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The Clean Network and the Future of Global Technology Competition

"[The Soviet Union] has a far flung apparatus for exertion of its influence in other countries, an apparatus of amazing flexibility and versatility, managed by people whose experience and skill in underground methods are presumably without parallel in history."

-George F. Kennan's  "Long Telegram," February 22, 1946¹

5G, or the 5th generation network, promised to be a revolutionary, stepwise shift in network speed for telecommunications.² 5G relied on a physical network of switches and routers and possessed the ability to accommodate vast exchanges of data required to power autonomous vehicles, virtual reality and artificial intelligence with little lag. Global equipment providers competed to build the underlying switching systems, which theoretically gave them control over information flow passing through the network, alongside the capacity to reroute or copy data without user knowledge. As countries held high-band 5G spectrum auctions to build their 5G networks, Huawei, a Chinese company, was emerging as the global leader, surpassing competitors such as Ericsson, Samsung and Nokia on technology and price for 5G network supplies.³

Huawei, along with ZTE, another Chinese telecom company, had ambivalent economic relationships with the world and the United States in particular. For many years, ZTE and Huawei both had enjoyed access to supply chains rooted in the U.S. and, especially for ZTE, U.S. markets. But both companies had also been sites of conflict between the U.S. and China. Huawei was formally a non-state-owned firm, but its origins and associations with the People's Liberation Army (PLA) and murky relationship to the Chinese Communist Party (CCP) made it a source of consternation for countries concerned about the Chinese government's potential access to the company's data or the state's support for firms generating an unfair competitive landscape in the industry. ZTE was a formally state-owned firm (See **Exhibits 1 and 2** on Huawei and ZTE ownership structures). Both firms were considered Chinese national champions and, though both firms denied excessive state involvement and claimed their motives were commercial, many doubted the firms' independence.

Ambivalence would become antipathy over the course of the late 2010s and 2020. While the U.S. had essentially excluded Huawei from its own critical infrastructure after 2019, concerns within the U.S. national security establishment over Huawei's global position mounted. Many fretted about U.S. military and other interests overseas relying on Chinese telecom equipment. Fears included espionage risks as well as what a former National Security Council official called "the worst possible day" scenario: "On the worst possible day in a conflict with a peer adversary, the United States may not be able to count on the survivability of communication satellites."⁴

To be sure, competition between the U.S. and China was not confined to technology. President Donald Trump initiated a trade war in 2017 that would see tariffs affect up to 55% of the total value of U.S. imports from China and 85% of China's imports from the U.S.⁵ Amid multiple sources of economic conflict, however, the technology issue seemed the thorniest. As the President of the U.S.-China Business Council, Ambassador Craig Allen, put it: "The trade war is bogus, but the technology war is real."⁶

Yet, despite widespread agreement in the U.S. among members of both political parties that Chinese technology firms presented a security threat to American interests, it was not at all clear how to address the problem. By 2020, Huawei's dominance in 5G seemed all but assured, and no American companies possessed the technology necessary to challenge the company. Over the course of 2019, the U.S. unsuccessfully sought to exclude Chinese telecom firms from deploying equipment in large swaths of the globe through an uncoordinated effort by the interagency. In 2020, the "Clean Network" led by the U.S. Department of State, challenged Huawei and convinced a significant number of countries to rip already deployed equipment out of their infrastructure. It would transform the technological competition between China and the U.S. with ramifications for countries and firms the world over.

From a Two-Way Street to a Dead End

The People's Republic of China (PRC) had come a long way from the poor, agrarian country it was when it resumed economic and diplomatic relations with the U.S. after decades of political antagonism. After three decades of state socialism and political upheaval under Mao Zedong, the PRC under Deng Xiaoping adopted a series of market reforms in the late 1970s that catalyzed growth in agriculture and rural and urban industrialization. A steady opening to global markets that began in coastal areas and culminated in the country's accession to the World Trade Organization (WTO) in 2001 turned China into an export powerhouse—the "world's factory"—and the largest non-western recipient of foreign direct investment. In the years following the global financial crisis of 2008, however, the CCP made clear that the future of growth would have to move beyond low value-added exports and into both higher technology sectors and reliance on domestic demand. Policies as early as the 1990s encouraged Chinese firms to "go out" to compete in global markets, and the years following 2008 saw several strategic initiatives to push Chinese firms into global competition in frontier industries.

China was increasingly a sender of foreign direct investment, especially as outbound investment exceeded inbound in 2015 and Chinese firms became involved in infrastructure, real estate, commerce, and technology sectors in the developed and developing worlds. Analysts increasingly discussed the "two-way street" of investment flows between China and the United States; in 2016, Chinese investment in the U.S. peaked at \$46 billion, much of it in mergers and acquisitions in industries ranging from hospitality to semiconductors.⁷ Traffic in the "two-way street," however, would rapidly disappear within a few years, as new industrial policies in China and new anxieties in the U.S. about the security implications of China's technological advancement transformed the investment landscape.

Made in China 2025

In the 2010s, Chinese industry leaders and policymakers grew concerned about China's position in global technological value chains and began to search for ways to ignite technological growth. Science and technology drives and industrial policy were nothing new in China, but several events seemed to propel a sense of urgency. One trend was expanding capabilities in cyber-weaponry and cyberespionage in the west, such as the Stuxnet virus that devastated Iran's nuclear program in 2010 and Edward Snowden's 2014 revelations that the U.S. National Security Agency (NSA) breached Huawei's servers. Another set of trends in China included rising wages, declining labor productivity and the fear of trade conflict, and tariffs that dissipated China's advantages in manufacturing. China's competitiveness and security in the coming decades would depend on its domestic technological capabilities.

In 2015, China's Ministry of Industry and Information Technology (MIIT) announced a "Made in China 2025" initiative to comprehensively upgrade China's manufacturing sector. It laid out three phases: in the first phase from 2015 to 2025, China would transform itself from a "big" manufacturing power to a "strong" manufacturing power where innovation in key technologies would drive productivity, lower energy use and emissions, and create globally competitive companies and sectors. By 2025, domestic content of "core components and materials" would double to 70 percent. By 2035, China would become a "mid-level" player

among “strong” manufacturing powers. By 2049, the 100th anniversary of the country’s founding, China would become a world-leading manufacturing power.⁸

Made in China 2025 identified ten priority sectors including “new advanced information technology,” which included telecommunications and semiconductors. The latter would be a focus of domestic funding to relieve dependence on foreign chips. The government planned to mobilize \$150 billion for national and local “industry funds” to identify domestic firms in the space and fund them. For example, SMIC of Shanghai was designated to be China’s champion “foundry,” or a bulk manufacturer of chips designed by other firms, and HiSilicon of Shenzhen, part of telecom equipment giant Huawei, would be one of several national champions in chip design.⁹

As Chinese firms embarked on an international buying spree, governments in Germany, South Korea, Israel, and the United States began to fear losing prize technological firms to Chinese acquisitions. Toward the end of Obama’s administration, the Committee on Foreign Investment in the United States (CFIUS) became a greater roadblock to Chinese acquisitions, striking down deals in the semiconductor sector specifically. In 2018, the purview of CFIUS was expanded and an export controls regime was strengthened through two pieces of legislation designed to deal with the changing nature of Chinese entities and ambitions. Policymakers in the U.S. and elsewhere worried about murky relationships between Chinese technology firms and the state, as well as about a series of news laws in China that seemed to give the Chinese state broad legal rights to state assets. The National Intelligence Law (2017) obliged “individuals, organizations, and institutions to assist Public Security and State Security officials in carrying out an array of intelligence work” including that “state intelligence work organs...may demand needed support, assistance, and cooperation.”¹⁰ Laws on Cybersecurity (2016) and National Security (2015) similarly expanded the legal possibilities of state intervention.

Huawei and ZTE Corporation were both seen as China’s national champions in telecom, but the firms were very different. Huawei was founded in Shenzhen in 1987 by Ren Zhengfei, a veteran of the People’s Liberation Army’s engineering corps. Huawei was technically a non-state-owned firm, but its ownership structure was vague and the company certainly benefitted from the state’s largesse. A *Wall Street Journal* investigation estimated that the company had benefitted from more than \$75 billion worth of tax breaks and preferential financing and resources as it grew.¹¹ The company had long been accused of stealing intellectual property, and had on occasion admitted doing so.¹²

ZTE was also founded in the 1980s by a state-connected entrepreneur and later attracted a majority state owner.¹³ The company grew through capturing domestic market share in mobile phones and 3G and also committing to internationalization, pursuing both network contracts and mobile phone market share abroad. Unlike Huawei, ZTE was focused on the U.S. market.¹⁴ The Bureau of Industry and Security (BIS) subjected the company to export controls in 2016 when it was found in violation of U.S. sanctions on Iran, but the controls were lifted after only two months when ZTE agreed to fines and judicial review of its practices in the United States.¹⁵

Both companies attracted unwanted attention in the U.S. as early as 2012 when the U.S. House of Representatives Permanent Select Committee on Intelligence issued a report on Chinese telecommunications firms, principally Huawei and ZTE, and potential effects on U.S. national security. The report criticized both firms for failing to clarify their relationships with the CCP and, therefore, concluded that “to the extent these companies are influenced by the state, or provide Chinese intelligence services access to telecommunications networks, the opportunity exists for further economic and foreign espionage by a foreign nation-state already known to be a major perpetrator of cyber espionage.”¹⁶

At the end of 2018, Huawei’s CFO, Meng Wanzhou, was arrested in the Vancouver airport at the request of the U.S. Department of Justice officials. The indictment was focused on the company’s activities in violation of U.S. sanctions in Iran.¹⁷ On May 16, 2019, the BIS amended the Export Administration

Regulations by adding Huawei Technologies Co., Ltd. and sixty-eight of its non-U.S. affiliates located in twenty-six countries to the Entity List.¹⁸ The change was made based on the U.S. government's determination of Huawei's involvement in activities adverse to the national security or foreign policy interests of the United States. The goal of this amendment was to restrict Huawei's access to chips from most American chipmakers.¹⁹ Three months later, BIS added another 46 non-U.S. affiliates of Huawei to the Entity List.²⁰ The central security concern was that Huawei could allow the Chinese government to use its telecom network for intelligence collection and would have the potential power to disrupt critical communications infrastructure.

Dealing with Huawei's links with U.S. firms and preventing Huawei from deploying equipment in the U.S. was possible using U.S. legal infrastructure. But, whatever the U.S. did in its own market, Huawei was offering high-quality and competitively priced 5G equipment across the globe. U.S. policymakers had to determine what U.S. interests were in the global battle for 5G and how to act on them.

The Clean Network

Though many in the U.S. appeared to agree that Huawei's role in global 5G digital infrastructure posed serious national and economic security concerns, addressing the issue was not straightforward. The technical aspects of rapidly changing telecommunications were complex, as were the supply chains that enabled the development, manufacturing and deployment of 5G. Among the several agencies in the U.S. government charged with national security, trade, investment and technology, no agency had clear responsibility for the challenge, and the U.S. was losing allies to Huawei's business.

In mid-2019, Secretary of State Mike Pompeo brought Silicon Valley veteran Keith Krach (MBA '81) into the U.S. State Department to help. Krach had co-founded and served as the CEO of Ariba, the first and largest B2B eCommerce Network, and more recently served as CEO of the digital security company DocuSign, building the company's Global Trust Network to 320,000 companies and 300 million users in 188 countries.²¹ Earlier in his career, he served as the youngest Vice-President in the history of General Motors. His content knowledge and leadership experience in software strategy, sales, management and information technology made Krach suited to understanding the nature competition in the industry.

During his confirmation hearing in 2019, he did not mention China specifically, but he didn't mince words: "As you know, our rivals are playing the long game, and they are playing for keeps—a four-dimensional game of economic, military, diplomatic, and cultural chess with little respect for human rights, intellectual property, rule of law, the planet, or the sovereignty of other nations."²² Krach was confirmed unanimously by the Senate as Under Secretary of State for Economic Growth, Energy and the Environment.

