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# China's 5G Mobile Technology in Asia: US Security Concerns and Regional Economic Priorities

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# AsiaPacific

## I S S U E S

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*Papers in the AsiaPacific Issues series feature topics of broad interest and significant impact relevant to current and emerging policy debates.*

*The views expressed are those of the author and not necessarily those of the Center.*

**SUMMARY** Seeing Chinese fifth generation, or “5G,” mobile communications technology as a potential security threat, the US government has been discouraging other countries from using Chinese 5G equipment despite its global popularity. Understanding this issue requires an explanation of American security concerns related to Chinese 5G technology and a review of the steps the US government has taken to ban Chinese equipment from US communications networks. The responses of several Asian countries to American calls for a prohibition against Chinese 5G equipment are varied. While close US allies generally follow the American call to avoid incorporating Chinese communications equipment, some less developed Asian nations have put economic considerations above security concerns. As a consequence, US policy could create a communications schism between the US and some developing Asian nations. Despite the likelihood of this negative outcome, American policy makers may continue to urge against the use of Chinese equipment because they prioritize security over other considerations.

As Chinese fifth generation, or “5G,” mobile communications technology has become a leading force on the global communications stage, the United States watches with some alarm and worry that its own security, along with that of Asian allies, could be threatened by Chinese corporate and technological dominance. As a response, the US has taken steps to discourage the use of 5G equipment in friendly Asian nations, for both economic and national security reasons.

The US strategy of prodding some of these nations to ban Chinese 5G equipment, however, may create a dilemma for less developed countries in Asia that for economic reasons choose to use Chinese 5G equipment rather than comply with American security concerns. The policy could also lead to a technological divide between those states that do or do not follow US exhortations. The resulting communications schism could reshape global network system functions and capabilities, and might potentially damage US relations with the recalcitrant countries into the future.

A review of American security concerns over adoption of Chinese 5G technology shows steps the Biden and previous administrations have taken to effectively ban equipment from the People’s Republic of China (PRC) from US communications networks. This ban, with its resultant need to “rip and replace” current generations of equipment, has caused economic difficulties for many smaller and rural US communications companies. US and other government officials and technology experts argue the ban is needed for security reasons.

Within the Asia Pacific region, close US allies Japan and South Korea have generally followed American calls for a prohibition of Chinese 5G equipment, and India and Vietnam have also put security concerns over economic needs. However, other less developed nations in the region such as Malaysia and the Philippines have equivocated on instituting a ban, while Indonesia and Nepal have essentially disregarded the American policy and put economic interests ahead of possible security threats.

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## 5G and Chinese Strategies

Deployment of 5G networks stands to revolutionize many areas of daily life. With transmission speeds rising from some 70 Megabits per second (Mbps) in fourth generation (4G) hardware to as many as 4.5 Gigabits per second (Gbps) in 5G, users of 5G-capable smartphones will see faster speeds of everything from video content download to mobile game functioning. 5G can also enable many other new functions, such as wireless virtual reality, remote surgery, and connected smart cars, factories, and homes.

To become a global leader in the technology, China is projected to invest the equivalent of US\$150 billion in its 5G network through the year 2025.<sup>1</sup> As of 2022, China had installed more than one million 5G base stations.<sup>2</sup> By mid-2021, China’s Ministry of Information Industry and Technology (MIIT) claimed it had completed the construction of the world’s largest 5G stand-alone network.<sup>3</sup>

China’s leading communications equipment companies, predominantly state-owned ZTE and state-sponsored private company Huawei Technologies, are using this well-developed domestic market as a base for expansion to global markets. In addition to cutting edge products and price competitiveness, these companies had an advantage in exporting their technologies, as many countries had previously built their 3G and 4G mobile networks with Chinese-supplied communications equipment. To advance to 5G without using the same suppliers would mean ripping out the old equipment and starting anew rather than building on the previous generation.

