Chapter Twenty-Two

Building a New Technological Relationship and Rivalry

US-China Relations in the Aftermath of COVID

Eric Schmidt

Containing COVID-19 requires opposite moves. Stopping the virus requires radical separation—of the sick and the healthy, of communities stricken and those spared, of nations whose borders are ordinarily open to people and goods. In a better world, this radical separation would be paired with intense cooperation—cooperation in finding and distributing a vaccine, restarting the world economy, and pooling resources to prevent future outbreaks. COVID-19 marks one of the first times that we as a species have faced a sudden global crisis with modern communications linking us seamlessly together. It could easily be a unifying moment.

Instead, in fewer than six months, the outbreak of COVID-19 has cracked the bridge that was thoughtfully constructed between the United States and a rising China in the years since Henry Kissinger’s 1971 visit to Beijing. Rather than cooperating with each other and sharing the burden of global leadership at a moment of crisis, Washington and Beijing turned their animus on each other. The

Eric Schmidt is an accomplished technologist, entrepreneur, and philanthropist. He joined Google in 2001 and helped grow the company from a Silicon Valley start-up to a global leader in technology alongside founders Sergey Brin and Larry Page. Eric served as Google’s chief executive officer and chairman from 2001 to 2011, as well as executive chairman and technical advisor. Under his leadership, Google dramatically scaled its infrastructure and diversified its product offerings while maintaining a strong culture of innovation. In 2017, he cofounded Schmidt Futures, a philanthropic initiative designed to help exceptional people do more for others by applying science and technology thoughtfully and working together across fields.
present friction, despite the two nations’ economies sharing a deep structural interdependence, showcases how easily domestic policy and decision making in both countries can destabilize a relationship that had been growing more fragile for some time. Even as China surpassed Mexico and Canada to become the United States’ largest trading partner in April 2020, informed commentators are now talking of a new cold war and wondering whether Taiwan will be the next domino to fall after Hong Kong’s wholesale absorption into the mainland’s system of governance and control.¹

Prudent leadership is needed to transcend the present tensions and establish a new framework for how the United States and China will cooperate and compete in the years to come. The framework must place technology as its central axis. Advanced technology is at the core of US-China competition and cooperation in global markets today. While calls for “decoupling” are reaching a higher decibel than ever before, leaders of both countries must resist the temptation to isolate industries and talent. We cannot—and should not—attempt the kind of expansive decoupling being called for by some. Neither coexistence nor global progress is possible unless the leaders of both countries find ways to revive cooperation even as the two countries enter a new phase of economic competition intensified by deep ideological differences and geopolitical rivalry.²

Five elements will underlie a recalibration of the relationship in such a way that preserves sovereignty and security, enables US companies to win the great game of platform competition now under way in global markets, and lets the United States continue to reap the beneficial aspects of interchange. They are as follows: (1) some purposeful decoupling of specific linkages that introduce unacceptable vulnerabilities; (2) continuing cooperative research, which brings significant joint benefit; (3) a clear commitment to commercial interchange between tech sectors; (4) greater collaboration in shared challenge areas; and (5) gearing up to win the platform competition through greater federal investment in research and development (R&D).

Before exploring each element in turn, we must first understand why COVID has become an inflection point in the relationship between the two dominant actors in the global system and how the underlying intensification of technological competition brought us to this point.

**What the Virus Wrought**

While greater cooperation may emerge in time, the early months of the pandemic have been characterized by radical separation. There is a new fragility in
the world, which we feel collectively. Leaders seem driven by rapid-fire response to events, neglecting reason or long-term perspective. This dynamic is especially evident between the United States and China. One of the first breaks in cooperation occurred when N95 respirator masks produced by foreign-owned factories in China were effectively nationalized by the Chinese Communist Party without sufficient consultation. When China’s own demand for medical-grade masks stabilized as the Wuhan outbreak subsided, China then pursued a ruthless and ultimately counterproductive program of “mask diplomacy” that tied the export of scarce medical supplies to coercive ends. Conditions for receiving lifesaving shipments included recipients making public statements of support for the Chinese Communist Party, heads of state giving thanks beside Chinese aircraft delivering supplies, or, most perniciously, recipients agreeing to a greater market share and dropping security concerns for telecommunications company Huawei. It was not Beijing’s finest moment.

Nor was it Washington’s best hour. As the outbreak grew in the United States, escalating accusations about the origin of the virus and questions about early transparency around the threat it posed produced a disastrous break in diplomacy for international health, with the United States ultimately defunding the World Health Organization and President Xi Jinping of China effectively pledging to replace the US contribution with Chinese funds. Coming after the US withdrawal from the Paris accord on climate, it was a second major retreat by the United States from an established framework for global cooperation.