As the top economic diplomat for the State Department, known in government simply as "E," the position required Krach to advance the State Department's global economic and security agenda. A day after his confirmation by the Senate Foreign Relations Committee, Krach flew to Bahrain to attend the Peace for Prosperity conference, followed by the G20 summit and a visit to Korea.²³ A week later, back in the U.S., Secretary Pompeo gave Krach the mission of developing and operationalizing a global economic security strategy that would drive economic growth, maximize national security, and combat the CCP's economic aggression.²⁴

The resulting strategy consisted of three pillars. First, catalyze economic competitiveness by driving productivity and access to capital and accelerating the development of emerging technologies critical to economic growth and security. Second, safeguard critical American assets, such as intellectual property, supply chains, financial and education systems. Third, form a network of partnerships comprising like-minded countries, companies, and civil society that would operate by a set of trust principles in multiple areas of economic collaboration.²⁵

In January 2020, Undersecretary Krach brought Secretary of State Pompeo to Silicon Valley on a four-day listening tour to better understand U.S.–China business relationships from 36 CEOs. Krach recalled, “I wanted to provide a safe, group environment in which the top leaders could say the good, the bad and the ugly about their experiences in China, in front of their peers. There really was not a lot of good; even when they did business and did well, they didn’t trust them.” Krach said, “I wanted to Secretary Pompeo to hear first-hand from Silicon Valley executives about the nature of China’s rapid advance and aggressive upgrading strategy through systematic IP theft, protectionist policies and state-backed subsidies. I wanted him to understand China’s key interest in semiconductors and the imperative to bring manufacturing back to the U.S..”²⁶

In January 2020, the United Kingdom’s decision to allow Huawei into its 5G network sparked tensions between London and Washington. For its part, the U.K. had announced to Parliament that it would permit “high-risk” vendors to supply equipment to carriers for its 5G networks, but would manage that risk by “protecting networks regardless of vendor.”²⁷ The U.K.’s National Cyber Security Centre (NCSC) announced a set of standards for telecom security in July 2019 that laid out “principles, requirements and tests for the most important things we need operators to do to protect their network, regardless of vendors used.”²⁸ The NCSC also put in place special processes for “high risk vendors,” and specifically a Huawei Cyber Security Evaluation Centre which published annual Oversight Board reports for Huawei especially. The oversight board reviewed the company’s source code and assessed security risks. In 2020, the Oversight Board concluded that it could “only provide limited assurance that all risks to U.K. national security from Huawei’s involvement in the U.K.’s critical networks can be sufficiently mitigated long-term.”²⁹

Across the Atlantic, the Americans were not impressed. White House officials said it would be “nothing short of madness” to include the Chinese company in telecoms infrastructure, and that intelligence sharing would be at risk if Britain went ahead. In a sign of the U.S. bipartisan political alignment on the threat posed by Huawei, Speaker of the House Nancy Pelosi warned European countries they will “choose autocracy over democracy” if they let Huawei take part in rolling out 5G technology at the 2020 Munich Security Conference in February 2020. She added it would be the “most insidious form of aggression” if 5G communications were to come under the control of an “anti-democratic government.”³⁰

Still, Huawei’s momentum toward capturing tremendous global market share in 5G appeared assured. A few days later, at a press conference in London, Huawei announced 91 commercial 5G contracts worldwide, with 47 in Europe. “It looked like they were going to run the table,” Undersecretary Krach recalled.³¹ The U.S. government’s past approach to addressing Huawei’s 5G network with other countries had been more sticks than carrots. “It involved a lot of banging on the table and saying, ‘Don’t buy Huawei.’ Where I come from, you never mention your competitor’s name,” Krach said. “Why don’t we treat them as a customer?”³²

Unlike other companies that made their customer lists public, Huawei did not specify their contracts. Krach believed that this lack of transparency suggested that Huawei’s apparent market position was not irreversible. After 60-odd bilateral meetings with his counterparts, Krach said, “They’d often say, ‘Well, they are an important trading partner.’ Then, they would lean in and whisper, ‘But we don’t trust them.’ Trust is the most important word in any language. In the software business, trust was the basis of every relationship. I used to say: we’re not in the software business, we’re in the trust business.  The U.S.’s strategic positioning needs to be all about trust.”³³

Krach also became convinced that everyone was terrified of China. “Nobody wanted to use the China or Huawei word,” Krach said.²⁸ “The elephant in the room was always the CCP’s bullying. Countries and

companies were terrified of its retaliation. However, the key to beating all bullies is to confront them head-on. When you confront a bully, he backs down. And he really backs down if you have your friends by your side. The key to defeating China Inc. lies in the power of assembling a network of trusted partners to serve as a security blanket against China's retaliation."³⁴

Krach's team had prior success with alliances around global standards, such as the Blue Dot Network on quality, clean infrastructure development with clean financing, and the U.S.-led Energy Resource Governance Initiative, or ERGI^a, on clean energy with clean minerals such as lithium, copper and cobalt for advanced battery development.³⁵ Nothing had been done in the information technology space.

Building a Strategy

In Krach's Senate confirmation testimony, he outlined his strategy to address the China Challenge: "My focus will be on harnessing three powerful areas of competitive advantage: strengthening our partnerships with friends and allies, leveraging the innovation and resources of the private sector, and amplifying the moral high ground of our democratic values."³⁶

In formulating his strategy, Krach said, "The Clean Network's mission would be to build an alliance of democracies to reverse China's dominance of the critical economic sectors by harnessing the synergies of the U.S. Government, our allies, and the private sector, while leveraging our competitive advantage and existing initiatives like Blue Dot Network and ERGI and shared democratic values in the epic battle between freedom vs. authoritarianism. The core principles of this initiative were grounded in democratic values, which form the basis of trust: integrity, accountability, transparency, reciprocity, and respect for the rule of law, property, labor, sovereignty, human rights, and the planet."

These "trust principles" formed the basis of the network and criteria that countries and companies had to meet for inclusion. Krach said, "The trust tenets of the Clean Network explicitly state that 'The U.S. is committed to fostering the Clean Network comprised of like-minded countries, economies, companies, investors, institutions, and civil society organizations that adhere to the set of Trust Principles. The goal is to include all countries and organizations as participants. Countries that currently do not abide by the Trust Principles will be excluded from CN membership until they reform problematic practices and laws. No nation is excluded forever, and the CN does not require a country to choose between partnership with the U.S. and any other nation.'" (See **Exhibit 3b** on trust principles). "The ultimate objective was to create a fair, free, and reciprocal level playing field; we never assumed we could create regime change."³⁷

Krach envisioned that 5G would serve as "the initial beachhead to a comprehensive strategy of economic competition with China in a variety of other sectors." Once one built a network and secured a defensible beachhead, he reasoned, one had a strategic high ground that could be used to attack adjacent markets.

Part of Krach's strategy was to brand the Clean Network as an alliance of democracies and companies that operated by a set of trust principles for all areas of economic collaboration in opposition to what he called "China Inc." He said, "I call them China, Inc. because, I witnessed the devastation of thousands of manufacturing companies like my dad's five-person machine shop. At GM, I learned about forced tech

^a The "Blue Dot Network" was a U.S. Department of State-led initiative for certifying global infrastructure projects "to promote quality infrastructure investment that is open and inclusive, transparent, economically viable, environmentally and socially sustainable, and compliant with international standards, laws, and regulations." See U.S. Department of State, "Blue Dot Network," webpage, <https://www.state.gov/blue-dot-network/>, accessed March 29, 2021. ERGI was a State Department Bureau of Energy Resources-led initiative to promote "sound and resilient energy mineral supply chains." Bureau of Energy Resources, "Energy Resource Governance Initiative" fact sheet, <https://www.state.gov/wp-content/uploads/2019/06/Energy-Resource-Governance-Initiative-ERGI-Fact-Sheet.pdf>, accessed March 26, 2021.

transfer when the Chinese government requires a JV to have access to their market and in Silicon Valley, I experienced government backed IP theft from China. I didn't understand it at first, but then I saw the coercive nature of how their system methodically targets one industry after the other. They give a bunch of subsidies and resources and let companies grow and compete domestically and then at a certain point declare a national champion and put government resources, including the Ministry of Foreign Affairs, behind them. Then, you're not competing with a company but with China as a country." Krach said, "Huawei was the posterchild for China Inc, so it was natural to link Huawei to the CCP since everybody understands the party is the government and then link the CCP to the surveillance state which enables the genocide in Xinjiang and the evisceration of freedoms in Hong Kong." (See **Exhibit 4** for these arguments).

Krach brought James Shinn (MBA '81), who also had experience in software and substantial experience in government service, onto the team as a Senior Advisor. By March 2020, Krach had recruited a half-dozen executives, many from Silicon Valley, and paired them with State Department career officers to form a broad network of "honorary E-team members" to operationalize a plan that was aligned around a shared playbook. (See **Exhibit 3a** on this "playbook.")

The Clean Network had three stated objectives: "The first objective was to prove that China Inc. is beatable by defeating the CCP's masterplan to dominate 5G which would also open the playing field and enable U.S. entrants. The second objective was to deliver an enduring model for competing with China Inc. as measured by meeting ten essential factors. The final objective was to provide a beachhead and a head-start on building a strategic platform that could be leveraged in other sectors of economic competitions, such as cloud computing, mobile applications, underwater cable, AI, IoT, clean energy, digital currency, autonomous vehicles, advanced manufacturing and biomedical engineering, electronic payments, since they all pose the same challenges."³⁸ (See **Exhibit 5** on these objectives and the team's system of measuring achievements).

"Huawei had all the momentum and seemed unstoppable," Krach said.³⁹ Krach believed that everyone wanted to go with the leader: "In a rapidly changing technology market, leadership was not determined by size but by momentum. Our strategic imperative was to reverse Huawei's lead in global 5G market share by taking away its momentum."⁴⁰ In 2020, no U.S. firm could offer end-to-end 5G services, and the market was an oligopoly dominated by Ericsson, Nokia, and Samsung in addition to the two Chinese vendors. Up to this point, network equipment had been a single-vendor market. When an operator purchased equipment from one vendor, it could not mix in technology from other companies. "My team believed the market was ripe for a shift to interoperability, similar to what happened in the PC business," Krach said. "If the mobile network equipment market became truly interoperable, it would no longer be an oligopoly. U.S. firms would have new opportunities to enter the market, making it much harder for Beijing to suppress competition and maintain Huawei's dominant position."⁴¹

In the short term, however, the urgent matter of highest concern was protecting the competitive position of the only two significant non-Chinese players, Nokia and Ericsson. Since the vast majority of telco operators contracted at least two vendors, if something happened to either one, Huawei would win by default. Krach said, "China Inc.'s 5G market-distorting industrial policies were so successful that they resulted in such commanding economies of scale advantage for Huawei, that the only two significant non-Chinese players' ability to keep up with the necessary R&D investment was being threatened."⁴²

The team deployed a four-prong strategy to build the network effect. (See **Exhibit 6** on the four principles of the network effect). According to Metcalfe's law, as members and areas of collaboration grew, the resulting network increased exponentially. Market power came from the number of members squared. Following this principle, the team first brought all the countries and telcos that had already decided to exclude Chinese vendors onto the Clean Network, and recruited several additional telcos and high-tech companies where Krach had pre-existing relationships to reach an initial critical mass and increase market

power. They would supply public endorsements, quotes and serve as examples for other countries and companies on the fence. (See **Exhibit 7**.)

Second, the team established a set of value propositions and put together a marketing and sales campaign for alternative providers. (See **Exhibit 8 for value propositions**.) They would leverage existing U.S. bilateral relationships and pitch the campaign to allies. An essential element of the value proposition entailed reducing Huawei's state-subsidized pricing advantage by securing various authorities from the Export-Import Bank (ExIm), the Development Finance Corporation (DFC), and USAID, as well as the allies' governments' financing arms. For developing countries, a key component of the value proposition involved U.S. private sector investment, especially from high-tech companies that were part of the network. For the more advanced developed countries, the value proposition extended to potential collaboration in the Techno-Democracies 12 alliance (TD-12) which the team developed previously as part of their Global Economic Security Strategy.^b Krach also wrote to CEOs and governing boards at American universities and asked them to incorporate clean labor practices into their supply chains and divest from Chinese companies involved in human right violations.⁴³

Third, the playbook targeted networks of networks. Krach believed that the fastest way to build a network was to build a network of networks and by combining the Blue Dot's clean infrastructure network and ERGI's Clean Mineral Network and uniting existing regional initiatives in the Indo-Pacific, Latin America, Africa and across the Atlantic. From his bilateral talks, Krach knew that countries and companies not only distrusted China but feared Chinese retaliation. Krach said, "Countries and companies are terrified of China's retaliation. The CCP cannot retaliate against everyone. That is where the E.U. comes in, the Transatlantic Alliance comes in, NATO comes in."⁴⁴ "There is strength in numbers and there's also power in union and solidarity."⁴⁵

Fourth, Krach and his team sought to establish the 5G industry trust standard that would combine trust principles with the highest international standards for equipment vendors.⁴⁶ In May 2020, Krach's team at the U.S. State Department asked the Center for Strategic and International Studies (CSIS) to convene a working group of 25 experts from companies and research centers to establish a set of guidelines to evaluate the level of security and trustworthiness of telecommunications equipment vendors.⁴⁷ The resulting criteria used internationally recognized, technologically neutral standards of digital trust and touched a broad network model including network infrastructure, data transfer and applications.⁴⁸ The guidelines complemented the Prague Proposals⁴⁹ and the EU's 5G Toolbox.⁵⁰ The idea was for such standards to be included in Requests for Proposals (RFPs) put out by governments in 5G network auctions. Krach explained, "That way, no matter how technologically sophisticated the competition might be, failure to meet predetermined standards would disqualify them by default."⁵¹

Launching the Initiative: "5G Trifecta"

Krach wanted to be able to move fast, and so needed to align the multiple agencies and departments within the U.S. government around a competitive U.S. technology strategy. Senior Advisor Shinn was in charge of leading the interagency process. The process could be tedious, as each department was subject to due process with a disclosure timeline. Specific goals, constraints and interests had to be taken into account and required negotiations, office by office. "These are all quasi-independent agencies with their own well-established sets of procedures," Shinn recalled.⁵²

^b The Techno-Democracies group was imagined as a technology-focused and larger version of the G7, a set of "like-minded countries that will focus on the development, protection, dissemination, development, and use of emerging technologies" as well as "serve as stewards of technology norms for the coming decades." Public materials of U.S. Department of State, Global Economic Security Strategy Pillar III, <https://www.slideshare.net/KeithKrach/td10-technologydemocracies-10>, accessed April 6, 2021.