While Chinese equipment manufacturers aimed to leverage their technological and price advantages to advance into global markets, American security concerns would be a significant hurdle to selling 5G equipment outside China’s borders.

## American Security Concerns, and Their Economic Repercussions

US concern over China’s rapid advance in 5G technologies, and the potential to be a dominant force

in the sector, appeared as early as March 2018 in a report by the US government's Committee on Foreign Investment in the United States (CFIUS). The committee asserted that Huawei owned about 10 percent of essential 5G patents,<sup>4</sup> which would generate lucrative royalties as the technologies were incorporated into internationally-recognized standards for 5G operating systems.

More importantly, even before the advent of 5G technologies, the US viewed Huawei with suspicion as a potential gateway for Chinese government spying. In 2011, the American government blocked Huawei from buying California-based tech start-up 3Leaf Systems, and in early 2018 pressured AT&T from selling Huawei phones in the US.<sup>5</sup> In November 2022, the Biden Administration formally banned approvals of new telecommunications equipment from Huawei and ZTE, citing "an unacceptable risk" to US national security.<sup>6</sup>

Whether Huawei, ZTE, or other Chinese telecommunications companies are actually a threat to American security is a source for debate. For its part, Huawei has steadfastly denied it had installed backdoors in its software that could allow it to monitor user data or shut down networks in the event of international conflict. In 2022, the company claimed "Huawei has not had any major cybersecurity incidents while working with more than 500 telecom providers, including most of the top 50 telecom operators, for nearly 20 years in 170 countries to connect more than 3 billion people."<sup>7</sup>

However, technical specialist Nicholas Weaver, a staff member at the International Computer Science Institute at the University of California at Berkeley, argued that telecommunications systems are specifically designed to be wiretapped, and that with "the addition of a small sabotage chip...you lose all your assurances."<sup>8</sup> Moreover, prominent US politicians ranging from Republican Senator Marco Rubio to Democratic Senator Mark Warner have supported moves to prevent Chinese companies from selling equipment to build American communications systems. In 2019, Warner commented that "[s]oftware reviews of existing Huawei products are not sufficient to preclude the possibility of a vendor pushing a malicious update that enables

surveillance in the future" and that "[a]ny supposedly safe Chinese product is one firmware update away from being an insecure Chinese product."<sup>9</sup>

Some non-US politicians also expressed concern over the security risks of Chinese 5G equipment. In early 2020, former Australian Prime Minister Malcolm Turnbull commented that "[t]he real question is not looking for a smoking gun but asking whether this is a loaded gun and whether you want to have that risk."<sup>10</sup> As of June 2022, said the *Washington Post*, "U.S. officials have never presented smoking gun evidence of such snooping." The newspaper continued, however, that "[American officials] have said the risk the Chinese government could compel Huawei's cooperation in spying is dangerous enough."<sup>11</sup>

A significant economic problem in banning the Chinese companies in the US was that many small and rural American communications companies had used their equipment in building out their networks. This adoption of Chinese technology had come as American manufacturers of the advanced equipment had largely left much of the field to both the Chinese companies as well as to European and Asian corporations including Finland's Nokia Corporation, Sweden's Ericsson AB, and South Korea's Samsung.

To facilitate a "rip and replace" process of removing Chinese equipment, Congress' 2020 Secure and Trusted Communications Networks Act authorized \$1.9 billion as reimbursement to the companies to remove the Chinese vendors' equipment.<sup>12</sup> However, in July 2022, Federal Communications Commission Chairwoman Jessica Rosenworcel informed Congress that "[t]o fund all reasonable and supported cost estimates within the first and third prioritizations groups and cover administrative expenses, the Reimbursement Program will require \$4.98 billion, reflecting a shortfall of \$3.08 billion."<sup>13</sup> Eligible applicants for the funding, among a list of more than 100 companies, ranged from Eastern Oregon Telecom to Central Louisiana Cellular to Puerto Rico Telephone Company, Inc.<sup>14</sup>

This funding shortfall highlights the economic hardship, even in the developed communications

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market of the US, of removing Chinese communications equipment for national security reasons. While America's wealthier allies have followed the US in banning the PRC from building out new networks, less developed nations have less readily accepted the costs of transitioning away from using Huawei and ZTE products for their network upgrades.

