ECONOMY, CULTURE & HISTORY
Japan SPOTLIGHT®
Bimonthly
November/December 2026

New Technologies & Industrial Policy to Foster Global Prosperity



Published since January 1982
by Japan Economic Foundation (JEF)
https://www.jef.or.jp/journal/

Economy, Culture & History
Japan SPOTLIGHT Bimonthly
November/December 2026 (ISSUE 270)
VOLUME 45 NO. 6
ISSN 1348-9216

Economy, Culture & History
Japan SPOTLIGHT
Bimonthly
November/December 2026 (ISSUE 270) VOLUME 45 No.6

New Technologies & Industrial Policy to Foster Global Prosperity



CONTENTS

1 PUBLISHER'S NOTE
Geopolitics & AI Challenge Global Order & Growth
By Hideichi Okada

2 EXCLUSIVE INTERVIEW - LEADERS IN JAPAN (No. 17)
Vice Chair, Keidanren (Japan Business Federation) Yumiko Noda
Leading a Circular Economy That Supports Economic Security, the Environment & the Economy
By Naoyuki Haraoka

8 COVER LEAD
New Technologies & Industrial Policy to Foster Global Prosperity
By Haruhisa Somaya

10 COVER STORY

55 SPECIAL ARTICLE
The Transformation of the International Order Driven by Resources (Part II) – The Rare Earths War: US-China Rivalry & the Age of Resource Blocs
By Guo Sizhi

58 CULTURE
Concept Shop Touhenboku: Transcending Wholesalers
By Mukesh Williams

63 BOOK REVIEW
INDONESIA, The Beautiful Archipelago
By Biren Nanda

64 STUDENT VIEW
From Policy to Classroom: J-FLEC & the Distance Japan Still Has to Cover
By Arihant Lodha

66 ECONOMIC INDICATORS FOR JAPAN
Slowdown in Inbound Demand
By Nobuo Iizuka

NEXT ISSUE

The amount spent in Japan by inbound visitors has continued to increase in recent years, and this robust consumption has become important for Japan's industries and economy. When travelers come to like Japan through exciting experiences, international understanding also deepens. At the same time, responding to issues such as overtourism caused by the rapid rise in inbound travel has become increasingly important. The Jan./Feb. 2027 cover story, "Progress and Challenges in Japan's Inbound Tourism Economy", will examine these current developments and emerging issues. The issue will be published on our website on Jan. 10, 2027.

COVER STORY

New Technologies & Industrial Policy to Foster Global Prosperity

10 **1 Roundtable on Building a Strong & Prosperous Japan Through Technological Innovation & Industrial Policy (Oct. 6, 2026)**
By *Japan SPOTLIGHT*

21 **2 Japan's Growth Strategy & Fiscal Sustainability**
By Keiichiro Kobayashi

25 **3 Building a More Resilient Japan: Supply Chains, Industrial Policy & the Global South**
By Yasuyuki Todo

31 **4 Japan's Science, Technology & Innovation Strategy: Strategic Prioritization, Open Science & Economic Security**
By Kazuyuki Motohashi

36 **5 Maintaining Competitive Neutrality Through International Coordination of Industrial Policy: Lessons from China's Electric Vehicle Policy**
By Mariko Watanabe

42 **6** Interview with economist and politician Philip M. A. Hoffmann, MdB (Mitglied des Bundestages), Member of the German Parliament
Market Excels Bureaucracy in Stabilizing the Economy Against Geopolitical Risks
By *Japan SPOTLIGHT*

47 **7** Interview with Dr. Alberto Prina Cerai, Research Fellow at the Italian Institute for International Political Studies (ISPI)
Industrial Policy Coordination Needed in Struggle for Economic Security Between EU & Japan
By *Japan SPOTLIGHT*

51 **8** Interview with Environmental Economist Brilé Anderson & Senior Economist Antoine Dechezleprêtre, OECD
The New Era of Industrial Policy
By *Japan SPOTLIGHT*

Publication date: November 10, 2026 (Published on the 10th of every odd month)
Publisher: Hideichi Okada, Chairman & CEO, Japan Economic Foundation (JEF)
Editor-in-chief: Haruhisa Somaya
Editorial Staff: Masako Watanabe, Kimie Teruya
Design: PRITECH Co., Ltd.
https://www.jef.or.jp/journal/

Copyright ©1982-2026 Japan Economic Foundation. All rights reserved.
Materials may not be reproduced without written permission.

The opinions expressed in the articles published in *Japan SPOTLIGHT* are those of the authors and do not necessarily reflect the views of the Japan Economic Foundation, which is not sponsored by and does not sponsor or support any particular political or religious organization.

Geopolitics & AI Challenge Global Order & Growth

By Hideichi Okada

Prime Minister Sanae Takaichi started her policy speech at the Diet on Oct. 5, 2026 with the following remark: "The world is now in the midst of a transformation of the international order. Countries are competing with massive, long-term industrial policies, and inter-state competition over advanced technology, human resources, and investment is intensifying more than ever before."

While there may be various opinions on the economic policies of the Takaichi Cabinet, I believe many people would agree with this initial assessment of the current situation.