When Krach felt that the pieces were in order, they began to operate. In May, three opening moves Krach dubbed at a press conference as the “5G national security trifecta” commenced: an announcement of a major U.S. onshore investment in semiconductors, and the public announcement of a 5G Clean Path initiative laying out rules for mobile traffic passing through U.S. diplomatic facilities at home and abroad, and tightened restrictions on exports to Huawei. Together, these moves were designed to put Huawei on the defense.⁵³

TSMC In May, Taiwan Semiconductor Manufacturing Co Ltd, the world’s biggest contract chipmaker and a major supplier of Huawei, announced that it would build a \$12 billion chip factory in Arizona to utilize the company’s 5-nanometer chip production technology, the most advanced in the world. It would be the company’s first production investment in the U.S. in decades; most of its production took place in Taiwan, where the company said production was more effective and cost-efficient. Mike Pompeo stated that the deal “bolsters U.S. national security at a time when China is trying to dominate cutting-edge tech and control critical industries.”⁵⁴

Krach said, “The onshoring of TSMC, which was the biggest onshoring in history – \$12 billion state of the art plant. And it also brought their ecosystem. We had two theories. One was that it would trigger other semiconductor companies to onshore in the U.S., which has happened, and it also triggered the CHIP Act, which is roughly about a \$30 billion act to help onshore these things.”⁵⁵ The team worked with a bipartisan group of senators to develop two bills to bolster domestic spending on U.S. science and technology research, onshoring, and the industrial base. The Endless Frontier Act, introduced in late May 2020, was a \$100 billion bipartisan technology research funding bill.⁵⁶ That bill had not passed by the end of the Trump administration. The CHIPS for America Act sought to increase federal incentives to enable research, supply chain and in semiconductor manufacturing.⁵⁷ Parts of the CHIPS for America Act were passed in 2020 and 2021.⁵⁸

Internationalization of the Clean Path On April 29, 2020, Secretary Pompeo announced that the U.S. Department of State would prohibit all 5G mobile data traffic passing through U.S. diplomatic facilities at home and abroad to touch equipment supplied by untrusted IT vendors such as Huawei and ZTE.⁵⁹ The 5G clean path would be an end-to-end communication path that did not use any transmission, control, computing, or storage equipment from untrusted IT vendors. Secretary Pompeo also invited governments and corporations to “join a global effort to promote data privacy, security, human rights, and collaboration in communication networks.”⁶⁰

Tightened Export Controls On May 15, the U.S. Department of Commerce issued export controls to further restrict Huawei’s access to semiconductor chips. All non-U.S. chip manufacturers that used American-origin equipment, intellectual property or design software to produce chips for Huawei or its affiliates would be subject to Export Administration Regulations (EAR), and required a license before shipping to Huawei.⁶¹ As a result, TSMC, Huawei’s supplier for artificial intelligence processors and networking chips, stopped taking new orders from Huawei.⁶² Huawei said in a statement that the new rule “will impact the expansion, maintenance, and continuous operations of networks worth hundreds of billions of dollars that we have rolled out in more than 170 countries.”⁶³ The company’s rotating chairman, Guo Ping, said “Survival is the keyword for us now.”⁶⁴

The U.S. on the Offense, with Friends

Krach immediately launched a global campaign that would include trips to Asia, Europe, the Middle East, and Latin America. The team first started by aligning with the countries that already excluded Huawei and directly approaching CEOs of telecommunications companies. By the end of May, Poland, Australia, Denmark, Norway, New Zealand, and the Czech Republic were already members of the Clean Network. Armed with an enterprise salesforce spreadsheet with over 500 telcos and countries, his team worked

through existing U.S. relationships and executed quickly, sometimes signing agreements with multiple countries in one day.⁶⁵

By June, both Canada and Singapore had announced that they would not use Huawei equipment in 5G infrastructure. Spain's Telefónica and O2 in the U.K. became Clean Network companies, while Telefónica Deutschland (Germany) and Vivo (Brazil) stopped procuring equipment from so-called "untrusted vendors," i.e. Huawei and ZTE.⁶⁶ By June 25, 2020, the Clean Network counted the Czech Republic, Norway, Poland, Estonia, Romania, Denmark, Greece, New Zealand, Australia, Israel, and Latvia among its members.⁶⁷ Krach said at a press conference, "The momentum in favor of securing 5G is building. The more countries, companies, and citizens ask whom they should trust with the most sensitive data, the more obvious the answer becomes: not the Chinese Communist Party's surveillance state."⁶⁸

The United Kingdom

Washington applied increasing pressure on the British government following their decision to allow Huawei into its 5G network in January 2020. The British government was forced to reconsider its agreements with Huawei following the new U.S. export restrictions in May.⁶⁹ Secretary Pompeo visited his counterpart in London, and a bipartisan group of U.S. Senators urged Parliament to reconsider, suggesting that U.S.-U.K. intelligence sharing and military collaboration was at risk.⁷⁰ Some observers pointed out that Britain's decision on Huawei was complicated by two major projects with Chinese state-owned enterprises: China General Nuclear Power Group (CGN) was involved in constructing several nuclear plants for the U.K.'s green goals, and China Railway Construction Corp (CRCC) was funding the HS2 high-speed rail link, a key initiative for the Johnson government.⁷¹

In early July, Chinese ambassador Liu Xiaoming warned that severing ties with Huawei was a "litmus test of whether Britain is a true and faithful partner of China," and might endanger other Chinese investment in the U.K., including the two major infrastructure projects.⁷² Secretary Pompeo issued a statement saying, "The United States stands with our allies and partners against the Chinese Communist Party's coercive bullying tactics."⁷³ (See also **Exhibit 4**, an op-ed by Undersecretary Krach).

On July 14, 2020, the British government announced plans to ban local mobile providers from purchasing new Huawei equipment after 2020 and to remove all of the company's kit from Britain's 5G network by 2027.⁷⁴ The British would literally rip Huawei equipment out of their towers. France had adopted Huawei technology for the country's 5G rollout but, since 2018, tightened restrictions. By July 2020, the French government announced that it would not issue a total ban on using equipment from Huawei in the rollout of the French 5G telecoms network, but that it was pushing French telecom operators to avoid switching to the Chinese company.⁷⁵ French authorities also told telecoms operators planning to buy Huawei 5G equipment that they would not be able to renew licenses for the gear once they expire, effectively phasing the Chinese firm out of mobile networks by 2028.⁷⁶

Expansion of the Clean Network

August 5, 2020 marked the team's expansion of the Clean Network with five additional lines of effort as Secretary Pompeo announced its extension beyond the 5G Clean Path to Clean Carrier, Clean Store, Clean Apps, Clean Cable, and Clean Cloud and directly named Alibaba, Baidu, China Mobile, China Telecom, and Tencent as threats to be countered. (See **Exhibit 9**.) The resulting Clean Network would be based on "internationally agreed upon digital standards and serve as a comprehensive approach to address long term threats to data privacy, security, human rights and collaboration posed by the PRC."⁷⁷

A day later, two Presidential Executive Orders were issued in quick succession to ban transactions on TikTok, a video-sharing mobile application owned by the Chinese company ByteDance Ltd., and WeChat, a messaging, social media, and electronic payment application owned by Tencent Holdings Ltd. within 45

days of the respective orders.⁷⁸ Furthermore, U.S. Senate unanimously approved a bill banning federal employees from using TikTok on government-issued devices. On August 17, the U.S. Bureau of Industry and Security added another 38 Huawei affiliates in 21 countries to the Entity List which restricted access Huawei's non-U.S. affiliates from producing components using U.S. technology and software.⁷⁹

Krach was asked about the TikTok and WeChat announcement during an interview. He said, "It's about more than just two companies like TikTok and WeChat. What it's really about is three things. First, it's about the Communist Party's surveillance state with 5G being the backbone. Second, it's about the appendages that connect to that backbone like apps, cables, clouds. Third, it's also about that 'Great One-Way Firewall of China,' where all data can come in for the CCP's exploitation, but none come out. All the propaganda can go out. But the truth cannot come back in. You know it is also about reciprocity because our apps like YouTube, Google, Twitter, Facebook, aren't allowed in China."⁸⁰

A month earlier, India had already banned 59 Chinese apps including TikTok, and WeChat, citing security concerns.⁸¹ On August 24, India, a major Chinese trading partner, announced that it would phase out 5G equipment made by Chinese companies.⁸² By late August, the Clean Network reached over 30 countries and major telecommunications companies including Orange (France), Reliance (India), Telstra (Australia), SK and KT (Korea), Cosmote (Greece), NTT (Japan), and all telcos in Canada, Norway, Vietnam, and Taiwan.⁸³

Taiwan

Taiwan was another major strategic partner for the Clean Network. Companies such as TSMC and Win Semiconductors were major suppliers to Huawei and could bolster the U.S.'s semiconductor manufacturing industry. On September 17, Krach attended the funeral of former Taiwanese President Lee Teng-hui, becoming the highest-ranking U.S. State Department official to visit Taiwan since the Carter administration severed diplomatic ties in 1979.⁸⁴ Krach and his delegation met with the Taiwanese business community, including executives at Foxconn, the Taiwanese multinational electronics manufacturer, along with government officials.

While in Taiwan, Undersecretary Krach and local officials also discussed an Economic Prosperity Partnership named after the late President Lee. A five-year agreement was signed on November 20, 2020. The State Department cited that "future EPP Dialogues will help strengthen the U.S.-Taiwan economic relationship, further magnify the two societies' respect for democracy, and strengthen our shared commitment to free markets, entrepreneurship, and freedom."⁸⁵ A U.S.-Taiwan science and technology cooperation agreement signed in mid-December 2020 became the first concrete outcome of the EPP.⁸⁶ Krach's team at the State Department also set up the first step of a trade agreement (TIFA) for the Biden administration to tackle in January 2021.

Securing the Transatlantic Alliance – the European Union, NATO and the Three Seas

On September 22, Undersecretary Krach began a Clean Network tour in Europe with the goal of building a Transatlantic Clean Network. He said, "the success of the Clean Network hinged on it being viewed as an impetus of an alliance of like-minded partners, not solely a U.S. initiative."⁸⁷ He visited EU and NATO headquarters to push the network of networks component of the Clean Networks playbook. At EU headquarters, Undersecretary Krach and EU Commissioner Thierry Breton issued a joint statement highlighting their commitment to share principles on clean 5G security and the synergies between the Clean Network and the EU 5G Clean Toolbox.

They agreed on the EU 5G Clean Toolbox, a list of digital technology standards, as criteria for joining the Clean Network, meaning that entities meeting the EU 5G Clean Toolbox criteria could join the Clean Network.⁸⁸ In a later meeting with NATO Deputy Secretary General Mircea Geoana, Secretary Geoana emphasized the strategic importance of having a secure, non-fractured 5G Clean NATO Network, stating "the Alliance is only as strong as its weakest link."⁸⁹ On October 21, Estonian President Kersti Kaljulaid and chairwoman of the Three Seas Initiative, an energy and infrastructure network that comprised 12 Eastern European countries, announced their support for the Clean Network.⁹⁰

Germany was a key market for Huawei's expansion outside of mainland China. The majority of Europe's fiber-optic lines connected in Germany, and its political influence in Europe made a partnership valuable.⁹¹ China was Germany's biggest export market, and Germany's automotive industry, especially, relied on China for sales. A U.S. delegation went to Germany in spring 2019 to dissuade Germany from buying from Huawei, arguing that security threats posed by Chinese telecoms equipment outweighed the economic benefits. Over the course of 2020, Germany proposed increasing restrictions on telecoms equipment providers to exclude Huawei from 5G mobile phone networks without officially doing so.⁹² A senior security official noted that Britain formally banned Huawei and France informally excluded it, while Germany's strategy appeared to "strangle it in red tape."⁹³

Undersecretary Krach chose to praise Germany and appeal to its own strengths and values: "During my 30 years as a Silicon Valley CEO, I have always admired Germany because it has implemented the world's highest standards in terms of security, data protection, reliability, precision, and quality. The members of the Clean Network are asking Germany to defend these standards and follow the example of the vast majority of EU and NATO countries."⁹⁴ Krach cited the importance of Article 1 of German Basic Law, written in 1949, which states that, "Human dignity shall be inviolable. To respect and protect it shall be the duty of all state authority."⁹⁵ In Germany, Krach met with top level German executives, as well as Germany's Federal Government Commissioner for information technology and the head of Cyber and Information Security to discuss industry security standards.