With neither the United States nor China joining together in any of the global COVID vaccine coalitions striving to optimize R&D and production, analysts have raised the specter of a dangerous kind of “vaccine nationalism” playing out. These fears only grew when Gustave Perna, the four-star general appointed to run Operation Warp Speed, the US government’s vaccine initiative, was asked whether the list of countries that the United States was prepared to cooperate with includes China: “It does not,” he responded. A successful vaccine candidate held by the United States or by China could swiftly become an instrument of geopolitical competition, slowing the global administration of inoculum that is the one assured way to end the pandemic and restart the global economy. The costs to the world of China and the United States failing to cooperate are high.

The Deeper Fissure

When we ask ourselves why the rivalry has intensified, technology explains it to a much more significant extent than do the recent breakdowns induced by
COVID. China’s new technological prowess applied to an ambitious global agenda has destabilized the relationship. In emerging technology—in particular, artificial intelligence (AI) and 5G (fifth-generation mobile broadband)—Chinese and American companies are competing over platform dominance in global markets. Platform technologies are assemblages of hardware, software, and services that, by virtue of network effects, quickly become invincible in their sectors. Think Facebook and Weibo in social media, Google and Baidu in search, Amazon and Alibaba in online retail. Leveraging the positive feedback loop that results from rapid expansion, platform technologies often expand to other sectors and services. The future will increasingly become a battle over platform technologies dominated by a small number of companies from information-rich countries.

While both governments harbor ambitions of leading the world in research, applications, and market share, the Chinese government has acted most vigorously in support of its “national champion” companies. As recently as May 2020, President Xi announced that Beijing will invest $1.4 trillion over six years to accelerate the rollout of 5G wireless networks, improve technology infrastructure, and develop new AI systems. Huawei’s runaway market dominance in 5G is in fact the first platform technology of the internet age in which a Chinese firm has a breakout lead over the United States and other Western competitors, which have fallen behind in the race to develop and deploy the next generation of telecommunications technology. China, like the United States, is building an innovation system in which networks of knowledge, talent, and entrepreneurism drive advances so rapidly that few others will ever catch up.

Part of the reason why our government is not yet matching Beijing’s aggressive backing of science and technology is that many Americans still have an outdated vision of China, viewing it, in essence, as a still-developing nation rather than a peer with aspirations for global influence on par with the United States. In three generations, China transformed from having a per capita income of about $90 in 1960 to about $10,000 today. China has already passed the United States in gross domestic product based on purchasing power parity. China poses a larger economic challenge to the United States than the Soviet Union did. As a leading historian recently noted, “the Soviet Union could never draw on the resources of a dynamic private sector. China can.” Now, the Chinese government has ambitions—and specific plans, with promises of billions of dollars in funding—to surpass the United States in areas such as quantum communications, supercomputing, aerospace, 5G, mobile payment, new energy vehicles, high-speed railway, financial technology, and AI.
Already today, China has almost twice as many supercomputers as the United States. It has approximately fifteen times the number of deployed 5G base stations as the United States. By 2025, Chinese researchers are expected to overtake American researchers in the 1% of most-cited scientific papers in AI. By 2030, China is expected to spend more than the United States on overall R&D, in absolute terms. Sometime after 2030, the Chinese economy likely will become larger than ours.

China’s rapid technological progress unsettles Americans for many legitimate reasons. China is challenging the most important engine of American economic power—its innovation system. Americans believe that China’s ambition to dominate the world’s digital infrastructure will, whether through design or impact, create a new geopolitical reality. Americans see China’s technological ambition through the lens of its authoritarian system and its use of technology at home to maintain control. Americans also resent that China’s growth has been delivered in part by restricting the access of US firms to its domestic market, by theft of intellectual property, by forced technology transfer, and by other odious coercive economic tools. The United States welcomed China into the global trading system and welcomed Chinese students into American universities; and from the American perspective, that move has cost Americans jobs, hurt the American middle class, and is now threatening US leadership abroad. Chinese leaders, meanwhile, see US actions meant to hinder the growth of China’s technology companies as the overreaction of a declining power unwilling to allow China to exercise influence commensurate with its stature.

While the race for global market share in platform technologies may at first glance appear zero-sum for the firms involved, a web of underlying connections makes it anything but. Technical collaboration among US and Chinese researchers and the interlocking set of commercial activities between each country’s technology economy are a major driver of wealth and progress for both countries and for the world. Preserving the beneficial aspects of this research, talent, and market ecosystem is essential for economic reasons. The question, given present tensions, is how.