The postwar Bretton Woods system, established under the leadership of the United States, is currently facing a major turning point. The rules-based free trade system is now being challenged by various countries. Some of the international organizations founded after World War II are also facing challenges from major powers. Actions backed by force by highly influential nations have become frequent, and there are even rising concerns that the international community may be turning into a place ruled by the law of the jungle.

In early October, the *Financial Times* published an article titled "The New Great Game", comparing the September US-China summit in Washington and recent bilateral relations to the 19th-20th-century geopolitical rivalry between the British Empire and Imperial Russia. This historical "Great Game" spanned approximately a century of conflict between the two empires over a vast region that included Afghanistan, Central Asia and the Caucasus, drawing in numerous surrounding nations. The article pointed out that the postwar international order established under American leadership has begun to transform significantly within an international political and economic landscape confronted by new geopolitical dynamics, including the expansion of China's national power.

Since the 1980s, neoliberal policies have driven the growth of a global trade and investment system focused on deregulation, free trade, and market forces. Today, however, this system is also facing strong pressure to change.

Another major factor disrupting the global order recently is the emergence of generative AI and the rapid development of artificial intelligence. It is analyzed that within the next few years, many occupations will be replaced by AI, drastically transforming global finance, trade, investment systems, and people's daily lives. Concerns about AI-driven cybersecurity threads have also materialized. Eventually, this impact is expected to extend to international trade and the global economic order.

How should we handle this situation?

For the development of the economy, trade, and investment, it is essential for companies to continue their active operations. For enterprises, crucial elements are whether they can secure a certain level of predictability regarding the future and whether their free business activities are guaranteed. In this respect, maintaining a rules-based framework for free trade and investment is necessary.

Following her initial assessment of the current situation in her Diet speech, Prime Minister Takaichi continued: "Japan ... will resolutely defend a free and open international order based on the rule of law, ... and will boldly advance 'crisis management investment' ... and 'growth investment'. By doing so, we will realize robust and sustainable economic growth."

No matter what geopolitical changes occur, continued investment in growth by every nation remains essential for global economic development. The key will be driving new investments through the advancement of science and technology and the pursuit of innovation. The traditional belief in neoliberal deregulation and keeping governments out of the market has shifted. Today, countries are actively competing in industrial promotion, backed by massive government subsidies and incentives.

In an environment of rapid AI development, the driving forces of economic growth may take a different form than before. Furthermore, the development and widespread adoption of AI are expected to reshape the global economy, trade, and even political frameworks.

We might be at the very forefront of creating a new framework for trade, the economy, and global politics, facing new challenges like geopolitical changes and the rise and spread of AI. To build a peaceful and prosperous world and an inclusive society instead of a divided one, each of us must take action with the awareness that our individual efforts will contribute to forging this new framework as we confront the challenges before us. JS

Hideichi Okada became chairman & CEO of the Japan Economic Foundation (JEF) in July 2026. Previously, he was president & CEO of Japan Petroleum Exploration Co. Ltd., executive senior vice president of NEC, and vice minister for international affairs at the Ministry of Economy, Trade and Industry. He also served as executive assistant to Prime Minister Junichiro Koizumi.

Exclusive Interview

LEADERS IN JAPAN

No. 17

Vice Chair, Keidanren (Japan Business Federation)
Yumiko Noda



Leading a Circular Economy That Supports Economic Security, the Environment & the Economy

By Naoyuki Haraoka

In our Leaders Interview for this issue, we spoke with Keidanren Vice Chair Yumiko Noda, who compiled the federation's policy proposals on the circular economy.

With rising geopolitical risks, we asked Ms. Noda, who plays a key role in steering Japan's economy, about the circular economy, which is expected to help address three major challenges: securing resources and energy, dealing with environmental constraints, and achieving economic growth.

(Sept. 30, 2026)

Significance of the Circular Economy

Haraoka: You have played a leading role at Keidanren in formulating policy proposals on the circular economy, which have been submitted to the Japanese government.

To begin with, I would like to ask about the significance of the circular economy. Given the current geopolitical situation, the oil supply crisis surrounding the Strait of Hormuz has drawn attention to the importance of the circular economy from a national security perspective. While this is certainly an important aspect, could you explain the broader implications of the circular economy, including its wider economic and environmental positive impacts?

Noda: The tightening of China's export controls on rare earths and the instability in crude oil supplies through the Strait of Hormuz since the beginning of this year pose serious risks for Japan, which relies heavily on overseas sources for its natural resources. In particular, any disruption to the supply of critical mineral resources, including rare earths, would jeopardize Japan's high-tech industries, from automobiles and wind power equipment essential to the green transformation (GX), to medical devices, defense equipment, and semiconductors. Manufacturing simply cannot be sustainable without raw materials.

Disruptions to supply chains can have a profound impact on business operations. Against this backdrop, the utilization of "urban mines" is attracting growing attention. The circular economy is now attracting considerable attention as a key solution to securing resources, for example, by extracting raw materials from end-of-life products through recycling technologies and reusing them as secondary resources.

