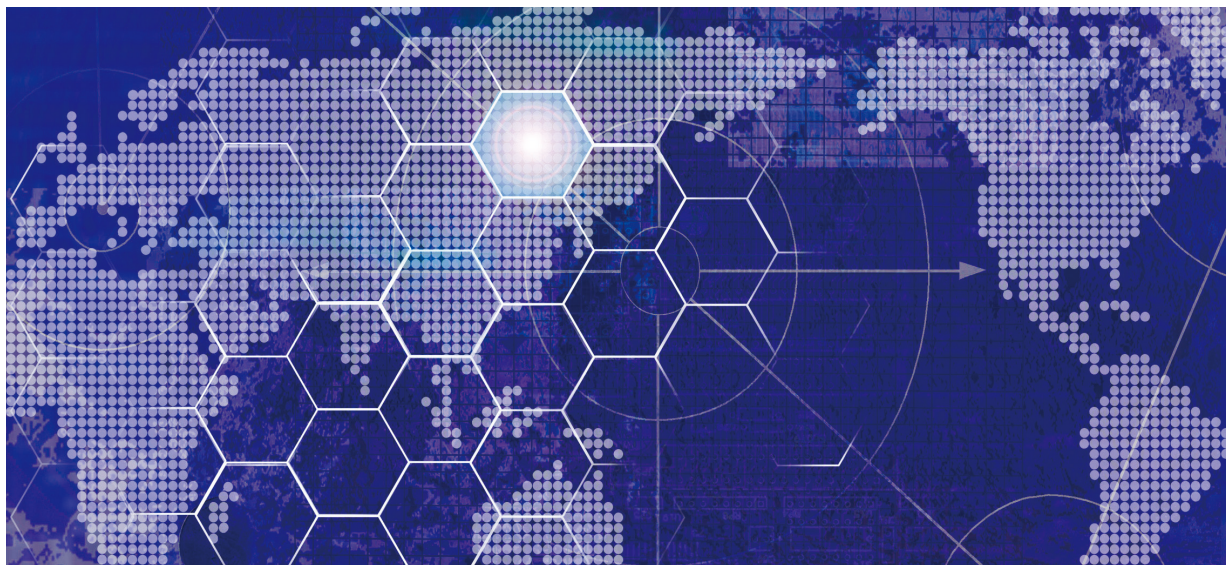


Battles over Techno-hegemony: Japan's Course



(Photo AFLO)

With attention focused on advanced technologies in the context of international relations and international security, battles over techno-hegemony have surfaced. The most prominent form of technological competition is the race for simple technological advantage. First, each country considers its technological capabilities to be directly linked to its own security interests and, in a more straightforward manner, views them as sources of hard power and pursues relative technological superiority. Each country expects and/or worries about the disruptive innovations that introduce cutting-edge technologies as game changers in the military domain.

Second, the technological capabilities of a nation do not determine only the superiority or inferiority of its military power. Technology is also used as a diplomatic tool. Some countries can impose constraints on access to critical technology, a choke point for products, and force other countries to make concessions. The internationalization of the value chain and the deepening of interdependence make this kind of statecraft possible. This phenomenon can be called “weaponized interdependence.” China’s pursuit of domestic production of semiconductors is aimed at reducing its dependence on the United States, which has established

a dominant position in global semiconductor production. Third, it has been pointed out that advanced technology combined with artificial intelligence (AI) may be used to support the regimes of authoritarian states. It has been pointed out that voice recognition technology and automatic translation technology equipped with deep learning technology are used to manipulate public opinion, and biometric technologies such as facial recognition technology is used to monitor and suppress people. In addition, it has been noted that these technologies are exported and used abroad, often by authoritarian regimes, to shape public opinion and monitor the public. Advanced technologies backed by the current information technology enables large-scale and rapid circulation of information, while strengthening the control of governments over peoples. It may be said that information and communication technology has played a role in spreading the norm of liberal democracy while proliferating and strengthening authoritarian political models. In the midst of this, competition has begun for technology as a source of soft power and/or sharp power.

Against this backdrop, in the midst of competition for technological superiority, governments are scrambling to engage in research and development (R&D) to produce technological innovation. For example, the essence of AI innovation, as typified by deep learning, lies in foundational technologies, advanced human resources, and good-quality data. Key foundational technologies include computing, algorithms, semiconductors that enable high-performance information processing, and advanced information technologies. Countries are competing for these technologies, talent, and quality data. Moreover, from basic research to social implementation, the boundaries between the military and civilian sectors have become increasingly blurred. In the past, technology development and application were focused on spin-off, the diversion of military technology to civilian industries, and spin-on, the diversion of civilian technology to military use. At present, however, “spin-around” and “civil-military fusion” are being pursued, transcending the boundaries between the military and civilian sectors. It is well known that many advanced technologies have dual-use purposes.