**A New Technological Relationship**

To move beyond the current dynamic, both sides must seek a new arrangement. What has been lost in US-China discord is this: if this rivalry could generate healthy competition fought on an even playing field, the two countries would have more to gain by competing fairly and cooperating where possible than by oppos-
Building a New Technological Relationship and Rivalry

ing each other on all fronts. The question now is how we redraw the relationship in a way that recognizes the centrality of commercial competition and the need for that competition to occur fairly and without geopolitical escalation. Let me propose five principles that I believe can guide us to a new technological relationship.

Some Purposeful Decoupling Is Necessary

In limited areas—namely, areas with clear security and military applications—some purposeful decoupling is necessary and, in fact, may stabilize the relationship by delineating clear no-go zones. The breakdown of cooperation over medical supply chains is one example. A half-century-long march toward optimizing for efficiency, with “just in time” logistics stretching across global supply chains, left countries around the world facing shortages of critical medical supplies when the pandemic hit. Each nation will have to take careful stock of what it relies on, where that is produced, and how future shocks can be mitigated by combinations of iron-clad supply guarantees, stockpiling, and domestic production capacity. Finding a new set point between efficiency and resiliency in the context of Chinese supply chains, without closing ourselves off to the world or spurning the prosperity that an interconnected economy can deliver, is an important issue for the United States to address. While doing so will not be easy or without costs, the problem is solvable. Similarly, preserving essential state functions, such as telecommunications, necessitates decoupling hardware and services that introduce unacceptable security threats into the network core, as is the case with Huawei.

Harder areas to establish a clear plan for decoupling include technologies such as AI, which are inherently dual use, but we must begin that discussion. It should begin with a basic question: If China halted trade with the United States in a crisis or in response to rising tension, what products or materials key to national security would the United States not be able to build or procure domestically or find elsewhere in the world market? We should not overact, but we must undertake a careful and systematic analysis. Today we might depend on China for personal protective equipment and ventilators. We must make sure, though, that it is never an electronic chip or any other critical technology that leaves us in a position of being coerced or having to concede a vital interest because of our dependence.

Decoupling, seen through this lens, is not just about disconnecting from China. It is about revitalizing America’s own productivity in critical areas and building up allies’ and partners’ capacities. Done right, purposeful decoupling could spur
a commercial renaissance in particular classes of technologies across Western nations and their allies, helping to strengthen the liberal world order.

**Continuing Cooperative Research, Which Produces Significant Joint Benefit**

Advocates for much stronger prohibitions on commercial interchange have pushed US leadership to take steps toward more fully decoupling the international research system, especially on AI and biology but also in other areas of technology too. They cite China’s well-documented espionage, intellectual property theft, and talent recruitment programs, which are unquestionably disadvantaging our companies, our universities, and our military.\(^{10}\) It is certainly true that particular types of joint ventures between Chinese and US firms do need to be placed off limits due to national security concerns. Greater policing of intellectual property theft in industry and academia is necessary, on a scale appropriate to the size of the problem. Also needed in policy is a more careful demarcation of the dynamics of cooperation, competition, and mutual benefit across different kinds of research—fundamental, applied, product development. But it would be a catastrophic mistake to make unfortunate and serious edge cases the basis for undoing a system that has on the whole yielded impressive joint gains and driven the accrual of enormous economic value.

Take AI as an example. Analysis by Schmidt Futures of top AI research submitted to conferences shows that research collaborations between American and Chinese institutions are, by a wide margin, the most productive AI research pairings in the world. Two-thirds of the research papers published by US-based institutions at top AI conferences have a coauthor of Chinese descent. Additionally, the United States has benefited enormously from its ability to attract top Chinese technical talent. A recent analysis indicated that of a group of 128 high-level researchers with undergraduate degrees from Chinese universities whose papers were presented at AI conferences, more than half currently work in the United States. Among international students majoring in computer science and math at US universities, nearly 20% were Chinese nationals.\(^{11}\) At the same time, the Chinese tech ecosystem has prospered as well, since a sizable number of China’s technology and research leaders educated in the United States return home to take leadership roles. The community of Chinese American technologists and their immediate American colleagues know best the fruits of global technological collaboration. Their voices are necessary to help us confront the challenges we face and find additional ways that cooperation can be sustained and encouraged. We must not
lose sight of how competition in research, in peaceful application, and in commercial markets is healthy, normal, and most often accelerates technological progress for everyone.