Originally, the significance of the circular economy lay in addressing environmental challenges. In October 2020, Japan declared its commitment to achieving carbon neutrality by 2050. Achieving this goal, however, requires a multifaceted approach. One key component is GX, which involves transitioning to energy sources that do not emit greenhouse gases (GHGs), such as renewable energy and nuclear power. However, the energy transition alone will not be sufficient to achieve carbon neutrality. Approximately half of the emissions reductions needed to achieve net zero can be achieved through the energy transitionthe, while the other half is considered to require a fundamental transformation in the way industries and products are designed, manufactured, consumed, and disposed of. Without shifting away from the conventional economic structure that

relies on primary and natural resources, achieving carbon neutrality will be extremely difficult.

Given all this, Japan gradually came to recognize the need for a circular economy alongside GX. In 2021, in my capacity as chair of Keidanren's Committee on the Environment, I reached an agreement with then Environment Minister Shinjiro Koizumi that Keidanren and the Ministry of the Environment would work together to promote the circular economy. This marked a groundbreaking turning point. Until then, environmental measures had often been viewed by businesses as constraints. For the first time, the public and private sectors joined forces to address these challenges.

As I explained, efforts to promote the circular economy initially began as part of environmental measures, particularly those aimed at achieving carbon neutrality. However, following Russia's invasion of Ukraine in 2022, the importance of securing a stable supply of resources grew significantly. In February 2023, Keidanren issued its Proposal for Realizing a Circular Economy, calling for the promotion of a circular economy from the perspective of linking efforts to secure resources and reduce environmental impacts with strengthening corporate competitiveness and advancing growth strategies.

Furthermore, in November 2023, Keidanren dispatched its first fact-finding mission to Europe to observe firsthand the region's advanced circular economy initiatives. This experience deepened the recognition among Japanese companies that they, too, should promote the circular economy to reduce resource and environmental constraints.

Europe, too, faces geopolitical and security challenges, including those arising from the Greenland issue. Accordingly, Keidanren organized its second mission to Europe in January 2026, with 37 participants representing 22 companies and organizations visiting Finland and Germany. Through exchanges of views with policymakers, ministers, and business leaders, the mission sought to gain a deeper understanding of the latest developments and emerging trends of the circular economy in Europe.

The mission returned to Japan with a strong sense of urgency, recognizing that Japan needed to swiftly reflect these developments in its policymaking and take concrete measures. Keidanren immediately began formulating a set of proposals. Following approval by Keidanren's Policy Board on March 17, the proposals were submitted to the Ministry of Economy, Trade and Industry and the Ministry of the Environment. As an island nation with limited natural resources, Japan has developed on the strength of its manufacturing industries. It therefore needs to strengthen its resource security measures through a circular economy on a national scale, even more so than Europe. Accordingly, Keidanren has proposed measures to the government to promote the strategic use of secondary resources, in addition to securing primary resources.

In response to these proposals, the Japanese government announced its Circular Economy Action Plan in April. In June, the importance of the circular economy was also incorporated into the Basic Policy on Economic and Fiscal Management and Reform. Furthermore, measures to promote the circular economy were incorporated into the budgetary requests for the following fiscal year.

Haraoka: What about from the perspective of economic growth?

Noda: An economic structure that relies on primary resources will eventually face supply chain disruptions, making it impossible not only to manufacture products but also to sustain economic growth. Rather than driving growth, such disruptions could lead to an economic slowdown. To break free from these constraints and achieve sustainable growth, it is essential to establish production systems that make use of secondary resources, or recycled materials. I believe this is a key solution, and it is the first point I would like to emphasize.

Companies, too, are beginning to recognize that the mass production and mass consumption model is unsustainable. As resource supply disruptions can bring manufacturing to a halt, businesses are increasingly coming to understand that they cannot expect to achieve growth unless they fundamentally transform their manufacturing practices and production systems into circular ones.

Furthermore, digital technologies are essential to realizing a circular economy. Traceability systems are needed to connect the "veins" and "arteries" of the economy by identifying where waste is generated and where it is needed as a resource. To accurately track how resources contained in products circulate throughout the processes of production, consumption, and disposal, and to recover critical minerals and return them to the production system, digital tracking is indispensable. As a result, new platforms for managing digital traceability are emerging one after another.

In the venous industry, waste management operators have traditionally focused on treating waste appropriately while minimizing environmental impacts and promoting recycling to reduce the volume of waste sent to final disposal. Going forward, however, they will need to transition to new business models that recover more resources from waste and return them to the production system. In other words, the industry must transform from conventional waste treatment into resource recovery. This transformation is expected to create added value and contribute to economic growth.

Corporate revenue models are also changing. Companies are shifting away from the traditional model of making a profit by selling products toward a model in which they lease products to customers, retain ownership, and earn revenue from usage fees. By enabling customers to use products over the long term and generating revenue in return, companies can move away from one-time sales toward a steady stream of income over an extended period. There is also potential to increase revenue by encouraging customers to use high-quality products for longer, opening up new pathways to economic growth.

Encountering the Circular Economy

Haraoka: Had you been interested in the circular economy and working on related issues for quite some time?

Noda: I previously served as deputy mayor of Yokohama. In 2000, the Basic Act for Establishing a Sound Material-Cycle Society introduced the 3R (reduce, reuse, and recycle) framework, and Japan began implementing policies to promote waste reduction and recycling. In this context, Yokohama became one of the leading municipalities in Japan in advancing the 3Rs.