Considerations of equipment quality, along with economic costs, likely played a mitigating role against security concerns in regional Asian decisions to adopt Chinese 5G equipment, as the following section indicates.

### **China's 5G in Asia**

In 2018, after America banned most Huawei, ZTE, and some other Chinese firms' products from use by the US government and government contractors, Australia and New Zealand announced they would not allow Huawei to take part in building their 5G networks. Other Western states soon followed suit. The British government banned Huawei equipment in the UK's 5G mobile network starting from September 2021.<sup>15</sup> In July 2022, the Netherlands' largest operator, T-Mobile Netherlands, named Ericsson as the sole vendor of its 5G network, with the goal of removing Huawei equipment from its 4G systems.<sup>16</sup>

In Asia, however, the story was not so clear.

Several Asian nations have responded both to pressure from the US, as well as to their own security and economic interests, in following paths similar to those of American allies in Europe. In 2018, Japan, one of the US's staunchest allies, was one of the first Asian states to announce a ban on Huawei and ZTE 5G equipment from official contracts.<sup>17</sup> The major telecom carrier Softbank followed in 2019, as it shunned Chinese equipment makers for its 5G network in favor of Ericsson and Nokia.<sup>18</sup>

In another key US ally, South Korea, leading communications companies SK Telecom and KT turned to a local leader, Samsung, for deploying their 5G networks. However, an exception to the domestic reliance on Samsung has been the smallest of South Korea's carriers, LG Uplus, which used Huawei for

its 4G LTE network and included Huawei among its preferred bidders for 5G equipment.<sup>19</sup> Pressure on South Korea also came from the Chinese government. China's dominant National Development and Reform Commission allegedly warned Samsung Electronics and SK Hynix in 2019 not to block trade with Huawei. As of the end of 2021, Huawei Korea continued to operate in the country.<sup>20</sup>

Among nations not clearly aligned with US security interests, the situation is more complex. India's government did not initially specifically exclude Chinese equipment makers from participating in the rollout of the nation's 5G network, which began trial operations in 2021.<sup>21</sup> In July 2022, however, India's Ministry of Communications mandated that, for national security matters, only "trusted products" from "trusted sources" could be connected to the nation's communications network.<sup>22</sup> Huawei and ZTE did not qualify as trusted sources. India's own security interests likely played a key role in this decision. As just one manifestation of long-festered tensions, in May 2020 China and India clashed militarily along India's border with Tibet, resulting in casualties on both sides. In the absence of the Chinese equipment suppliers, Nokia, Ericsson, and Samsung were well placed to gain business as suppliers to modernize India's network.

Vietnam, like India, has a border dispute with China, in this case over its South China Sea territorial claims, and has also avoided Chinese equipment for its 5G deployment. Vietnam is another case in which national security likely plays a role in the nation's move away from reliance on Chinese equipment for its 5G network. Vietnam's earlier mobile networks did incorporate Chinese technology. The largest carrier, Viettel, used Huawei and ZTE equipment to build its 3G network in the late 2010s. Moreover, through 2021 the Vietnamese government had not formally barred the country's carriers from using Chinese equipment. Viettel, however, avoided the Chinese companies for its 4G upgrade, and in 2019 began exploring 5G collaborations with Ericsson and Nokia, but not Huawei.<sup>23</sup>

Malaysia also had early interest in using Huawei equipment for its 5G network. In 2019, then