**Clear Commitment to Commercial Interchange between Tech Sectors**

Anyone with an Amazon account, or really any American consumer, grasps the kind of economic value being generated in China in response to US consumer demand. The vital role that the US export market plays for China, along with Chinese ownership of US Treasury securities and the value of the US dollar, is widely understood to have powered both economies to unprecedented heights. What is less known is the value that accrues to US firms selling goods and services to China, especially in the technology market.

Today China accounts for about 45% of global semiconductor demand but relies on imports for more than 90% of its chip needs. Semiconductors are China's single largest import ($241 billion), followed by oil ($228 billion)—leading to the oft-repeated and stunning fact that China spends more on silicon than it does on hydrocarbons. These foreign semiconductors are critical components for China's national champion companies, including ZTE in telecom. Although moves to decouple the chip ecosystem have already begun, with US government restrictions on particular classes of hardware leading the Chinese to accelerate their own domestic design and production capacity, companies based in the United States and its allies, including Taiwan, will continue to supply the majority of this crucial hardware, at least in the short term. Apple's hardware and services are another easily identifiable illustration of beneficial interchange; in the hands of one in five Chinese smartphone users are iPhones designed in California and loaded with tools and services from Apple's App Store.

Human capital is perhaps an even more significant aspect of how entrepreneurial technology companies have been founded and grown. It is hard to find an arrangement that has had more mutual benefit to the development of technology and wealth on both sides of the Pacific than the influx of high-skilled Chinese talent to the United States. Just as leading American technology firms have executive teams that are internationally diverse, especially on the engineering and product development side, Baidu, Alibaba, and Tencent all have US-educated executives within their ranks. It is not just the old guard either. Colin Huang, China's new second-richest man and the founder of the rapidly growing e-commerce company Pinduoduo, was educated in the United States and has written publicly about his
Eric Schmidt

formative experience starting his career at Google.13 These high-profile “sea turtles” act not only as crucial carriers of value in US-China interchange. Having a stake in each society, they are also a beachhead from which further dialogue and stronger cooperation can be built.

The United States is an overwhelming winner as well. In fact, multiculturalism is arguably our deepest competitive moat in the development of technology, protecting the lead that many US firms have built over global competitors. Just as teams of international talent within US firms have been the biggest driver of commercial breakthroughs in the last generation, the primary determining factor for whether the future of technology will be defined in the United States or China in the coming generation is human capital. The ability to attract and retain top-tier talent from around the world drives a flywheel spinning continuously faster in which the best talent comes to the United States to work at the best institutions on the most cutting-edge intellectual property. High-skilled immigration and diversity power our nation’s competitive advantage in technology. Continuing to draw the best talent here is a core competency for our country, and we should be doing everything we can to reinforce it.

Ultimately, both the United States and China would be harmed if their economic and technological systems decouple fully. Imagine a world with two wholly different internets—How much would that set us back in the creation of new products, services, and technologies? How much would two separate internets set back cooperation in health care, science, and research? How much would it increase the risk of a miscalculation militarily between the two greatest powers in the world system? When viewed in this light, it is easier to see how deliberately splitting the “tech stacks” upon which our modern lives are built will much more likely make the world smaller, not bigger.

Greater Collaboration in Shared Challenge Areas

The scope of possible cooperation between the United States and China is growing in concert with the promise of technology. AI, machine learning, and expanding digital connectivity provide a rich arena for cooperation to solve the world’s hardest challenges. The outbreak of COVID-19 spotlights the importance of making progress in health care and global health security and in channeling modern machine learning techniques toward fighting a pandemic. Others challenge areas, such as climate change, are ripe for cooperation and in urgent need of solutions that scale. There are still other areas such as AI safety—that is, ensuring AI systems do only what they are designed to do—where cooperation would
benefit both countries and many others as well. The world would be a better place if China and the United States found a way to meet these challenges together, even as they continued to compete in global markets.

A great question before policy makers is how to call attention to these shared challenge areas more explicitly to reaffirm the mutual benefits of cooperation and to make progress together. One could imagine both top-down and bottom-up approaches. A commission of prominent Chinese and American political and business leaders could, for instance, craft a joint strategy to maximize cooperation in specific areas. We could similarly pull a page from the Cold War handbook for US-Soviet cooperation and boost bottom-up approaches driven by young people, whether through new incarnations of student exchanges that build on existing successes (e.g., the Schwarzman scholars program) or more modern takes such as a youth competition on major US and Chinese social media platforms. Whatever approaches we pursue, we must act now, as one can sense a turning tide. News that broke in mid-June 2020 about Baidu, the Chinese internet search giant, withdrawing from the Partnership on AI, a US-industry-based effort to address the ethical challenge of AI, is illustrative of the kind of cooperation that could be lost if the break between the two nations accelerates.14

**Gearing Up to Win the Platform Competition**

While greater cooperation is essential to realizing the benefits of the US-China relationship, we must also remain clear-eyed that we are in a fierce competition with China. Forcing action through engagement will only produce mutual benefits if we stay ahead or at parity in this competition. With the intensification of the competition after breakout progress made by the Chinese on multiple fronts, we must take action now to keep from falling behind.