When I took office as deputy mayor in 2007, Yokohama's population was still growing. Nevertheless, we set a highly ambitious target of reducing the amount of waste by 30%. Specifically, we asked residents to sort their waste into 15 categories, recycle all materials that could be recovered, and reduce the amount of waste sent for final disposal by 30%.

Initially, many residents expressed concerns that sorting waste into 15 categories would be too burdensome. However, through environmental education programs in elementary schools and sustained public awareness campaigns, we ultimately succeeded in reducing the amount of waste by as much as 40%. This was a pioneering initiative by international standards, and it was even recognized with an award from the World Bank.

Following my experience in Yokohama, I became president and representative of Veolia Japan GK in 2017. As Veolia is a European company, I had a firsthand view of how the European Union rapidly developed and implemented a series of measures to promote the circular economy following the launch of its Circular Economy Action Plan in 2015. I became keenly interested in the differences between the 3R initiatives that Yokohama and Japan had previously pursued and the circular economy approach that emerged in Europe.

The European circular economy aims to do more than simply reduce the amount of waste sent to landfills. Its goal is to recover waste and make it available for reuse as a resource. As the global population grows toward 10 billion while primary resources, or natural resources, become increasingly depleted, securing a stable supply of resources is becoming a critical challenge.

For this reason, the EU began considering how to secure resources within its own borders as early as 2015. Recognizing the importance of utilizing secondary resources, it has strategically advanced policies to promote the circular economy. Japan, by contrast, has succeeded in reducing the amount of waste it generates, but its underlying dependence on natural resources remains unchanged. Although Japan has made efforts to manufacture products from primary resources and to recycle waste or recover energy from it as much as possible, rather than simply incinerating it or disposing of it in landfills, efforts to close the resource loop by recovering materials and reusing them in new products as secondary resources remain a work in progress. Japan needs to move away from its current reliance solely on primary resources, such as rare earth elements imported from China and crude oil transported through the Strait of Hormuz.

In Japan, the amount of waste requiring final disposal, including landfill, has been kept under control through recycling and energy recovery from waste incineration. However, the essence of the circular economy that Europe is striving to achieve lies in recovering resources in a form that allows them to be reused in products and ensuring that the materials needed for manufacturing are properly recovered and recycled.

To promote a broader understanding of this concept, I have introduced Europe's circular economy initiatives at committee meetings and advisory councils organized by Keidanren or METI. Japan has accumulated valuable expertise in the 3Rs, and Yokohama's experience has been particularly noteworthy. The major challenge ahead is to build on this knowledge and experience and take Japan's 3R initiatives to the next level by evolving them into a circular economy. I have devoted considerable effort to helping make this transition a reality.

The Two Study Missions to Europe

Haraoka: The Netherlands was selected as the destination for the November 2023 mission to Europe, while Finland and Germany were chosen for the January 2026 mission. Could you explain the reasons for selecting each of these countries?

Noda: On Nov. 27, 2023, Keidanren dispatched its first fact-finding mission to Europe. On that occasion, we visited the European Commission and the Netherlands. We chose the European Commission and the Netherlands because the Netherlands is one of the most advanced countries in Europe in terms of the circular economy. The Dutch government aims to achieve a fully circular economy by 2050. In other words, it has set a highly ambitious goal of building an economy in which waste is eliminated and resources circulate in a closed loop.

Against this backdrop, a growing number of startups focusing on the circular economy are emerging in the Netherlands. One of the best-known is Fairphone. The company manufactures environmentally friendly, ethically designed smartphones that allow users to replace only the components they need to. For example, if users want to upgrade their camera or if their battery no longer holds a charge well, they can replace just the camera module or the battery, much as they would with a computer. Similarly, if the glass on the screen becomes scratched, they can replace only the glass rather than the entire display assembly.

The Netherlands has the world's highest per capita consumption of jeans. However, jeans production poses significant environmental and social challenges, including child labor and water pollution. To address these issues, numerous entrepreneurs are emerging who restore worn-out jeans or upcycle them into other products, such as bags. In addition, a growing number of companies are developing innovative circular business models, such as refurbishing discarded bicycles and transforming them into attractive, redesigned products

rather than letting them go to waste.

During Keidanren's second fact-finding mission to Europe in 2026, we visited Germany and Finland. Like Japan, Germany is a manufacturing powerhouse, with the automotive industry playing a central role in its economy. Given the growing importance of economic security, it is crucial for Japanese companies to understand the measures Germany is taking, particularly the business strategies being pursued by German automakers.

In Germany, we exchanged views with the Federation of German Industries (BDI), Keidanren's counterpart. We also spoke with BMW's head of sustainability and learned that the company regards manufacturing vehicles using secondary resources and recycled materials as a key strategic priority. We also visited a vehicle dismantling facility and saw firsthand how much effort BMW is putting into recovering parts and rare earths from end-of-life vehicles and reusing them as materials for new cars.

Finland is a relatively small country, but 78% of its land area is covered by forests, giving it abundant forest resources, much like Japan. An important issue in Finland is how to manage and circulate these forest resources sustainably. The Finnish government also plays an active role in education and public awareness initiatives to promote the circular economy. We had valuable discussions on how to help consumers understand the importance and significance of the circular economy, gaining insights that could be highly relevant for Japan.