Later in 2020, German lawmakers introduced a new IT security law that required vendors and operators to allow German security agencies technical and legal means to monitor network-equipment vendors. Suppliers would be financially liable for breaches.⁹⁶ But Germany did not prohibit Chinese vendors, and was leading the EU in pursuing a Comprehensive Agreement on Investment with China, which was a large market for German exports, particularly vehicles. The investment agreement took seven years to negotiate and was signed in January 2021, but not without consternation about 5G. As late as December 2020, EU negotiators struck clauses that would have frozen investment benefits for EU states that restricted access for Chinese telecoms.⁹⁷

During his European tour, which covered twelve countries and fourteen cities, Krach met with heads of state, telco CEOs, business leaders, and other government officials with the goal of building a Transatlantic Clean Network. Over the next two weeks, visits to Belgium, Luxembourg, Austria, Spain, Portugal, Albania, Cyprus, and Estonia yielded important progress on the continent, including signing three Clean Network agreements with governments in Bulgaria, North Macedonia, and Kosovo in one day. "The adoption of the Clean Network principles by the EU, NATO, Three Seas, and a growing number of European countries solidified its credibility as a multilateral initiative," Krach said. "The Clean Network had become a Transatlantic Clean Network."⁹⁸ (See **Exhibit 10** on the Clean Network in Europe.)

After additional visits to Egypt, Bahrain, and the United Arab Emirates, Krach said that the Clean Network grew to include 49 Clean Countries, representing two-thirds of the world's GDP, more than 100 Clean Telcos, and dozens of industry-leading Clean Companies such as Oracle, Fujitsu, Cisco, Siemens, VMware, NEC, and HP. Krach counted among its members 26 out of 27 EU nations, 27 out of 30 NATO members, 11 out of 12 Three Seas countries and 31 out of 37 OECD members.

Brazil and the Developing World

Krach's last trip was to South America, where he focused on Brazil as the way into other countries in the region. Brazil was a major challenge because Huawei had already made significant investments and "somehow convinced the Brazilian telcos not to participate in the previously-scheduled meeting" with Krach's team.⁹⁹ The main strategy in Brazil was to recruit local and global business leaders to endorse the Clean Network and insist on "trusted vendors" as a condition of doing business in major Brazilian cities (see **Exhibit 11**). The sweetener was the offer of government financing for clean projects via the DFC, ExIm Bank, USAID, and Latin America's International Development Bank. In November, Brazil's Foreign Minister Ernesto Araújo announced his support for the principles of the Clean Network, making Brazil the first South American country—and 50th in the world—to join the alliance.¹⁰⁰ The Dominican Republic joined the Clean Network, and Ecuador's Telecommunications Minister expressed support for the principles of the initiative. In December 2020 and January 2021, Ukraine and Georgia joined the Clean Network, and the strategically located Pacific island nations Nauru and Palau joined as well. The latter two were crucial wins for Krach's team because of their role in subsea cable networks.

On January 20, 2021, the Clean Network reached 60 countries that, combined, represented two-thirds of the world's GDP. It counted 200 telcos and industry-leading companies Oracle, Fujitsu, Cisco, Siemens, VMware, NEC, and HP among its members.¹⁰¹

Evaluating the Clean Network Approach

Beijing was predictably critical to the Clean Network initiative and Secretary Pompeo. Of all Trump administration officials, Pompeo had attracted the most ire in China because of his criticism of the CCP.¹⁰² Editorials in Chinese papers in summer 2020 argued that the Clean Network "exposed Pompeo's madness" and amounted to bullying by the United States. The *Global Times*, a CCP-run paper with a reputation for nationalism, wrote that Krach had "fabricated facts and created political gimmicks" that overstated the accomplishments of Clean Network. The paper wrote that the initiative had seemed to generate some bans against Huawei, but that "the effectiveness of these policies is still questionable, especially since technology develops extremely quickly – not to mention the fact that some Western countries lack policy sustainability."¹⁰³ Krach, along with Pompeo, would be among a group of Trump officials formally sanctioned by China as the Biden administration took office (see **Exhibit 12** for the Chinese Ministry of Foreign Affairs Announcement.) More academic views in China accused the U.S. of attacking Huawei out of insecurity about the U.S.'s own economic and technological position and saw the campaign as "commercial warfare."¹⁰⁴

Within the U.S., views ranged from praise to calls for adjustments to deep criticism. A scholar at the Council on Foreign Relations, Robert Knake, suggested several tweaks. He was critical of the "clean" messaging, which "could be dangerous, mirroring language the Chinese government itself has used to justify censorship." But his chief concern was that China could not join the Clean Network, since it explicitly excluded Chinese providers. Instead, he argued, a "digital trade zone" could be based on principles of non-censorship, privacy protections, and collective mechanisms for addressing cross-border cybercrime: "While China is unlikely to make these commitments, much less adhere to them, by establishing rules that all members must play by, the digital trade zone over time could prove to be too large of a market for the Chinese government to ignore."¹⁰⁵

Others called it "ethno-exclusive" and accused the U.S. of hypocrisy, citing post-911 surveillance efforts and the U.S.'s own breach of Huawei by tampering with Cisco equipment. Technology journalist Sam Biddle wrote: "Without exception, the United States engages in every one of these practices and violates every single one of these bullet pointed virtues of a Clean Internet. Where do we get off?"¹⁰⁶

Others went further, accusing the U.S. of pushing a “splinternet” by advocating the exclusion of Chinese vendors and applications. These concerns accelerated especially after the Trump administration's actions against WeChat and TikTok. An Australia-based security scholar, Alan Woodward, told the BBC: “It’s shocking. This is the Balkanization of the internet happening in front of our eyes. The U.S. government has for a long time criticized other countries for controlling access to the internet...and now we see the Americans doing the same thing.”¹⁰⁷ On the other hand, much of the praise for the approach focused on its multilateralism: a Bloomberg columnist credited Krach with “coordinating a variety of national and regional approaches to network security to shape a more unified international project, relying on trust more than compulsion.”¹⁰⁸

Whether they liked it or not, nearly all observers situated the Clean Network program within what one scholar called a “coming tech Cold War with China.” Adam Segal of the Council on Foreign Relations wrote that “U.S. technology policy toward China for the near future [would rest on] restricting the flow of technology to China, restructuring global supply chains, and investing in emerging technologies at home.” Beijing would respond by “racing to develop core technologies so as to reduce its vulnerability to supply chains that pass through the United States” by “mobilizing tech companies, tightening links to the countries participating in China’s Belt and Road Initiative, and sustaining a campaign of cyber-industrial espionage.”¹⁰⁹

For their part, American tech industry leaders seemed to embrace what Eric Schmidt, former Google CEO and Pentagon advisor, called in 2018 “a bifurcation into a Chinese-led internet and a non-Chinese internet led by America.”¹¹⁰ In a speech at Georgetown University in 2019, Facebook CEO Mark Zuckerberg cited China as a major threat to free expression: “China is building its own internet focused on very different values, and is now exporting their vision of the internet to other countries...We’re beginning to see this in social media. While our services, like WhatsApp, are used by protestors and activists everywhere due to strong encryption and privacy protections, on TikTok, the Chinese app growing quickly around the world, mentions of these protests are censored, even in the U.S.”¹¹¹

The effects of the U.S.’s campaign to exclude Huawei from 5G deployment on industry, both telecommunications and integrated circuits, as the two sectors were mutually dependent, were already profound. Most analysts agreed that the progressive tightening of export controls that followed Huawei’s addition to the entity list were “unprecedented,” both because of the size of Huawei and its reliance on complex global supply chains.¹¹² Following the company’s 2019 Entity listing, Huawei sought to stockpile chips from global vendors to secure its access during China’s domestic 5G rollout. The result was a supply shortage for semiconductors, at least until the May and August 2020 tightening of export controls made it nearly impossible for any vendor with exposure to the U.S. to sell to Huawei.¹¹³ Firms all over the world were caught in the crosshairs.

Some analysts warned that the effects on U.S. firms could be negative. Douglas Fuller, a telecommunications industry specialist, noted that “semiconductor manufacturing equipment is the last bastion of American-made machine tools. Unfortunately, stringent implementation of the Entity List export controls would provide incentives for American firms to move some production offshore to avoid the export controls...[T]hese attempts to weaponize the value chain will probably blow up in our face.”¹¹⁴

At the beginning of 2021, it was far from clear what would happen to a 5G sector that had begun to split between China and a Clean Network. 5G has arrived, and 6G was on the horizon, through complex processes of standards setting. Stringent demands that no U.S. government official’s or U.S. citizen’s telecom traffic touched Huawei or ZTE equipment would generally threaten global telecom integration and interoperability. As two analysts wrote: “A bifurcated 5G ecosystem would increase the risk that the global technology ecosystem would give way to two separate, politically divided technology spheres of influence. Such a split could result in some interoperability issues or lower economies of scale and higher transaction costs.”¹¹⁵ There remained no U.S. prospect for an end-to-end provider, and Ericsson and Nokia

were reportedly planning how they might develop bifurcated organizations and supply chains to “remain in both western and Chinese markets,” albeit from already weak financial positions.¹¹⁶

The Biden Administration would have to consider whether it wanted to retain the core elements of the Clean Network approach. One alternative would include something like the U.K.’s approach before July 2020. Paul Triolo of the Eurasia Group explained: “Rather than adopting a zero-tolerance policy toward Huawei, the United Kingdom instead put forward a holistic approach to network security for advanced telecommunications networks. The announcement was accompanied by the release of very detailed analysis of the risk to telecommunications networks, plus new security requirements for both carriers and vendors as well as additional restrictions around high-risk vendors.” Triolo called the U.K.’s approach “the mature approach.”¹¹⁷ Complementary ideas included replacing “blanket bans on country of origin with a stronger privacy regulatory framework.”¹¹⁸

And there remained a basic problem for the U.S., which was that no domestic vendor of end-to-end 5G had emerged. Thomas Donahue, the former Director for Cyber Security on the National Security Council, had in early 2020 proposed that the Department of Defense should work with the private sector to develop a U.S. consortium on 5G. He acknowledged that this strategy would be more difficult to implement than relying on or buying an existing foreign firm, but might also offer the greatest economic and security benefits to the U.S.¹¹⁹ The path was clearer for challengers to Huawei in 5G than it had ever been, but it remained to be seen how the space would be filled. Elisabeth Braw of the American Enterprise Institute wrote in a *Wall Street Journal* op-ed that the need for new market players would generate a “flourishing of innovation and business activity.” She also praised the Clean Network as an “undisputed success for an administration that was often met with international scorn.”¹²⁰

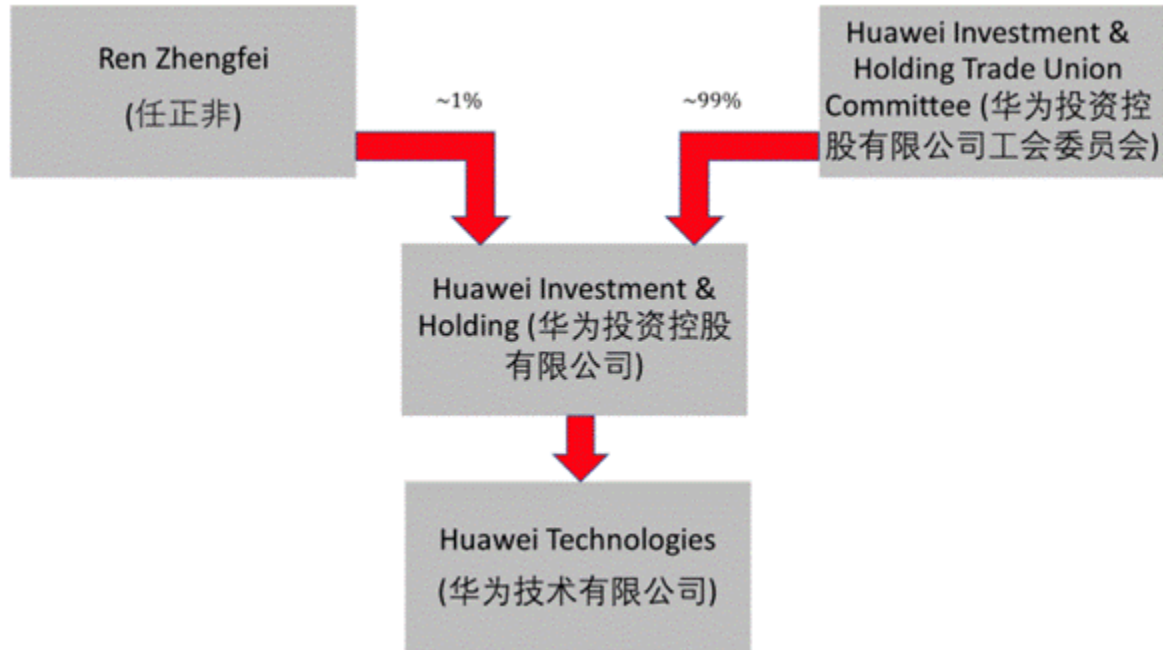
The Way Forward?