Indeed, the trends are stark. Absent change, we will soon be competing with a country that has a bigger economy, more investment in R&D, better quality research, wider application of new technologies, and stronger computing infrastructure. As the 2020s begin, we should be gearing our policy and legislation to compete effectively in a 2030s world that may look very different. We must devise a comprehensive national strategy to win. That strategy must see the range of technologies emerging today as interconnected opportunities. Advances in quantum computing will spur developments in AI, progress in AI will help accelerate discoveries in biotechnology, 5G networks will open up new opportunities to leverage AI applications, and so on. Such a strategy could embrace the following elements.
**Funding.** Overall federal R&D spending has not kept pace with technological change. Simply put, we need to place big bets. US government funding for R&D has seen a decades-long decline and is now at pre-Sputnik levels as a percentage of gross domestic product.\(^{15}\)

**Nationwide Infrastructure.** Given the interconnected nature of emerging technologies, we must invest in foundational infrastructure. This includes supporting a competitive and secure global alternative to Huawei in 5G, ensuring that the US microelectronics supply chain is resilient and assured, and investing in next-generation and high-performance computing.

**Flexible Grants.** The United States graduates the largest number of science and engineering doctorates of any country. We need new mechanisms to accelerate expert research in the postdoc and junior faculty phases. Congress should consider more models for multiyear investments in promising researchers, not just funding specific projects.

**Government-Industry-Academia Collaborations.** Because the commercial sector outspends the government on R&D in many important areas, the government must partner more closely with private companies to shape technology development. Partnerships can help researchers overcome technical and financial barriers. Congress should also explore tax incentives for companies that share data and provide computing capabilities to research institutions, and it should accelerate efforts to make government data sets more widely available.

**Talent Development.** The United States needs major new STEM (science, technology, engineering, and mathematics) education initiatives at the K–12, college, and graduate levels. This includes expanding the existing STEM scholarship programs and designing new ones. We also need to attract more global expertise to America. That helps our competitiveness.

**A New Rivalry and Relationship**

With COVID, unexpected hardship took hold in Wuhan and soon spread the world over. Hardships are now affecting our families, our communities, and our nation. No corner of the world will escape. An even bigger and more far-reaching setback is the prospect that the intensification of the US-China rivalry in a moment of global crisis will produce a permanent condition. A sharp break between the two dominant actors in the global system, at a time when all of humanity should be reaching for cooperation against a mutual threat, would be a costly setback.

The future—if managed by prudent leaders—must transcend the present confrontation. If market and platform dominance really is synonymous with geopo-
litical dominance, then we must prepare for a great power relationship with China that could risk outright confrontation. It will be a future much closer to the Cold War paradigm of “peaceful coexistence,” only one with potentially devastating consequences to our own economic trajectory. But if we pursue fierce technological competition on a transparent, open, and reciprocal playing field, then I welcome the challenge of “competitive cooperation.”

Today, the Chinese are competing to become the world’s leading innovators. The United States is not playing to win. That must change. Our way to technology leadership is a dual path: better protect our innovations and out-innovate our competitors. Decoupling completely is not a viable option. We must embrace the core notion that competition produces benefits for both nations—that it spurs us both to be better.

What must we do to win in such a world? We must reassert our own American system, preserving the democratic values at its core. This means addressing deep fissures and inequalities and remembering that immigrants give us our strength; alliances, our scale; ideas and creativity, our power. If we lead in this way—the American way—our allies, and ultimately the rest of the world, will join us.

NOTES


2. This essay expands upon an earlier work: Eric Schmidt, “China as Worthy Competitor—Working toward Shared Success in 2021 and Beyond” (paper presentation, Belfer Center US-China dialogue Managing the US-China Rivalry after the Pandemic, June 19, 2020).


15. In 1953, the United States spent 0.72% of its GDP on R&D. In 1957, when the then-Soviet Union launched Sputnik, it had grown to 1.3%. R&D spending peaked at 1.86% in 1964. In 2017, it declined below 1953 levels to 0.61%. “Federal R&D Budget Dashboard,” American Association for the Advancement of Science, https://www.aaas.org/programs/r-d-budget-and-policy/federal-rd-budget-dashboard.