Haraoka: Changing the subject, I get the impression that the United States is not particularly interested in the circular economy.

Noda: Environmental policies vary from state to state in the US, and some states are actively promoting the circular economy. However, there is not yet a unified policy at the federal level. One distinctive feature of the US, however, is that initiatives are largely driven by the private sector. Global companies, particularly Apple and Microsoft, place strong requirements on their entire supply chains to adopt greener and more circular practices.

These developments have a significant impact on Japanese companies, as many of them, including materials manufacturers, are part of the supply chains of these global corporations. For example, companies supplying components to Apple are required to manufacture them using renewable energy. They must also ensure that their products contain a certain minimum proportion of recycled materials.

Regardless of government policy, US global corporations are taking it upon themselves to ensure that their operations are circular, ethical, and green. They are actively working to secure zero-carbon power sources, including by investing in the development of nuclear power plants to ensure a stable electricity supply. They are also increasing their use of secondary resources for critical minerals and seeking to establish sustainable resource procurement practices.

These developments among US companies present both a significant challenge and a new business opportunity for Japanese companies. In this way, embracing the circular economy has become essential for companies seeking to participate in global supply chains.



Measures to Achieve a Circular Economy

Haraoka: There are various measures that can be taken to achieve a circular economy, both in the short term and in the long term. What would you consider the most important measures in each category?

Noda: Since the Industrial Revolution, we have taken an era of mass production, mass consumption, and mass disposal for granted. We have become accustomed to a throwaway culture, giving little thought to what happens to waste after we discard it, and have acted as though this system could continue indefinitely. Businesses, too, have grown within the 20th-century paradigm that the more they sell, the more they grow. As a result, they have rarely challenged the assumption that this economic model can continue without being questioned.

That is why the transition to a fully circular economic system is such an enormous challenge. It is not something that can be accomplished in a year or two. I doubt that we will have fully achieved it even by 2050. Transforming an economic system that has been in place for more than a century into a fully circular one, in which all materials are reused, is an ambitious, long-term undertaking – one that I believe will take a century to accomplish.

Nevertheless, we must begin this transformation immediately. Otherwise, we risk leaving future generations to bear the consequences of our inaction. Japan, in particular, is a country with limited natural resources. As the security environment deteriorates, Japan more than any other country must take this issue seriously and implement concrete measures. If we fail to do so, Japan could truly become a country that can no longer manufacture the products it needs.

What particularly concerns me is that China is beginning to ramp up its production of secondary resources. If China starts to control

the supply of these resources, Japan could find itself in a position where it has no choice but to import them from China. For example, if the EU introduces regulations prohibiting the purchase of products that do not contain recycled materials, Japan could be forced to import secondary resources from China to meet those requirements.

One of the most urgent priorities is to develop technologies for efficiently recovering rare earths from urban mines. I believe that unless we address this issue as soon as possible, we could find ourselves in an extremely difficult situation.

Furthermore, product design that allows products to be disassembled so that their raw materials can be recovered and reused is also important. Traditionally, manufacturing has relied on strong adhesives and multilayer films. While these technologies have been essential for ensuring food safety and preserving product quality, they also make recycling more difficult. From a circular economy perspective, packaging materials need to be made from a single material. However, this can involve trade-offs with safety and durability. To overcome this challenge, it is essential to develop new packaging materials and other materials that are recyclable while also offering high levels of safety and durability.

Unless products are designed to be disassembled and their materials separated by type, we will not be able to recover the rare metals hidden in urban mines. Infineon Technologies AG, a German power semiconductor manufacturer that was spun off from Siemens, is working with startups to develop technologies for separating precious metals from semiconductor substrates. I believe that Japanese companies, too, would need to start addressing these challenges now by rethinking product design and materials and innovating their manufacturing processes.

Now is the time to fundamentally rethink our approach to manufacturing and accelerate the transition to a circular society. At the same time, this presents an opportunity for Japan to take a global leadership role in this field.

Haraoka: Your proposals include "Improve environmentally conscious design for products, etc. at the manufacturing stage", which is a short-term measure, and "Improve the recycled resource supply system to facilitate stable supply of resources and a more resilient supply chain", which is a considerably more medium- to long-term measure.

Noda: Yes. We would need a medium- to long-term measure. However, it is extremely important to address and change the current situation in which valuable waste materials from Japan are being illegally shipped overseas. We must tackle this issue seriously and establish a system to ensure that materials with the potential to become secondary resources are retained and recovered within Japan.

A major challenge today is how to secure domestically the valuable materials contained in products consumed in Japan. At the very least, we must take effective measures to prevent their illegal outflow. In this regard, the Ministry of the Environment is actively engaging with local governments and working to strengthen regulations. This important perspective is also reflected in our proposals.

Haraoka: Another major challenge is that as this is a global issue, so efforts by Japan alone, or by any single country, will not be enough. I believe that determining how to promote international cooperation is a very difficult challenge.

Noda: That is an important point as well. It would be difficult to establish a circular economy system that operates entirely within Japan. Rather, I believe we should work with Southeast Asian countries to develop a model in which resources circulate throughout the region as a whole.