US President Donald Trump signed Executive Order 13859 announcing “the American AI Initiative” – the US national strategy on AI – on February 11, 2019. Priority was given to R&D in AI for the purpose of maintaining US leadership in the AI field. In addition, the Defense Innovation Unit (DIUx) of the US Department of Defense (DOD) is making efforts to strengthen cooperation with private high-tech companies in Silicon Valley, and the Defense Advanced Research Projects Agency (DARPA) is continuing its efforts to support R&D by civilian institutions, including foreign universities.

China focuses its attention on fostering high-tech industries, as seen in its “Made in China 2025” plan announced in 2015. Moreover, China’s military R&D appears to be moving from “military-civilian integration” to “military-civilian fusion,” deepening cooperation with the civilian sector. Although the prospects for the Shanghai Stock Exchange’s STAR Market, opened in July 2019, are unclear, the new market does show Beijing’s intention to support high-tech unicorns in the semiconductor material and AI sectors in which it has encouraged domestic production.

In addition, in order to promote open innovation, as exemplified by international joint R&D projects, competition is taking place in the hiring of world-class human resources. In China, high-tech workers from Silicon Valley called *hai-gui* have made great contributions to upgrading China’s advanced technologies. As described above, the flexibility of technology R&D frameworks, the globalization of value chains, and the mobility of highly skilled human resources are advancing, and international interdependence over technology is deepening.

On the other hand, there is a movement to promote decoupling at the technological level. This entails severing technological interconnections to maintain technological superiority. In the US, there is growing concern that China is acquiring advanced US technology through legal and illegal means, such as forced technology transfer, industrial espionage, cyber espionage, joint R&D, personnel exchanges, academic exchanges, and corporate mergers and acquisitions (M&A). The FY2019 National Defense Authorization Act (NDAA), signed by President Trump in August 2018, included a ban on government agency

procurement of products from five Chinese companies. The Chinese companies targeted by the NDAA were telecommunications equipment giants, surveillance camera manufacturers, and telecommunications equipment manufacturers, all of which are high-tech companies. Overwhelming support for the NDAA in both the Senate and the House indicated that decoupling from China in terms of advanced technology was widely supported in Washington.

One notable tool for decoupling at the technology level is export controls. On November 2018, the US Department of Commerce (DOC) welcomed public comments on the introduction of export controls for emerging technologies. The emerging technologies discussed included biotechnologies, such as synthetic biology and genomic engineering; AI and machine learning, such as deep learning and speech processing; quantum technologies, such as quantum encryption and quantum computing; and advanced surveillance technologies, such as faceprint and voiceprint technologies. All are cutting-edge technologies based on advanced information and communication technology. Furthermore, the US

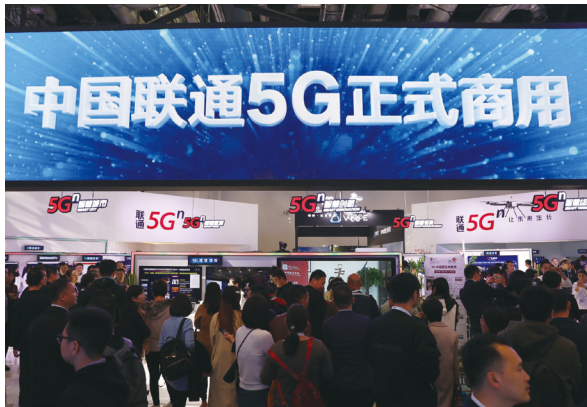
government added major Chinese telecom companies and their affiliates in May and August of this year, as well as Chinese AI-related companies in October, to the list of entities subject to its export controls. As a result of these measures, it has become clear that the scope of US export controls toward China has expanded beyond the conventional aerospace and defense sector to include AI and information and communication technologies.

The control of highly skilled personnel is also attracting attention as a security issue. This is because highly skilled personnel are a key element for technological innovation that creates advanced technologies. Against the backdrop of concerns over the outflow of advanced technologies and highly skilled human resources through foreign direct investment (FDI) and M&A, countries are undertaking to strengthen regulations on inward direct investment for security reasons. The reform of the Committee on Foreign Investment in the United States (CFIUS), authorized under the US Foreign Investment Risk Assessment Modernization Act (FIRRMA), is a typical example. Behind these efforts is the reality that R&D on advanced technologies is

currently being led by the private sector. While there is a need for enormous funds to be obtained from outside for today's R&D, there is also a security requirement to prevent technology outflow through participation in corporate management. These efforts also aim to prevent high-tech startups from being acquired by foreign entities. Furthermore, measures to prevent technology transfers through highly skilled human resources have become evident even as restrictions on entry visas have been tightened. It has recently become clear that Chinese engineers and researchers are severely restricted from entering the US. In this way, policies for technological superiority are intricately intertwined with the opposing vectors of open innovation (interdependence) and decoupling (cutoff).