Despite this apparent success, pressures on the U.S. government to respond more systematically to digital threats remained. While some continued to argue that “techno-nationalism” was antithetical to American economic values, complications around cybersecurity, surveillance and intellectual property were poised to only increase as technological advancements progressed. “Ben Bernanke taught me open economy macro. I’m a pro-competition, Silicon Valley type. We’re being backed into a more intrusive set of government policies,” James Shinn said. “But we don’t have a choice if we’re going to deal with the commercial threat posed by China’s national champions.”¹²¹ The Clean Network strategy met successes on 5G, but the Biden Administration had some tough decisions to make on the future of U.S.-China technology competition.

Krach said that the rapid international adoption of the Clean Network this year “proved that China Inc. is beatable, and in the process, we exposed their biggest weakness, which is lack of trust.” The power of networks in diplomacy boiled down to a simple idea. “If you retaliate against one country, you’ve retaliated against all of us.”¹²² In August 2020, the *Atlantic* magazine published an essay by Anthony Vinci, an adjunct senior fellow at the Center for a New American Security who argued that the U.S. and its allies “need a means of taking collective action when Beijing attempts to use economic power as a tool of political coercion.” Vinci called for “a new kind of alliance—like NATO, but for economic rather than military threats.”¹²³ Could the Clean Network be the foundation for just such an alliance?

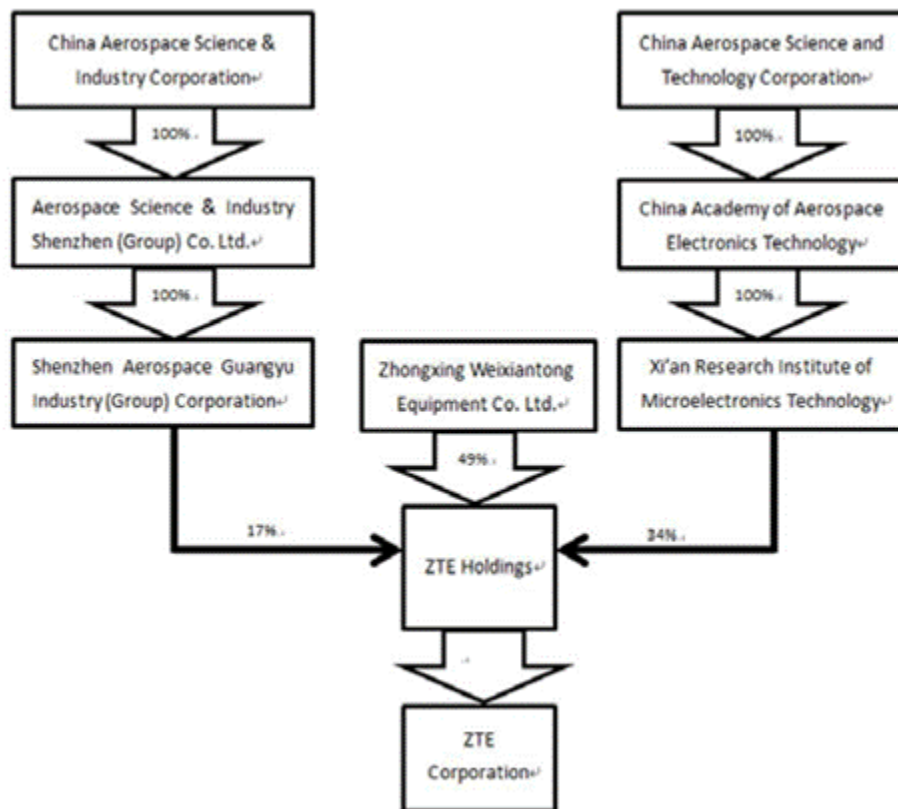
Exhibits

Exhibit 1 Huawei's Corporate Structure



Source: Balding, Christopher and Donald Clarke. "Who Owns Huawei?" April 17, 2019. https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3372669, accessed March 13, 2021.

Note: Huawei Technologies is a single-shareholder limited liability company (有限责任公司), one of the two basic corporate forms under China's company law, and is 100% owned by Huawei Holding. Huawei Holding, in turn, has two shareholders: Ren Zhengfei and the Huawei Investment & Holdings Trade Union Committee. How the Trade Union Committee makes decisions is unclear, according to legal scholars.

Exhibit 2 ZTE's Corporate Structure

Source: Li, Ran and Kee-Cheok Cheong. "How Much 'State' Is in China's State Enterprises? A Case Study of ZTE Corporation in an Era of Reform." *International Journal of China Studies* 7 (3), December 2016: 245-270. https://www.researchgate.net/publication/316083725_How_Much_State_is_in_China's_State_Enterprises_A_Case_Study_of_ZTE_Corporation_in_an_Era_of_Reform, accessed March 13, 2021.

Note: This was the ownership structure in 2016. China Aerospace Science & Industry Corporation was formerly part of the Chinese Ministry of Defense and, after 2003, was owned by the State-owned Assets Supervision and Administration Commission (SASAC).

Exhibit 3a Clean Network Playbook



Source: Public materials from Keith Krach presented early 2020 at the beginning of the Clean Network Initiative, <https://www.slideshare.net/KeithKrach/clean-network-overview>, accessed January 27, 2021. Previously referenced at Michael Mink. "How the Clean Network Alliance of Democracies Turned the Tide on Huawei in 5G." Life & News. December 2, 2020. <https://www.lifeandnews.com/articles/how-the-clean-network-alliance-of-democracies-turned-the-tide-on-huawei-in-5g/>. Accessed April 6, 2021.

Exhibit 3b Description of the Clean Network

The Clean Network of Trusted Partnership

The **Clean Network (CN)** is comprised of like-minded countries, companies, and civil society that operates by a set of trust principles for all areas of collaboration. It is an alliance of democracies built on the idea that strong partnerships advance shared prosperity. By harnessing the innovation, resources and synergies of its members, the CN creates a unifying and equitable global framework for trusted geo-economic partnerships.

It enables a set of shared principles that form the basis of trust. It does so in pursuit of three long term goals: Ensuring sustained economic growth and prosperity for all partners; Expanding fair, transparent, and reciprocal collaboration and trust principles to all aspects of economic partnering; and Creating a level playing field for companies, economies, and countries based on integrity, reciprocity, accountability, transparency, and fairness.

Trust Principles

A Series of Trust Standards based on:

Respect for:

- Rule of Law
- Property
- Sovereignty of Nations
- Labor
- The Planet
- Human Rights

- Integrity
- Accountability
- Transparency
- Reciprocity
- Liberty



THE CLEAN NETWORK
Alliance of Democracies, Companies & Civil Society
That Operates by a Set of Trust Principles
To Advance Freedom and Defy Authoritarianism

The CN partnerships are grounded in democratic values and shared Trust Principles that form the basis of trust: integrity, accountability, transparency, reciprocity and respect for the rule of law, property, and sovereignty. These Trust Principles which form the basis for sector and industry specific Trust Standards will enable fast, frictionless, and secure collaboration in areas critical to our shared future.

CN partners need to demonstrate and operate under the same set of shared trust principles, in order to ensure a high-integrity, level playing field for reliable transactions between trusted members. The commitment to these trust principles will offer private and public members of the network greater confidence to invest in long term prosperity of each partner and the network itself.

Lines of Collaboration – A Network of Networks

The **Clean Network** is a collection of networks that consists of multiple forms and lines of economic collaboration organized by sectors, regions and industries. Forms of collaboration include commerce, investment, supply, chains, money flows, research, safeguarding assets, research, logistics, procurement, trade, policy, and standards. The lines of collaboration include sectors such as energy, healthcare, digital, agriculture, manufacturing, transportation, minerals, infrastructure, finance, space and security.

Trust standards are tailored to fit the various forms and sectors of collaboration and built upon existing global norms such as those established by the Blue Dot Network (Infrastructure), Prague Proposals (5G), and the Energy Resource Governance Initiative (critical minerals) and the new Healthcare Prosperity Network. The CN also creates an umbrella network for existing regional initiatives such as the Indo-Pacific Strategy, Transatlantic Partnership, 3 Seas Initiative, EU-Asia Connectivity Initiative and American CRECE.

Strength Through Shared Principles and Solidarity

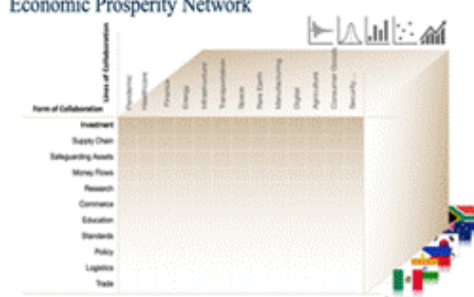
Some but not all the networks that comprise the CN have or are evolving structures by which countries, companies and civil society organizations may join. Opportunities will surface through establishment of traditional diplomatic partnerships (bi-laterals, tri-laterals and multi-laterals), agreements such as those related to economic development, direct foreign investment, trade, the environment or humanitarian endeavors. Creating and executing viable opportunities for investment and stable economic growth builds the network and validates contributors as members.

The U.S. is committed to fostering the Clean Network comprised of like-minded countries, economies, companies, investors, institutions, and civil society organizations that adhere to the set of Trust Principles. The goal is to include all countries and organizations as participants.

Countries that currently do not abide by the Trust Principles will be excluded from CN membership until they reform problematic practices and laws. No nation is excluded forever, and the CN does not require a country to choose between partnership with the U.S. and any other nation.

By forming this alliance of democracies, members have strength in numbers and solidarity to stand up to any nation that seeks to undermine our prosperity and basic freedoms. The power of the network is a product of the members' collaboration and mutually beneficial actions.

Economic Prosperity Network



Source: Public materials from Keith Krach, presented early 2020 at the beginning of the Clean Network Initiative, <https://www.slideshare.net/KeithKrach/clean-network-1-page-overview-public-version>, accessed March 26, 2021.

Exhibit 4 Essay by Keith Krach, Undersecretary of State, in *The Telegraph*

The Telegraph

The Free World Must Unite Against Huawei

China's 5G Strategy Is A Real and Urgent Threat to Countries That Value Liberty and Justice

KEITH KRACH 25 June 2020

The UK's decision to reconsider the use of Huawei in its 5G networks resulted in a predictable backlash from China, with Beijing threatening to punish HSBC and pull investment from major British infrastructure projects. It appears the Chinese Communist Party (CCP) sees much more than mere financial benefit in having Huawei embedded in foreign 5G networks. It's no wonder that so many countries are re-evaluating their partnerships with Chinese firms.

Foreign Secretary Dominic Raab recently remarked that it wasn't just the devastation of Covid-19 that took the shine off China, but the fact that the CCP didn't live up to the agreements that it made. The crackdown on Hong Kong is a case in point. As Mr. Raab said: "It comes down to an issue of trust. Otherwise, why would anyone trust them with other deals we might make?"

Governments and businesses around the world are asking a similar question regarding 5G systems that carry their most private information and intellectual property: who do we trust? The primary choices are two world-class European vendors, Ericsson and Nokia, and two Chinese companies, Huawei and ZTE. Both Huawei and ZTE are required to abide by China's National Intelligence Law, by turning over any and all data to the Chinese government upon request.

US telecom providers have chosen wisely. They are successfully deploying Ericsson and Nokia throughout their 5G systems and are working with other trusted firms for further expansion. They understand that a secure "edge" is just as important as a secure "core", because it's all part of an integrated system. And they know that talk of "secret back doors" is irrelevant because software updates provide a front door every day through which 5G vendors have the capability to pull data and interfere with networks.

Initiatives, such as those by the new Open RAN Policy Coalition, show great promise in accelerating innovative, secure, and trusted alternatives to Huawei. The US looks forward to collaborating with our partners in Europe to further advance these technologies. The US is accelerating its efforts to protect 5G security, as exemplified by three recent announcements.