Currently, many products that have been used in Japan, including secondhand trains and automobiles, are exported to Southeast Asia and reused there. By building on these existing flows of secondhand goods, I believe a more realistic and effective approach would be to establish a circular economy system jointly with Southeast Asian countries, rather than pursuing one independently in Japan.

Within the framework of the Asia Zero Emission Community (AZEC), which Keidanren is promoting, we could also consider incorporating a circular economy perspective alongside decarbonization and developing a system to circulate resources within the Asian region.

While China is actively promoting the circular economy, Southeast Asian countries such as Thailand and Vietnam are also beginning to pursue similar initiatives. However, these countries still lack sufficient recycling expertise and technology. If Japan could share its advanced recycling technologies and expertise with these countries and work together to establish new systems for producing secondary resources, this could open up significant new opportunities.

Haraoka: A circular economy might be relatively easy to achieve in small communities. This makes me wonder whether promoting decentralization and implementing circular economy systems within smaller communities could be a fairly easy way forward. What do you think?

Noda: I believe this is actually a very important point. Although it is not addressed in great detail in our proposals, when I served on a committee at METI, I advocated the importance of enhancing well-being through the circular economy and the idea that resource circulation within smaller loops is preferable. To preserve the value of resources, circulation within small communities should be the starting point.

Within a small community, it is more efficient to create small-scale circular systems. For example, items that are no longer new but are still usable can be passed on to other members of the community. Similarly, food waste generated in the community can be composted and used as fertilizer to grow crops, which can then be consumed

locally.

In a circular economy, the general principle is that the smaller the loop, the better. However, when it comes to circulating mineral resources such as aluminum, iron, and rare earths, the volume of these materials contained in waste generated by small communities may be too limited to make recovery viable. In such cases, it may be necessary to collect these materials in larger urban areas to take advantage of economies of scale and recover them by using advanced technologies. The appropriate scale for resource circulation varies by sector. As a general principle, however, it is preferable to keep resources and products circulating within local communities, preserving their value and reusing them without changing their form whenever possible. I believe that initiatives such as sharing and repair within local communities can foster a wide range of connections among people in the community.

Furthermore, I believe these connections can also contribute to improved well-being. Ideally, a circular economy creates small loops that foster a sense of community and strengthen social relations. As the area becomes more attractive, young people are drawn to it and start new businesses, such as cafés and local craft breweries, bringing greater vibrancy to the community. This is also an important perspective from the standpoint of regional revitalization.

Proposals to the Japanese Government

Haraoka: You have submitted the policy proposal to the Japanese government. Are there any particular measures that you would especially like the government to implement?

Noda: I strongly urge the government to take the lead by purchasing circular products itself. Government expenditure accounts for 18.6% of GDP. Unless the government takes initiative in leading a circular economy and gives priority to purchasing circular products, businesses are unlikely to make significant progress in investing in circular technologies or advancing their own circular economy engagement. It is extremely important for the government to prioritize circular products in its procurement, even if they are somewhat more expensive than conventional alternatives.

The Netherlands is actively promoting circular public procurement. In particular, Amsterdam has introduced a system under which companies are not eligible to bid for public infrastructure projects unless their proposals meet circularity requirements. I strongly urge the Japanese government to introduce similar measures, obliging the private sector participating in a public project to choose circular solutionsor recommend them to prioritize those solutions whenever public authorities take the initiative in commissioning projects or determining specifications.In Japan, we would also like the government to consider introducing measures that give preference to circular products and solutions when public-sector entities take the lead in procurement and specification-setting.

Haraoka: It seems to me that the focus on security has perhaps become too dominant. After all, the circular economy is generally understood to be more about decentralization, strengthening communities, and enhancing well-being. In putting these recommendations together, were there any particular challenges you faced, or aspects that you would have liked to emphasize more strongly?

Noda: From the perspective of regional economy revitalization, our aim is to establish circular economy systems within local communities to enhance local well-being. We hope that these initiatives will, in turn, encourage the emergence of startups and stimulate local economic activity.

Haraoka: I get the impression that European companies recognize that enhancing people's well-being can also generate revenue. It would be good to see more companies adopting this kind of approach, wouldn't it?

Noda: I sincerely hope so, too.

Follow-up on the Proposals

Haraoka: Finally, how do you plan to follow up on these proposals?

Noda: I feel that we have just begun to take action. The proposals have already been reflected in the budget requests for the next fiscal year, and I hope to see them adopted for actual budget allocations and businesses begin taking concrete steps toward a circular economy. It is encouraging to see companies that once asked about a circular economy, responding with the question "What exactly is a circular economy?", now saying, "We are working hard to put it into practice." The fact that the circular economy is becoming a core management priority for businesses is remarkable. I almost feel as though we have entered a completely new era. I believe that when Japanese companies are truly committed to something, they work steadily and persistently, and they can undoubtedly become global leaders. I look forward to seeing what they accomplish in the years ahead. If further action proves necessary, we will consider what steps to take next.

Haraoka: Thank you very much for taking time to speak with us despite your busy schedule. JS

Written and translated by Naoyuki Haraoka, advisor to the Japan Economic Foundation, with the cooperation of Tape Rewrite Co.

