress. It has been four years since the EU Parliament passed the General Data Protection Regulation (GDPR). It has been three years since China announced a plan for digital supremacy. The absence of an American plan to disperse innovation and provide the necessary digital assets is a recipe for falling behind.

If we are to successfully compete with China, there must be a plan for digital competition in the United States. While antitrust vigilance must be maintained, it is not a panacea. Regulatory powers, appropriately applied, can open access to the data need for competition-driven innovation. Optimally, Congress should set the rules for open data interconnection, privacy, and security — not in a serial activity, but as a coordinated legislative initiative to preserve the dynamism of American capitalism while protecting American consumers.

My Brookings colleague Ryan Avent has observed how in the summer of 1862, Abraham Lincoln signed multiple pieces of legislation that boldly defined the nation well into the 20th century. Harnessing the original high-speed network was the Pacific Railroad Act creating the Transcontinental railroad. Stimulating growth by creating opportunity was the Homestead Act. The Land Grant College Act opened the academy to all.

At a time in which the new technologies of the steam railroad and magnetic telegraph were transforming commerce and culture, Lincoln and Congress stimulated investment, set rules, and gave the nation a forward push. We could use such vision, leadership, and boldness today.

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