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prime minister Mahathir Mohamad commented that “Huawei’s research is far bigger than Malaysia’s capability... We will make use of their technology as much as possible.” He also indicated he was not concerned about possible espionage activities, because “we are an open book.”<sup>24</sup> Mahatir’s tenure in office, however, ended in early 2020, and in early 2021, the nation’s state-owned telecommunications operator DNB sought bids from equipment suppliers that included both Huawei and ZTE as well as Ericsson, Nokia, Samsung, and others. In July, however, DNB announced Ericsson would design and build the 5G network, at a cost of some \$2.6 billion. Ericsson may have been chosen on economic grounds based on a pledge to “arrange for financing for the supply, delivery, and management of the entire 5G network.”<sup>25</sup>

In light of the Ericsson choice, opposition leader Anwar Ibrahim questioned the decision, claiming Huawei could have deployed the national 5G network at roughly half the cost of the Ericsson agreement.<sup>26</sup> In December 2022, newly installed prime minister Anwar announced his administration would review DNB’s 5G plan, indicating it was not formulated transparently.<sup>27</sup> At the end of January 2023, the government’s review revealed that the 2021 contract did not bind DNB exclusively to Ericsson, and that a second vendor, possibly Huawei, ZTE, or Nokia, could also take part in the 5G rollout.<sup>28</sup>

Internal politics in the Malaysian case, then, seemed to influence the decision on whether to consider Huawei for building the Malaysian network. Prime ministers Mahatir and Anwar, both chairmen of the Pakatan Harapan center-left political coalition, expressed greater support for using Chinese equipment, ostensibly for cost-saving reasons. Depending on a nation’s leadership makeup, then, Chinese companies could find a friendlier reception, one apparently transcending security considerations.

In the Philippines, a similar dynamic seemed to play out, but with a 2022 political transition possibly shaping a choice in the opposite direction, from greater toward less reliance on Chinese technology. Former President Rodrigo Duterte had

pursued a rapprochement with China, to some extent at the expense of security ties with the US. In 2019, the nation chose Huawei to build its 5G network, and extended the technology tie to China by enlisting state-run China Telecommunications Corporation to be part of a consortium to roll out the network. Besides Huawei’s participation, China Telecommunications was also a 40 percent owner of the Philippines’ newest telecom carrier, Mislatel, later renamed Dito Telecommunity. The country’s two other major telecommunications companies, Globe Telecom and PLDT’s subsidiary Smart Communications, also welcomed Huawei’s 5G technology adoption for their operations.<sup>29</sup>

The Philippines’ adoption of the Chinese technology presented a pressing challenge to American military forces that access to bases in the country. In 2019, US Secretary of State Mike Pompeo visited Manila and warned “America may not be able to operate in certain environments if there is Huawei technology adjacent to that.”<sup>30</sup>

In his presidential campaign, Duterte’s successor Ferdinand Marcos Jr. had advocated for closer ties to China. Since he took office in June 2022, however, Marcos sought to revive ties with the US, a stance manifested in a February 2023 agreement allowing the American military access to four additional strategic sites in the Philippines. This move was met with criticism from the Chinese foreign ministry.<sup>31</sup> Also in early 2023, following a visit to Manila by US Vice President Kamala Harris, the US Trade and Development Agency (USTDA) announced an aid contribution of \$1.5 million to back a smaller Philippines 5G provider, Now Telecom, a move clearly meant to steer the Philippines away from adopting Chinese equipment. Now Telecom chairman and CEO Mel Velarde said the company aimed to “deliver a clean and secure 5G network.”<sup>32</sup>

The story for Chinese 5G manufacturers was far brighter in other parts of developing South and Southeast Asia. In Indonesia, for example, both Huawei and ZTE have been doing business since the late 1990s, offering communications infrastructure that is up to 30 percent less expensive than that of competitors. Huawei in particular has shown a commitment to the nation, pledging in 2020 to

train some 100,000 Indonesians in digital skills.<sup>33</sup> In September 2021, Huawei Indonesia renewed a memorandum of understanding on cyber security with the nation's highest security body.<sup>34</sup>