New Technologies & Industrial Policy to Foster Global Prosperity

By Haruhisa Somaya



In July 2026, the government of Japan formulated the "Japan Growth Strategy" – a new framework for industrial policy. The strategy aims to build a strong and prosperous Japan by adopting bold and flexible policy approaches under the concept of "responsible proactive fiscal management", mobilizing private investment, strengthening supply capacity and earning power, and thereby achieving economic growth.

Under the Japan Growth Strategy, more than 370 trillion yen in combined public–private investment is envisaged by FY2040 for 62 products and technologies across 17 strategic fields, including AI and semiconductors. The government estimates that this investment will generate economic effects amounting to approximately 1,100 trillion yen in nominal GDP. Public and private investment consists of two pillars: "crisis-management investment" to minimize various risks, including those related to national security, and "growth investment" to accelerate the development of advanced technologies.

The government positions science, technology, and innovation – drivers of economic growth in implementing the Japan Growth Strategy, and essential elements of national security – as areas where innovation will be generated based on the Basic Plan for Science, Technology and Innovation. The plan develops policies and measures along the following six pillars:

1. Revitalizing science, including the creation of new research domains;
2. Strategic prioritization of technological fields aligned with the 17 areas of the Japan Growth Strategy;
3. Organic linkage between science & technology and national security, including the development and deployment of dual-use technologies through industry–government–academia collaboration;
4. Advancement of the innovation ecosystem to promote social implementation of R&D outcomes;
5. Promotion of strategic science and technology diplomacy, including strengthened cooperation with allied nations in critical technology fields;
6. Reform of innovation promotion systems and governance, including expansion of public and private R&D investment.

Today, many countries are deploying new industrial policies involving massive fiscal expenditures and powerful tax and financial measures to promote national economic and industrial development, strengthen competitiveness, enhance economic security, and advance GX and resource circularity. Behind this trend lie public and strategic challenges that cannot be addressed by corporate efforts alone – US-China rivalry, supply chain disruption, securing energy, food, and critical minerals, climate change, the transition to a circular economy, and the digital/AI revolution.

In academia, since the 1980s, trust in market mechanisms grew amid liberalization and deregulation, and neoliberal thinking became dominant worldwide. Industrial policy was often viewed critically as generating inefficiency, distorting competition, and



slowing adaptation to technological change. Today, however, this evaluation is shifting, and reassessments of industrial policy are increasingly seen in academic analyses and reports by international organizations.

Considering Japan's new industrial policy and the recent developments surrounding industrial policy, the theme of this issue's cover story in *Japan SPOTLIGHT* is "New Technologies & Industrial Policy to Foster Global Prosperity." In the roundtable discussion moderated by JEF Chairman Hideichi Okada, leading experts in industrial policy and national security – Prof. Emeritus Naoyuki Yoshino of Keio University, Prof. Hiroaki Miyamoto of the Institute of Economic Research at Hitotsubashi University, and Executive Director Nobukatsu Kanehara of the Sasakawa Peace Foundation – discuss what industrial policies Japan should pursue, including those related to national security, to build a strong and prosperous nation.

Prof. Keiichiro Kobayashi of Keio University and Prof. Yasuyuki Todo of Waseda University discuss the Japanese government's industrial policy, including the Japan Growth Strategy. Prof. Kazuyuki Motohashi of the University of Tokyo addresses Japan's science, technology, and innovation strategy, offering assessments and identifying challenges, and Prof. Mariko Watanabe of Gakushuin University examines the use of trade rules to restrain the abuse of power by major countries with dominant industrial supply capabilities in the global economy.

Japan SPOTLIGHT also conducted three Interviews with international experts: Philip M. A. Hoffmann, economist and politician, and the member of the German Parliament, shares his views on innovation and industrial policy; Dr. Alberto Prina Cerai of ISPI (Italian Institute for International Political Studies) offers insights on industrial policy cooperation for economic security in critical mineral supply chains; and Brilé Anderson & Antoine Dechezleprêtre of the OECD, authors of the report *Industrial Policy Spending across 20 Countries: What governments actually fund*, discuss the report's findings and their perspectives on desirable approaches to industrial policy.

We hope that this special feature contributes to deeper discussions on Japan's innovation and industrial policies, as well as global industrial policy debates, and ultimately supports global prosperity through more robust policy formation.

Haruhisa Somaya is editor-in-chief of *Japan SPOTLIGHT* & executive managing director of the Japan Economic Foundation (JEF).