Another dimension of the battles over techno-hegemony is related to the international order and institutions relevant to technology. The international order and institutions governing technology shape how international technology is developed, used, transferred and managed, and affect the power and interests of individual countries. Therefore, countries are striving to mold the international order

governing technology in line with their own national interests. The Chinese government, for example, has launched the concept of the Digital Silk Road and will focus on developing and expanding the standardization process for the fifth-generation mobile communications system (5G). The leadership of Chinese companies, which are promoting the standardization of 5G on a global scale, is expected to complement the formation of the Digital Silk Road. In the US, in particular, there is growing concern that China will set the international standard for 5G. Cost-competitive Chinese companies will also play active roles in the international market for 5G base stations. Not only emerging Asian and African countries but also advanced European countries may accept 5G base stations from Chinese companies. There is no international consensus on the technological and security implications of China's 5G. Thus, China is focusing on the formation of the Digital Silk Road through the expansion of the 5G standard process and the overseas installation of 5G base stations. The formation of the Digital Silk Road, backed by advanced information and communication technology, will complement China's "Belt and Road" initiative and contribute to the



China Unicom, one of the three major Chinese telecom operators, announces the launch of a 5G service for the public in 50 cities, October 2019. (Photo Imaginechina/AFLO)

The international order and institutions governing technology reflect not only the economic and security interests but also the values and norms of each country. International institutional arrangements are currently being explored in various areas such as cybersecurity, data protection, antitrust, and taxes. For example, the flow of digital data is understood to be directly linked to the economic and security interests of individual countries, and efforts are underway to create an international institution to govern the flow of digital data. The EU established the “General Data Protection Regulation (GDPR)” to protect data from a privacy perspective, while in China a domestic law (Cybersecurity Law) was enacted to allow government access to data that could affect national security, the economy, and the lives of the people. The former treats the right

to individual privacy as a fundamental value of society, while the latter positions it as a secondary consideration to social stability. In addition, there is a conflict between those who reject government control and those who place importance on the principle of national sovereignty in the governance of the Internet. The former is advocated by Western countries, while the latter is supported by China and developing countries (G77). In this way, attempts are being made to establish an international order for the management of data flow and Internet governance that have led to conflicts of norms and values concerning digital governance.

Thus, when it comes to international relations concerning technology, there are two different dimensions of competition for techno-hegemony. One is the dimension of technological supremacy, and the other is the dimension of the international order governing technology. However, these dimensions are not mutually exclusive. The powers, interests, and norms surrounding technology in the international community define the international order governing technology. At the same time, the international order and institutions

governing technology influence the power, interests, and norms surrounding technology in each country. Under these circumstances, countries are competing fiercely for techno-hegemony.

Japan now faces a difficult challenge. While Japan has its eyes on China, a large market, it values its alliance with the US as the core of its security policy. At present, however, China's political, economic, and ideological presence in the international community is increasing, while the influence of the United States is declining in relative terms. In addition, some European countries have not determined how to distance themselves from China over issues such as 5G. Countries in Asia and Oceania are also increasing their presence in the international community, and do not always maintain solidarity on these issues. While Australia and New Zealand, which are eyeing the 5G era, vowed to block Chinese participation in 2018, Papua New Guinea authorized Chinese companies to build domestic Internet cables. Many countries in Asia and Africa have adopted China's low-cost, high-performance telecommunications system.

Under these circumstances, attention has been focused on Japan's stance. Industry now has a growing interest in digital transformation (DX). The digital society enabled by advanced information and communication technology is a world where everything is connected online. Japan has strength in sensors, machine tools and robotics, which are indispensable for the Internet of Things (IOT). Japan needs to show its presence in the digital society through technological innovation. Meanwhile, in 2018 the Japanese government changed its operational policy regarding government procurement of telecommunications equipment, and in 2019 it requested private companies and organizations in charge of 14 critical infrastructure fields to refrain from procuring telecommunications equipment that might cause information leakage. It is reported that Japan's review of the Foreign Exchange and Foreign Trade Law is intended to strengthen regulations on inward FDI for security reasons. Although these measures did not directly refer to any particular country or company, it is generally understood that they are *de facto* measures to exclude Chinese companies. Japan's moves appear to align with those of the US, which has been decoupling

from China in terms of technology. However, Japan's increasing inclination toward technological decoupling from China could also mean a weakening of its technological cooperation with China. There is also a risk that Japan's technological innovation will slow down.

The international order reflects not only the power and interests of each country but also its values and norms. International competition for technological hegemony is both a race for technological superiority and a race to establish the international order governing technology. Japan will have to decide whether to build a value chain system exclusively with members of the liberal international order (LIO) or continue to cooperate and compromise with countries that aspire to other models of international order. In the world of advanced technology, Japan's position in the LIO is being watched. ■