Nepal also seemed to prioritize costs and economic development over security concerns. The country had been using Huawei equipment for its mobile network since 1999, and had introduced the Chinese company's 2G equipment in 2000. By 2020, Huawei had provided equipment for the country's 3G and 4G networks as well, and was operating some 15,000 base stations.<sup>35</sup> Nepal's three major carriers Nepal Telecom, Ncell, and Smartcell used equipment from both Huawei and ZTE, and in 2019 Huawei was aiming to upgrade its 4G network to 5G.<sup>36</sup> This despite the fact that with Nepal's strategic position between China and India, and China's desire to monitor communications such as those of Nepal-based anti-Tibet espionage activities, any possible intrusion into Nepal's 5G network could have significant security ramifications.

*Future world communications networks could end up divided between those supplied with Chinese 5G and later generation equipment, and others built by Ericsson, Nokia, Samsung, and perhaps other providers. This could create a technological schism between the US and its closest allies on one hand, and much of the rest of the world, including developing Asian nations, on the other.*

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### Conclusion

This survey of diverse Asian reactions to Chinese 5G equipment deployment illustrates several key dynamics of a US-China economic security nexus. Countries such as Japan or Korea that have close alliance ties to the US will generally follow the US path to avoid the possible security threat from incorporating Chinese communications equipment into their networks.

Some less developed Asian nations, including India and Vietnam, have put national security considerations above what may be a more economically rational choice. In doing so, they conform to the US desire to avoid Chinese 5G deployment, even if this is not the driving factor of their decision.

Several other Asian countries, however, have put economic considerations above those of security relations with the US. Both traditional American allies such as the Philippines, and less closely aligned nations such as Nepal, have emphasized economic priorities and put aside security concerns

to embrace Chinese technologies for their 5G networks. The cost of "rip and replace" is likely a key factor in their decisions to continue to use Chinese equipment for their next generation of mobile communications networks. Even in the United States, small and rural communications carriers rely on federal funds to avoid using Huawei and ZTE products for their 5G upgrades, so it is clear that cost is a significant hurdle for developing nations if they must choose more expensive European or other non-Chinese products over those from the PRC.

National decisions on 5G adoption, then, were in general based on balancing political and security concerns on one hand, and price and quality of equipment on the other. The technology selection by the Asian countries considered here was the result of weighing these factors, and of choosing a course perceived as in the nation's best future interests. Sometimes this involved going against American security concerns.

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In the long run, US security interests could potentially benefit from diminished Chinese influence and a reduced risk of Chinese surveillance globally, the expected outcomes of Washington's pressure to not use Chinese communications equipment. Washington will likely to continue to exhort countries incorporating 5G systems, and future generations of communications networks as well, to avoid using Chinese equipment.

This policy, however, has a downside. The resulting division among Asian nations in communications technology ties to China could also have detrimental effects on other US goals in the region. For example, such a global divide in 5G and future network generations could see the loss of commu-

nications capability in a broader sense, with those nations following US calls for boycotting Chinese equipment lacking the funds to purchase more costly systems than those the Chinese companies offered. The least economically developed nations could be left with no choice but lagging behind in mobile generation advances. Despite America's

long-term interest in regional prosperity, countries forced to abandon ties to China's equipment, and either going without upgrades or using scarce financial resources to deploy alternative nations' expensive gear, could harbor resentment against the US pressure, perceived as serving narrow American self-interest.

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The East-West Center promotes better relations and understanding among the people and nations of the United States, Asia, and the Pacific through cooperative study, research, and dialogue. Established by the US Congress in 1960, the Center serves as a resource for information and analysis on critical issues of common concern, bringing people together to exchange views, build expertise, and develop policy options. The Center is an independent, public, nonprofit organization with funding from the US government, and additional support provided by private agencies, individuals, foundations, corporations, and governments in the region.

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