First, we secured a \$12 billion investment from the Taiwan Semiconductor Manufacturing Company to build a leading-edge semiconductor foundry in America, and bring eight of their suppliers with them, creating thousands of jobs.

Second, we unveiled a new rule requiring chip companies to obtain a license from the United States to sell certain 5G chips to Huawei that can only be produced with sophisticated US technology. It is imperative that Europe adopt similarly stringent export controls to keep critical tech out of the hands of the CCP.

Third, we unveiled the 5G Clean Path, requiring all data entering US diplomatic facilities to transit only through trusted equipment, thus reducing the risk of Huawei or the CCP siphoning away our sensitive information. The US encourages all of our partners – both companies and countries – to adopt similar 5G Clean Path models. Many already are. Across Europe, 5G "clean countries" are emerging that allow only trusted vendors in their 5G networks. The largest telecom companies across the globe, including Orange in France, Reliance in India and O2 in the UK, are also becoming "clean telcos".

The coercion experienced by the UK is only one of the authoritarian tactics that China employs in its battle to dominate 5G. Concealment, coercion, and co-option is a common three-pronged strategy of the CCP, including in its Covid-19 response. The CCP brazenly concealed the initial outbreak, co-opted the crisis to turn a profit, and coerced other nations through "face-mask diplomacy" to do its bidding. Those three strategies are also on display in Hong Kong.

To prevent CCP authoritarianism from winning the day on 5G, we must maintain solidarity. Nato Secretary General Jens Stoltenberg recently remarked on the China challenge, "We have to make sure that Europe and North America stand together." As Secretary of State Mike Pompeo recently said, "The United States stands with our allies and partners against the CCP's bullying and we stand ready to assist our UK friends with any needs they have." That goes for all freedom-loving countries, because the CCP's 5G strategy is a real and urgent threat to all who value liberty and justice around the world.



Public surveillance cameras are mounted to a pole in front of Huawei's new flagship store in Shanghai

Keith Krach is the US Under Secretary of State for Economic Growth, Energy, and the Environment

Source: Krach, Keith. "The Free World Must Unite Against Huawei." *Telegraph*, June 25, 2020. <https://www.telegraph.co.uk/news/2020/06/25/free-world-must-unite-against-huawei/>, accessed April 2, 2021.

Exhibit 5 Objectives and Achievements of the Clean Network

OBJECTIVE 1 METRICS: REVERSE HUAWEI'S MOMENTUM & DEFEAT CCP 5G MASTERPLAN						
Measurements	Clean	Competition	Results	Network Coalitions	Total	Clean
OKM Global GDP ¹	76%	Nokia 5G contracts	196 ↑	EU Members	27	26
Clean Countries Global GDP ²	67%	Ericsson 5G contracts	131 ↑	NATO Allies	30	27
Clean Path Global GDP ³	74%	Huawei 5G contracts ⁴	?? ↓	Three Seas Nations	12	11
Clean Countries	60	Nokia market cap ⁵	89% ↑	Quad Members	4	4
Clean Telcos	200+	Ericsson market cap ⁵	65% ↑	Five Eyes Members	5	5
Clean Companies	+++	Huawei market cap ⁶	?? ↓	G7 Members	7	7

OBJECTIVE 2: DELIVER THE FIRST VERIFIED COMPETITIVE MODEL		
10 Key Elements	Results Verification	+/-
1. EXECUTABILITY	Perfected on countermeasures; bloodied on competitive battlefield	+
2. MEASURABILITY	Achieved tangible results; from metrics within timeframe	+
3. PROVABILITY	Defeated Huawei; demonstrated China Inc. is beatable	+
4. AFFORDABILITY	No new funds; no new manpower	+
5. PRACTICALITY	Not dependent on Congress, Exec Orders or company acquisitions.	+
6. SCALABILITY	Success on a global scale; easily configured to suit local needs	+
7. REPEATABILITY	Strategies, sequencing systematized; trust positioning works for all sectors	+
8. VIRALITY	Cumulative effect proven; tipping point reached in Europe	+
9. MARKETABILITY	Viable brand established; seized the moral high ground.	+
10. APPLICABILITY	Expanded to 5 tech areas + semi; infrastructure, minerals, labor, funds	+

OBJECTIVE 3: PROVIDE BEACHHEAD & FOUNDATION FOR TECH-SEC PLATFORM								
Clean Lines	Program Status	Beachhead?	Model Work?	TD-10	Trust Risk	Level Field	Engagement	
Clean Path (5G)	Advanced	Yes	working	Yes	Yes	No	60 Countries	
Clean Carrier	Announced	Yes	Yes	Yes	Yes	No	Limited	
Clean Store	Announced	Yes	Yes	Yes	Yes	No	No Activity	
Clean App	Underway	Yes	Yes	Yes	Yes	No	Stalled	
Clean Cable	Underway	Yes	working	Yes	Yes	No	good Success	
Clean Cloud	Announced	Yes	Yes	Yes	Yes	No	T, A, B	
Clean Things (IOT)	Pre-announced	Yes	Yes	Yes	Yes	No	Limited	
Clean Drones	Pre-announced	Yes	Yes	Yes	Yes	No	Defensive	
Clean Data	Pre-announced	Yes	Yes	Yes	Yes	No	Limited	
Clean Currency	Pre-announced	Yes	?	Yes	Yes	No	Studies Only	
Clean Quantum	---	No	?	Yes	Yes	?	Limited	
Clean AI	Some Policy	Yes	Yes	Yes	Yes	No	Limited	
Clean Cars	---	?	?	Yes	Yes	No	No Activity	
Clean Semi	Onshoring	No	Limited	Yes	Yes	No	success	
Clean Energy	Policy	Yes	Yes	Yes	Yes	No	Priority	
Clean Minerals	ERGI	Yes	working	Yes	Yes	No	20 Countries	
Clean Infrastructure	Blue Dot	Yes	Stalled	No	Yes	No	16 Countries	

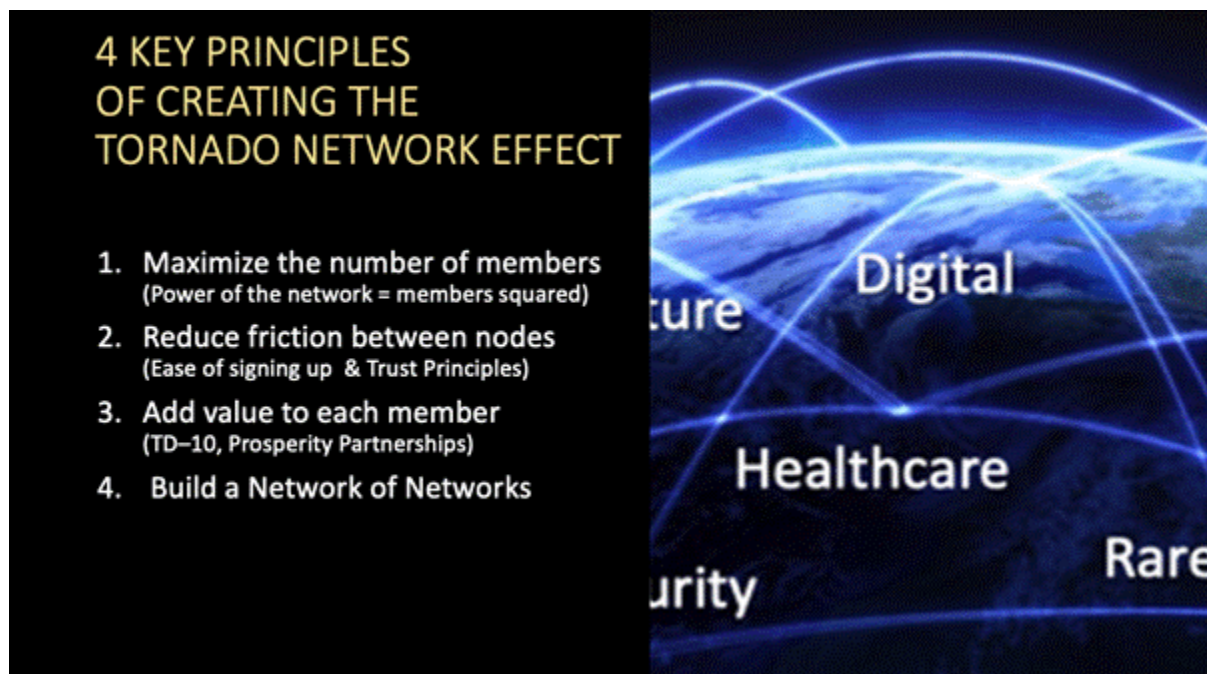
Source: Chart prepared for use in this case by Keith Krach, Former Under Secretary of State. March 26, 2021.

Footnotes

1. One Key Metric (OKM*) approximates the power of the network as outlined below by calculating the sum of the Clean Countries GDP + in a non-clean country, for a clean telco, take their market share and multiple by the country's GDP. (most telcos use more than 1 provider) in a non-clean country, for a non-clean telco, take their market share multiplied by their % using clean suppliers and then multiple by the country's GDP. So basically, come up with a % Clean for all non-Clean countries and multiply times their GDP to add the GDP of the Clean Countries.

2. % of Global GDP for Clean Countries.
3. % of Global GDP for the sum of Clean Countries GDP + GDP of countries that have at least 1 clean carrier for 5g called "Clean Path Countries".
4. Huawei has not given a number since February 22, 2020's number of 91. They have not commented when asked by the press that has gone down to 12 outside of China.
5. Measured from when Clean Team got authorities in mid-March until they left office January 20.
6. Huawei private company but issue. However, smartphone revenue down 43% in Q4 2020

Exhibit 6 Four Principles of the Network Effect



Source: Source: Public materials from Keith Krach presented early 2020 at the beginning of the Clean Network Initiative, <https://www.slideshare.net/KeithKrach/clean-network-overview>, accessed January 27, 2021. Previously referenced at Michael Mink. "How the Clean Network Alliance of Democracies Turned the Tide on Huawei in 5G." Life & News. December 2, 2020. <https://www.lifeandnews.com/articles/how-the-clean-network-alliance-of-democracies-turned-the-tide-on-huawei-in-5g/>. Accessed April 6, 2021.

Exhibit 7a Quotes from Political and Corporate Leaders Used by the Clean Network



 Japan's Minister for Foreign Affairs Toshimitsu Motegi stated that Japan would like to deepen cooperation with the U.S. in cyber security and supports the basic concept of the 5G Clean Path Initiative on securing safe communication between diplomatic facilities.

 The Prime Minister of North Macedonia Zoran Zaev stated, "The signing of the U.S.-North Macedonia 5G memorandum is vital for the prosperity, national security, and economic development of North Macedonia. North Macedonia and the United States underscore the importance of the Clean Network and utilizing trusted hardware and software suppliers to build 5G networks to protect against unauthorized access by third parties."¹

 The Prime Minister of Poland Mateusz Morawiecki stated, "Poland believes the construction of our 5G Clean Path network is a prerequisite for EU strategic technological sovereignty. That is why we must keep it secure at all costs and we are a 5G Clean Country. To protect our 5G network from potential wrongdoers it is necessary that all European entrepreneurs maintain clean production lines and a 5G Clean Path, free from potential industrial espionage. Demanding that 5G Clean Standards are observed with regard to 5G technology is a step towards building a fairer

 Telefónica states in its Digital Manifesto that "security is paramount," and its CEO and Chairman José María Álvarez-Pallete López recently declared, "Telefónica is proud to be a 5G Clean Path company. Telefónica Spain and O2 (UK) are fully clean networks, and Telefónica Deutschland (Germany) and Vivo (Brazil) will be in the near future without equipment from any untrusted vendors."

 CEO Jun Sawada of Japan's NTT states, "The safety and security of our customers and their personal information is our top priority. In this context, the statement by US government regarding 5G Clean Network is consistent with our position. That is why we are glad to be appreciated as a 5G Clean Telecommunications company and are committed to only using trusted vendors in our 5G networks in Japan and as we expand our business around the world."

 Oracle CEO Safra Catz said, "Oracle shares the vision of secure, trusted and resilient 5G applications and networks. Grounded in our commitment to develop the most secure telecommunications and infrastructure products and services for our customers, we are proud to support the Clean Network initiative and provide Clean Network solutions."

 Cisco Chairman and CEO Chuck Robbins said, "Cisco supports a fair, free, and open Internet. After all, our founding mission is to connect everyone and everything. Human rights have long been integrated into how Cisco works with our trusted supply chain partners as we build the next generation of intelligent, intuitive, secure advanced wired and wireless networks, including Optical, 5G and Wi-Fi 6 networks. The Clean Network Initiative is bringing needed attention to these issues."

