### ♦ Competition over advanced technologies continues

As international competition continues, countries will focus on gaining and maintaining technological superiority. This is part of strengthening the economic dimension of traditional national security (national defense), and governments will pursue technological superiority by providing large-scale government support in emerging and critical technology fields, including artificial intelligence (AI), quantum computing, and biotechnology. Competition is expected to be particularly intense in acquiring and developing advanced semiconductors, especially graphic processing units (GPUs) and high bandwidth memory (HBM) essential for advanced AI. The next US administration is expected to continue to support research and development (R&D) in advanced technologies, and China will also focus on AI, space, quantum computing, and other fields as strategic industries. Support for the development of advanced key technologies in Japan is being provided under the Economic Security Promotion Act enacted in 2022. The Key and Advanced Technology R&D through Cross Community Collaboration Program ("K Program") is already underway to encourage R&D on specified critical technologies in aerospace, the seas, cyberspace and other domains designated under the Act as well as appropriate utilization of the results of such R&D. Just as research cooperation between Japan and the US is being pursued in quantum technologies, further cooperation will be undertaken between allies and like-minded parties at the R&D stage in other emerging and critical technology fields.

The protection of technologies to maintain technological superiority is also becoming increasingly important. In September 2024, the US government implemented new export control measures related to quantum computing, semiconductor-related technologies, and 3D printing, and in October announced rules restricting investment in China in the areas of semiconductors, quantum information technologies, and AI. Regulations may continue to be tightened in areas such as investment screening, export control, and research security. Efforts to protect technology have progressed in Japan as well. The Act on the Protection and Utilization of Critical Economic Security Information enacted in May 2024 enshrined into law a security clearance system. International cooperation will also be sought in the area of technology protection to increase the effectiveness of measures while guaranteeing the soundness of economic and academic activities. Partners such as Japan, the US, European countries, and South Korea will need to make concerted efforts to protect advanced technologies. Coercive measures by the next US administration to realize such international cooperation cannot be ruled out, in which case partners other than the US will need to work together to address issues.

### ♦ Rebuilding resilient and reliable supply chains

As international competition intensifies, there seem to be growing moves to restructure economies using national security logic to make these economies more secure. In the US, a series of measures to support the semiconductor industry in accordance with the CHIPS+ Act have been announced, while in Japan, attempts to reorganize semiconductor supply chains have been accelerated: the first JASM (TSMC Kumamoto) plant (12-28 nm) began operation in Kumamoto at the end of 2024 and mass production is now underway. Construction of a second plant (6-40 nm) is expected to start at the end of 2024, with operations scheduled to begin in 2027. These steps are part and parcel of the efforts being made under the Economic Security Promotion Act to ensure stable supply of designated critical products (by making

supply chains more robust). The Act also aims to reinforce supply chains for critical minerals. Support through subsidy measures is being considered and implemented for exploration and feasibility studies (FS) enabling Japanese companies to discover new promising mines, for mine development and construction of beneficiation and smelting facilities to mine and produce mineral resources, and for technology development to boost the efficiency and lower the cost of mineral resource production. It was already decided in March 2024 to provide approximately 4.9 billion yen in subsidies for Japanese and Australian companies to carry out exploration projects in Australian mines, with the aim of securing nickel and cobalt through future mine development.

International cooperation for the sake of assessment, preparedness, deterrence, and countermeasures against economic coercion through the weaponization of economic interdependence by other countries is also being considered. Efforts to monitor the implementation of China's export control measures for critical minerals and rare metals such as gallium, germanium, graphite, and antimony as well as to promote information sharing will be developed mainly by the G7, which is already playing a key role in restructuring critical mineral supply chains (mining, refining, marketing, and local value creation). Countermeasures against non-market practices and policies will also be strengthened. Responses to the problem of China's oversupply of low-cost products (mature semiconductors, electric vehicles (EVs), solar panels, etc.) will move from the consideration stage to the implementation stage. The US, the EU, Canada, and Latin American countries have already announced that they are considering/implementing studies and tariff measures in this regard, and Asian countries are following suit.

Meanwhile, China will strive to make its semiconductor industry self-sufficient by focusing on the development of lithography equipment and software to minimize the impact of US government export control measures. To this end, the China Integrated Circuit Industry Investment Fund ("Big Fund") was established in May 2024 on an unprecedented scale (approximately US$47.5 billion) to support domestic semiconductor-related companies. The Chinese are also upping the pace of de-Americanization, as evidenced by the ban on the use of products and software from some US companies. On the other hand, China has eliminated some restrictions on foreign investment in the manufacturing sector and eased market access in the telecommunications, medical, and other service industries, advertising the Chinese market as being open to the rest of the world. Such measures are expected to attract investment in key industries and foster technology absorption and industry development through technological cooperation. China also announced in May 2024 that it will be investigating chemical resin imports from Japan, the US, the EU and Taiwan in what is regarded as a countermeasure to tariffs imposed by the US, Europe, and other countries.

### ♦ Recommendations

- Continued focus should be placed on developing and fostering advanced technologies. Japan in particular should develop its strengths in emerging and critical technologies such as optical semiconductors and quantum computing, while exploring collaboration with allies and like-minded parties.
- Companies and other parties need to accelerate their preparations before the security clearance system becomes operational in 2025. Gaps among companies will undermine the effectiveness of the system and so should be minimized as much as possible. Information sharing among industry, government,

and academia is needed for this purpose.

- Vulnerabilities in cross-border supply chains should be identified and bottlenecks eliminated through the development of alternative suppliers and technological breakthroughs. Cooperation with allies, like-minded parties and other partners should be pursued not only to re-use already closed mines but also to develop technologies to recover and reclaim urban mines (e-scrap).
- As progress is made in rebuilding resilient and reliable supply chains, consistency with free-trade principles becomes an issue. Security for economies (and economic systems) is itself now recognized as essential. Security and stability are being emphasized in addition to profitability and efficiency based on economic rationality as preconditions for economic activities. Against this backdrop, it will be necessary to reconcile international rules and regulations based on traditional free-trade principles with the principles on which economic security depends in an era of international competition as well as establish trade regimes accordingly. In doing so, Japan must lead international discussions and rule-making that will win the support of a majority of the international community through cooperation among industry, government, and academia.

(November 28, 2024, Yoshiaki Takayama,
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