 Antonio Neri, CEO of Hewlett Packard Enterprise stated, "At Hewlett Packard Enterprise, security is a core value that guides us from initial design all the way through a product's lifecycle. As the only major server manufacturer to produce made-in-USA industry-standard servers, we're also proud to be recognized by the Clean Network and support its goal of promoting network security around the world. HPE's Trusted Supply Chain initiative, Trust technology ensures that when our partners build networks with our hardware and software, they can be sure it is trusted, secure and uncompromised."

 VMware CEO Pat Gelsinger said, "VMware is pleased to provide support for Clean Path and its intent to create end-to-end 5G infrastructure that is open, secure, programmable, reliable, and software-driven. Safety and security should be the goal of everybody globally who is serious about building the best and safest possible telecommunications infrastructure for 5G, 6G, and beyond."

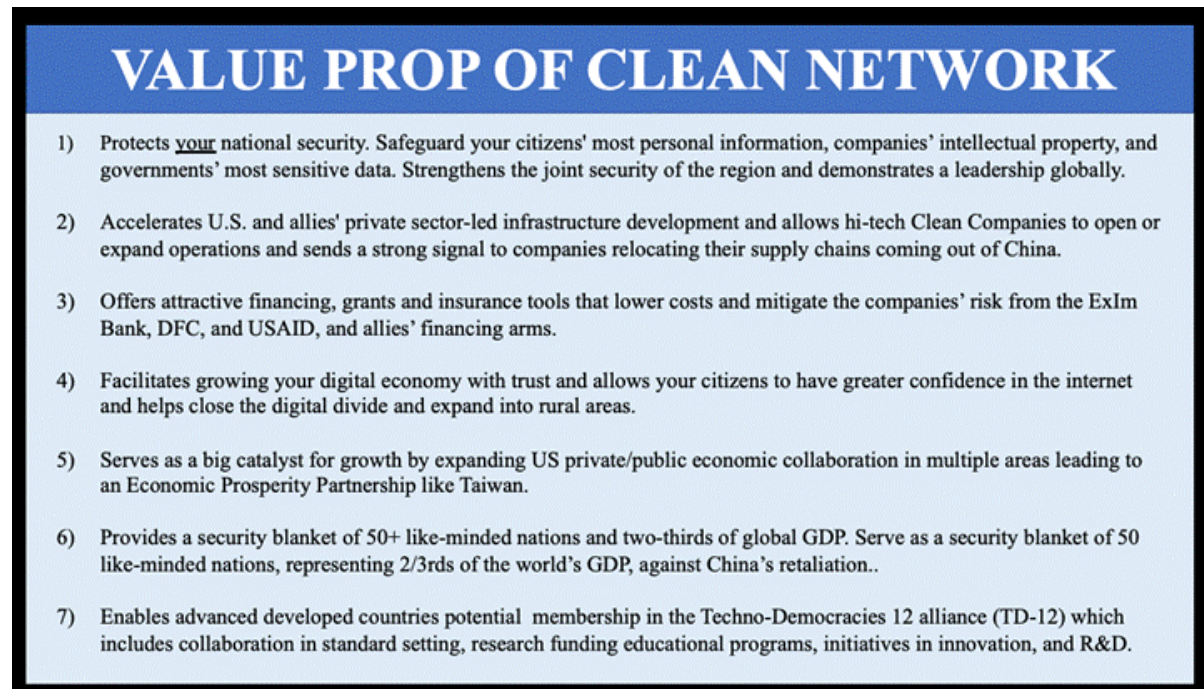
 SoftBank Corp. CEO Ken Miyuchi said, "SoftBank Corp. is pleased to be recognized as a 5G Clean Telecommunications company. We believe telecommunication networks are an important part of social infrastructure, and that they will play a crucial role in transforming people's lives and industry in the 5G era. SoftBank Corp. is committed to providing services that are convenient and secure to all of its customers. We fully supports the Clean Network and will endeavor to build out 5G Clean Network that use secure equipment from trusted network vendors."

 NEC Corporation CEO Takashi Niino said, "NEC is dedicated to developing and deploying innovative, reliable technologies in a manner consistent with our AI and Human Rights Principles. We are committed to working with trusted partners who share our values for building open, secure global networks that create an inclusive world. As a trusted supplier of 5G Open RAN solutions and top undersea cable vendor, we are proud to support the Clean Network."

Source: United States Department of State. "The Clean Network." Webpage. <https://2017-2021.state.gov/the-clean-network/>, accessed April 6, 2021.

Exhibit 7b Quotes from U.S. Financial Institutions Used by the Clean Network

Source: United States Department of State. "The Clean Network." Webpage. <https://2017-2021.state.gov/the-clean-network/>, accessed April 6, 2021.

Exhibit 8 Value Propositions of the Clean Network

Source: Chart prepared for use in HBS case study by Keith Krach, Undersecretary of State for Economic Affairs, Energy, and the Environment. Based off of media remarks by U.S. Under Secretary of State Keith Krach. See U.S. Embassy of Chile. <https://cl.usembassy.gov/under-secretary-keith-krach-opening-remarks-to-the-media/>. Accessed April 8, 2021.

Exhibit 9 The Expansion of the Clean Network

Announcing the Expansion of the Clean Network to Safeguard America's Assets

The Clean Network Lines of Effort

The Clean Network is a comprehensive effort to address the long-term threat to data privacy, security, human rights, and trusted collaboration posed to the free world from malign actors, such as the Chinese Communist Party. The Clean Network is rooted in internationally accepted digital trust standards and reflects the commitment to an open, interoperable, and secure global internet based on shared democratic values and respect for human rights. This effort represents the execution of a multi-year, enduring strategy, built on a coalition of trusted partners.

Expansion of the Clean Network

The alignment around the Clean Network is about countries and companies choosing freedom versus authoritarianism. Huawei along with its CCP appendages—like cloud and apps and cables—create the Orwellian big brother state which extends the great one-way China firewall, where data comes in but not out and, reciprocally, propaganda goes out, but the truth doesn't come in. The full set of Clean Network initiatives includes:

Clean
CARRIER

Clean Carrier: To ensure untrusted People's Republic of China (PRC) carriers are not connected with telecommunications networks. Such companies pose a danger to national security and should not provide international telecommunications services to and from the United States.

Clean
STORE

Clean Store: To remove untrusted applications from mobile app stores. PRC apps threaten privacy, proliferate viruses, and disinformation. Personal and business information must be protected from exploitation and theft for the CCP's benefit. India has already banned 106 Chinese apps.

Clean
APPS

Clean Apps: To prevent untrusted PRC smartphone manufacturers from pre-installing or downloading trusted applications on their apps store. Huawei is trading on the reputations of leading companies and should remove their apps from Huawei's store to ensure not partnering with a human rights abuser.

Clean
CLOUD

Clean Cloud: To prevent U.S. citizens' most sensitive personal information and our businesses' most valuable intellectual property from being stored and processed on cloud-based systems accessible to our foreign adversaries through companies such as Alibaba, Baidu, and Tencent.

Clean
CABLE

Clean Cable: To ensure the undersea cables connecting our country to the global internet are not subverted for intelligence gathering by the PRC at hyper scale. We will also work with foreign partners to ensure that undersea cables around the world aren't similarly subject to compromise.

Clean
PATH

Clean Path: To secure data traveling on 5G networks into diplomatic facilities overseas and ensure it only passes through clean equipment from trusted providers. This protects against access by Chinese companies, which are obliged to hand over data and information to the state without any controls.

Source: United States Department of State. "The Clean Network." Webpage. <https://2017-2021.state.gov/the-clean-network/>, accessed February 10, 2021.

Exhibit 10 The Clean Network in Europe and North America

 U.S. DEPARTMENT of STATE

The Transatlantic Alliance Goes Clean

FACT SHEET
OFFICE OF THE SPOKESPERSON
OCTOBER 17, 2020

TRANSATLANTIC CLEAN NETWORK

- Government regulations in place to exclude untrusted vendors; and/or All major telcos are Clean Telcos; and/or Government signed 5G security MOU
- Government expressed public commitment for the Clean Network or EU 5G Clean Toolbox; and/or Government regulations in progress to exclude untrusted vendors



We issued a joint statement with the EU on the synergies between the Clean Network and the EU 5G Clean Toolbox. Since adoption of the Toolbox meets the criteria for being part of the Clean Network, the two work well together. NATO's Deputy Secretary General has also emphasized the importance of having a 5G Clean NATO Network. Glad to hear that. – Secretary of State Michael Pompeo,

"The 5G Toolbox serves as a reference for telco operators' board of directors, who are required to make the decision on 5G suppliers. If they choose a high-risk 5G supplier and something happens, the board members may be liable." – EU Commissioner Thierry Breton,

It is important to have a secure 5G Clean NATO Network, which is non-fractured, because the Alliance is only as strong as its weakest link. – NATO Deputy Secretary General Mircea Geoana

"Countries and companies are terrified of China's retaliation. The CCP cannot retaliate against everyone. That is where the EU comes in, the Transatlantic Alliance comes in, NATO comes in. The bottom line is the tide has turned. Countries and companies now understand that the central issue is not about technology, but TRUST." – Under Secretary of State Keith Krach

"It's good news that Berlin soon will address the security risk posed by the CCP telecom giant." – WSJ, A Huawei Turning Point,

Source: United States Department of State. "The Transatlantic Alliance Goes Clean." Fact sheet, October 17, 2020. <https://2021.state.gov/the-transatlantic-alliance-goes-clean/index.html>.

Exhibit 11 Quotes from Latin American firms presented in Brazil**Augusto Lins, President of Stone Pagamentos:**

"Having a 5G clean network is very important to fight cyber crime, data breaches, and money laundering as well as to attract investments to new value-added products and services which will require innovative solutions. A network is only as strong as its weakest link."

NEC Latin America:

"The Clean Network with open radio access network architecture will support a diversity of trusted vendors. This is good for Brazil's economic growth, good for operators, and good for consumers. Open architecture and clean 5G will help Brazil become a global producer of network components."

Siemens Brasil:

"A Clean 5G Network is not just about cell phones; it is about critical manufacturing processes, oil and gas platforms, and power networks, sanitation systems and internet of things. The Clean Network will help ensure that Brazil's critical infrastructure – power, transportation, and sanitation systems – is safe and reliable."

"The Clean Network will help us do Brasil become a trusted export platform, expanding Brazil's market of 200 million consumers into potentially 500 million consumers."

"Clean networks are important to safeguard intellectual property and user privacy."

Source: Krach, Keith. "Under Secretary Keith Krach's Remarks on Economic Security." U.S. Embassy and Consulates in Brazil, November 11, 2020. <https://br.usembassy.gov/under-secretary-keith-krachs-5g-policy-remarks-in-brazil/>, accessed March 15, 2021.

Exhibit 12 Ministry of Foreign Affairs Statement on Sanctions on U.S. Officials, issued January 2021

Source: Screenshot from the Ministry of Foreign Affairs of the People's Republic of China. Webpage. https://www.fmprc.gov.cn/mfa_eng/xwfw_665399/s2510_665401/t1847554.shtml, accessed March 22, 2021.

Exhibit 13a Cowen Equity Research, issued April 2021

COWEN**EQUITY RESEARCH**

April 14, 2021

INDUSTRY UPDATE**HUAWEI WATCH: CY20 RESULTS SPEAK TO ACCELERATING SHIFT AWAY FROM HUAWEI****THE COWEN INSIGHT**

Huawei's recently reported CY20 annual operating results highlight continued declines in Huawei's Infrastructure-related revenue in regions outside of China, providing further evidence of ongoing shift away from Huawei to benefit of Western networking equipment suppliers. While early, this trend is clear, expanding, and, we believe, irreversible.

As we have highlighted on previous occasions in our view, the early but clear trend of a shift away from Huawei by CSPs throughout the world represents the single best development for Western suppliers of networking equipment in the past 20 years. We believe that \$8B of Huawei's estimated over \$20B of infrastructure-related equipment revenue generated outside of China in CY20 could shift to Western equipment suppliers over time. We think this shift will also likely eventually result in an improved pricing environment in most service provider product markets and thereby should enhance most suppliers' margin structure. This trend together with a highly favorable capital expenditure outlook for both communication service providers (CSPs) and WebScale Cloud companies should make for a strong demand environment for networking equipment suppliers that address CSP and WebScale Cloud product markets such as wireless RAN (ERIC and NOK), optical DWDM (CIEN, INFN, NOK and CSCO) and routing (ANET, CSCO, JNPR and NOK).

Huawei's CY20 Operating Results

Huawei's CY20 results reinforce the view of meaningful incremental benefit for Western suppliers of communications and networking equipment in the CSP market as an increasing number of CSPs shift away from Huawei. In short, Huawei's reported CY20 operating results show that its business in general and its CSP business in particular is under pressure outside of China with its CSP revenue from markets outside of China in outright decline. We estimate Huawei generated \$21.5B in infrastructure-related equipment (i.e., excluding wireless handsets and other consumer devices) revenue outside of China, down from \$23.0B in CY19, a (6%) Y/Y decrease.

Carrier Networking Equipment

While Huawei's total Carrier revenue increased by 7%, or \$3.2B, Y/Y in CY20, all of the growth was driven by Huawei's domestic carrier (CSP) business which more than offset the decline in its non-China carrier business. To be clear, the opportunity for Western suppliers lies in Huawei's non-China carrier business. We estimate Huawei generated almost \$16B in CSP networking equipment revenue outside of China in CY20, down from \$17.7B in CY19, a decrease of (10%) Y/Y.

To be clear, we expect this ongoing trend to accelerate in CY21 and beyond as an increasing number of CSPs continue to shift future projects away from Huawei to Western suppliers. This trend already is well underway with an increasing number of projects awarded by an increasing number of CSPs away from Huawei to Western suppliers. We believe these project awards will, in turn, show up in Western suppliers' revenue in the next 12 – 24 months and will accelerate from there. Our March 18, 2021 note "Huawei Watch – Second Edition" detailed the Tier 1 CSPs that have already announced plans to move away from Huawei, which will in due course translate into incremental revenue for Western networking equipment suppliers.

And we see this trend as irreversible, even should sanctions eventually be rolled-back or lifted or should Huawei figure out a way to work around the current significant restrictions placed on Western suppliers' ability to ship components to Huawei. We think CSPs, especially large Tier 1 CSPs, cannot afford and will not take the risk of awarding a meaningful portion, if any, of new project deployments to Huawei given both the technical/product risk and the political risk given the importance of their networking infrastructure to their businesses. In addition, each country that places restrictions on Huawei and each CSP that shifts away from Huawei places incremental pressure on other countries and CSPs to do likewise.

Source: Screenshot from Cowen Equity Research, Webpage.

<https://cowen.bluematrix.com/links2/pdf/50fb21a4-cf50-4cd2-afd7-55cb498a9e0e>

Exhibit 13b Cowen Equity Research, issued April 2021

COWEN

EQUITY RESEARCH
INDUSTRY UPDATE

March 10, 2021

HUAWEI WATCH: VODAFONE IDEA GATES HUAWEI AND ZTE

In our new Huawei Watch series, we will seek to gauge the pace and extent of CSPs' ongoing shift away from Huawei and its prospective impact on Western suppliers of networking equipment and optical components. This first edition addresses Vodafone Idea's recent decision to exclude Huawei and ZTE from any new RAN or optical equipment contract awards for its core network expansion.

We have observed on previous occasions (see our note, "Best Thing To Emerge In Networking In The Past 20 years"), in our view, this early but clear trend of a shift away from Huawei by CSPs throughout the world represents the single best development for Western suppliers of networking equipment in the past 20 years. This shift by CSPs away from Huawei could make available an additional \$25B annual revenue opportunity to Western networking equipment suppliers and could—and we think likely will—also result in an improved pricing environment in most product markets and thereby should enhance most suppliers' margin structure.

The most recent datapoint speaking to the enhanced market opportunity for networking equipment suppliers to communication service providers (CSPs) from ongoing migration away from Huawei, Vodafone Idea Limited (VIL), one of the four largest CSP in India. Vodafone Idea is not alone in India in shifting away from Huawei and ZTE, just the opposite. Every major service provider in India appears to be limiting the role of Huawei and ZTE to their current footprint, with some of these service providers also having decided or contemplating entirely eliminating Huawei and ZTE from their network infrastructure, including ripping out and replacing Huawei and ZTE equipment.

Nor is India the only region in which CSPs are shifting away from Huawei. As a general proposition, the same shift is happening among CSPs throughout the world but is especially notable and well underway among most Tier 1 CSPs in Europe and Canada.

Impact

In our view, this early but clear trend of a shift away from Huawei by CSPs throughout the world represents the single best development for Western suppliers of networking equipment in the past 20 years. This shift by CSPs away from Huawei could make available an additional \$25B annual revenue opportunity to Western networking equipment suppliers and could—and we think likely will—also result in an improved pricing environment in most product markets and thereby should enhance most suppliers' margin structure.

Underlying our estimate of the prospective total additional market opportunity for Western suppliers of networking equipment, we estimate Huawei generates over 40% of its networking equipment revenue, or over \$25B in CY20, from outside of China.

BEST THING TO EMERGE IN NETWORKING IN THE PAST 20 YEARS

THE COWEN INSIGHT

Representing the most important development in the networking equipment industry in the past 20 years, recent checks indicate that the cutback of Huawei by operators in Western-oriented countries has commenced and is spreading at an accelerating pace. This should benefit rev growth and profitability for most systems suppliers, while presenting a challenge for most optical component companies.

Representing what we think is, or is among, the most important development(s) in the networking equipment industry in the past 20 years, a number of recent public datapoints and our industry checks indicate that the cutback of Huawei by operators in Western-oriented countries has commenced and appears to be spreading at an accelerating pace. We expect this trend to continue, extending to most Western countries and becoming broader in scope within each of those countries. This trend should benefit revenue growth and profitability for a number of telecom equipment suppliers, but presents a potential, but not unequivocal, challenge for most optical component companies.

Most Prominent Systems Beneficiaries

Of the companies set forth above, we think CIEN, ERIC and NOK are the most significant beneficiaries, CIEN by virtue of its technology and market leadership in the optical systems market, ERIC by virtue of its strong competitive position in the wireless equipment market, and NOK by virtue of its position as one of the leaders in all of the key service provider communication and networking equipment markets. In the wireless equipment market, ERIC is particularly well-positioned to benefit—to pick up at least, and probably more than, its pro rata portion of any Huawei losses in the wireless equipment market given NOK's publicly acknowledged cost structure issues related to its current reliance on FPGAs and its public statements that the shift to SoCs will not be fully consummated until the end of CY22.

Source: Screenshot from Cowen Equity Research, Webpage.

<https://cowen.bluematrix.com/docs/html/aaab0bae-c676-465a-8f5d-71e96728ec78.html>

Rolling Thunder: Clean Network Timeline

January 12-15, 2020 Silicon Valley partner tour.



January 20-24, 2020 Davos country leaders' partner meetings.



January 28, 2020, UK's decision to allow Huawei into its 5G network sparks tensions with U.S.

February 14, 2020 Nancy Pelosi warns letting Huawei into Europe is to "choose autocracy over democracy."



February 20, 2020 Huawei president Ding boasts, "91 5G contracts worldwide, including 47 from Europe."



March 3, 2020 Chuck Schumer (D-NY) urges UK to reject Huawei.



March 5, 2020, Krach's E team gets authorities for semiconductors and 5G.



March 8-10, 2020, Semiconductor Equipment partner meetings in Silicon Valley.



April 29, 2020, Clean Path initiative is announced.



May 18, 2020, the 5G Trifecta crucial onshoring of TSMC's semiconductors.



June 3, 2020, Canadian telcos lock Huawei out of 5G build.



June 24, 2020, Telefónica CEO María declares, "Telefónica is proud to be a 5G Clean Network company."



Rolling Thunder: Clean Network Timeline

June 25, 2020, Krach welcomes the Czech Republic, Norway, Poland, Estonia, Romania, Denmark, Greece, New Zealand, Japan, Australia, Israel, and Latvia into Clean Network.



June 29, 2020, Huawei Loses Out in Singapore 5G Bid. Nokia and Ericsson chosen as Singapore's 5G network providers.



July 14, 2020, UK bans Huawei from future 5G networks.

July 4, 2020, Krach warns about genocide and slave labor in China on "Cavuto Live."



July 15, 2020, US hails Britain's move to ban Huawei and join Clean Network.



July 22, 2020, French authorities effectively ban telecom operators from using Huawei gear once licenses expire.



August 5, 2020, Clean Network expands to include more tech areas.



August 10, 2020, Clean Network grows to 30 Countries and Territories along with largest telcos: Orange (France), Reliance (India), Telstra (Australia), SK and KT (Korea), Cosmote (Greece), NTT (Japan), O2 (UK) and all telcos in Canada, Norway, Vietnam, and Taiwan.



August 24, 2020, India phases out equipment from Chinese companies.



September 17, 2020, Krach arrives in Taipei, becomes highest-ranking State Department official to visit since 1979.



September 18, 2020, Krach attends service for President Lee Teng-hui, starts new economic dialog, welcomes Taiwan to Clean Network.



Rolling Thunder: Clean Network Timeline

September 22, 2020, European Clean Network tour begins, with goal of building a Transatlantic Clean Network.



September 23, 2020, Krach meets with Estonian President Kaljulaid, who commits to EU 5G Clean Toolbox and 5G Clean Path.



September 28, 2020, Krach and Austrian Federal Minister Köstinger elevate U.S.-Austria partnership and safeguard 5G from "high-risk" vendors through the Clean Network and the EU 5G Clean Toolbox.



September 30, 2020, Krach and EU Commissioner Breton issue statement on synergies between Clean Network and EU 5G Clean Toolbox.



September 30, 2020, NATO Deputy Secretary General Geoana seeks 5G Clean NATO Network citing need for non-fractured alliance.



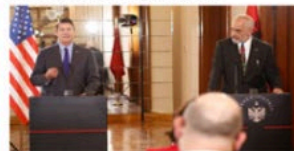
October 1, 2020, Portugal commits to EU 5G Clean Toolbox, joins Clean Network.



October 2, 2020, Spain's Secretary for Telecoms, Sánchez commits to EU 5G Clean Toolbox, joins Clean Network.



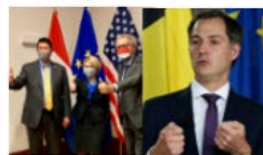
October 3, 2020, Albania's Prime Minister Rama commits to 5G Clean Path. Krach and Finance Minister Denaj sign Memorandum of Economic Cooperation.



October 4, 2020, Germany prepares legislation that will effectively ban Huawei from its 5G network.



October 8, 2020, Luxembourg and Belgium announce replacement of Huawei, join the Clean Network.



November 17, 2020, President Abinader announces Dominican Republic joins Clean Network.



November 18, 2020, Huawei Sells Honor Phone Business to a state-led consortium as U.S. sanctions bite.



December 22, 2020, "Ukraine joins NATO, EU, OECD, and 3 Seas on the Clean Network," Prime Minister Shmyhal.



January 12, 2021, Nauru President Aingimea: "The Clean Network provides a trusted foundation to secure the most sensitive information."



January 13, 2021 "Palau is excited and proud to join the Clean Network." President Remengesau.



January 14, 2021, US, Georgia sign Clean Network MOU on 5G cooperation.



The Clean Network Today

MEMBERS OF THE CLEAN NETWORK

- Nearly 60 Clean Countries
- 200+ Clean Telcos
- 26 of 27 EU Members
- 27 of 30 NATO Allies
- 30 of 37 OECD Members
- 11 of 12 Three Seas nations
- 66 percent of global GDP
- All Quad Members
- All Five Eyes Members
- Powerful High-Tech Clean Companies

Wall Street Journal: Though its success has been a quiet one, Clean Network could turn out to be the administration's **most enduring foreign-policy legacy**. It has become an **undisputed success** and it looks likely to stick. Neither Biden nor foreign leaders appear interested in reversing it. Nobody will want to tear it up and rebuild.

Bloomberg: Silicon Valley veteran Keith Krach harnessed the power of Metcalfe's Law to build a network of nations to counter China — a **notable change in tone** after years in which the administration pursued a go-it-alone, "America First" strategy. "In contrast to a somewhat more confrontational style at the beginning of the administration, the Clean Network bears the hallmarks of 'good old fashioned' diplomacy," The Clean Network's effort to create a united economic front is to China what George Kennan's "long telegram" of 1946 was to the Soviet Union.

Epoch Times: Krach coined the term Clean Network and led the initiative to take away Huawei's momentum by unifying allies. This triumph seemed unthinkable at the beginning of this year, as the Chinese giant Huawei seemed unbeatable. Within a few months, the Clean Network's momentum garnered overwhelming international support and bipartisan backing. Huawei's vaunted 90 deals have dwindled to just 12 outside of China.

Life & News: The Clean Network **turned the tide on the CCP's 5G master plan**. By building an alliance of democracies built on democratic values embodied in its Trust Standards. It **proves that China Inc. is beatable** and, in the process, exposed its **biggest weakness — lack of trust**. The Clean Network demonstrated a rare genius for building **effective public/private sector partnerships** that leverage the innovation and resources of the world's business leaders and entrepreneurs.

Senior researcher Mary Brooks: "The Clean Network is some of the **first real coordinated action** we've seen from the US government to secure supply chains, ensure the use of trusted vendors, and build consensus around what safe and trustworthy technology should look like."

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