Roundtable on Building a Strong & Prosperous Japan Through Technological Innovation & Industrial Policy (Oct. 6, 2026)

By *Japan SPOTLIGHT*

Participants: Dr. Naoyuki Yoshino, emeritus professor, Keio University / specially appointed professor, Tokyo Metropolitan University
Dr. Hiroaki Miyamoto, professor, Institute of Economic Research, Hitotsubashi University
Nobukatsu Kanehara, executive director of the Sasakawa Peace Foundation
Moderator: Hideichi Okada, chairman & CEO, Japan Economic Foundation (JEF)

Participants



Dr. Naoyuki Yoshino



Dr. Hiroaki Miyamoto



Nobukatsu Kanehara



Hideichi Okada

Abstract of Discussion

- Adapting to an aging society and emerging technologies such as digital transformation (DX), AI, and robotics; developing a national grand design; and implementing reforms in labor markets, business processes, organizational structures, and education across both the public and private sectors are essential to enhancing Japan's productivity and prosperity.
- AI and DX can enable older people to remain in the workforce, while fostering complementary roles for younger and older workers can enhance Japan's productivity.
- As the importance of national security grows amid an increasingly complex geopolitical environment, Japan should mobilize the collective capabilities of the entire nation – including the government, industry, financial sector, and academia – to strengthen national security.
- It is essential for Japan to integrate its science and technology policies with its national security policies and pursue strategic support and industrial policies, including R&D subsidies and government procurement, to promote the development of dual-use technologies such as AI and drones that support national security.

Introduction

Okada: Today, Russia's invasion of Ukraine, the US and Israeli attacks on Iran, and economic coercion by certain countries are contributing to the fragmentation of global supply chains and posing threats to the stable supply of energy, food, and critical minerals. At the same time, global challenges such as addressing climate change, transitioning to a circular economy, and navigating the digital and AI revolutions are becoming increasingly pressing. Japan must respond to these challenges in an appropriate and effective manner.

These threats and challenges cannot be adequately addressed through the efforts of individual companies alone. They are, in essence, public-interest and strategic issues. In response, many countries are now pursuing a new form of industrial policy, leveraging massive public spending, robust tax incentives, and financial measures to promote their national economies and industries, strengthen economic security, and advance green transformation (GX) and resource circularity.

Since the 1980s, confidence in market mechanisms has grown, and neoliberal thinking has become mainstream worldwide amid the

spread of liberalization and deregulation. Against this backdrop, industrial policy – whereby governments selectively support specific industries or technologies – has tended to be viewed critically on the grounds that it creates inefficiencies, distorts competition, and delays adaptation to technological change.

However, this perception is changing today, and industrial policy is increasingly being reassessed in analyses by various international organizations and in academic circles. The United States and the European Union are also implementing strong government support measures to enhance the competitiveness of their domestic industries, as exemplified by the US CHIPS Act, the EU's Draghi Report, and the proposed European Competitiveness Fund. China, for its part, has been actively pursuing strong support for its domestic industries since the introduction of "Made in China 2025" in 2015.

Under the administration of Prime Minister Sanae Takaichi, Japan has formulated the Japan Growth Strategy with the aim of transitioning to a "growth-oriented economy." The strategy calls for promoting more than ¥370 trillion in public- and private-sector investment by fiscal 2040 across 17 strategic sectors, including AI and semiconductors.

In the opening of her policy speech to the Diet on Oct. 5, Takaichi emphasized the need for Japan to pursue bold growth-oriented investment, stating: "The world is now amid a transformation of the international order. Countries are competing with one another through massive, long-term industrial policies, and competition among nations for advanced technologies, human resources, and investment is intensifying to an unprecedented degree."

Against this backdrop, this roundtable will focus on the theme of "Technological Innovation and Industrial Policy" to explore ways to promote the development and growth of industry and the economy in today's world.

In 2022, the Japan Economic Foundation (JEF) put forward Recommendations for an Evolutionary Industrial Policy to Achieve Broad Economic Security in its broad sense. The proposal was motivated by the question of how Japan could maintain and enhance its national power in response to the country's prolonged economic stagnation following the collapse of the bubble economy, growing geopolitical uncertainty stemming from tensions between the US and China, and a deteriorating security environment.

In this roundtable, I would like to invite experts to discuss how Japan should pursue "technological innovation and industrial policy" amid the complex international environment and geopolitical changes surrounding Japan. We are joined by Dr. Naoyuki Yoshino of Keio University and Dr. Hiroaki Miyamoto of Hitotsubashi University, both of whom participated in our policy proposal four years ago, as well as Nobukatsu Kanehara of the Sasakawa Peace Foundation, who is an expert on technological innovation and industrial policy from a national security perspective.

Proposal for Advanced Industrial Policy & Japan's Current Situation

Okada: To begin, as I mentioned earlier, four years ago, with the support of Dr. Yoshino and Dr. Miyamoto, we prepared a policy proposal entitled "The Need for an Evolved Industrial Policy to Achieve Economic Security in Its Broad Sense". I would like to ask doctors Yoshino and Miyamoto how you have interpreted and responded to the proposal's underlying objectives and recommendations since its publication, and how your research in this field has progressed over the past four years. To start, I would like to invite Dr. Yoshino to share his views.

Yoshino: Japan is now embarking on a new industrial policy through what is known as proactive fiscal policy. Broadly speaking, I would identify three types of fiscal measures used to implement industrial policy. The first is subsidy-based support; the second involves public works and the development of various types of infrastructure; and the third, which we will discuss today, focuses on technological innovation, research and development (R&D), and productivity improvement.

Our research conducted jointly with Dr. Miyamoto, who is also participating in today's event, found that the third type of technological innovation – in particular, industrial policies aimed at promoting technological innovations that have an impact across Japan's entire industrial sector – is the most effective form of industrial policy. Such policies are crucial to boosting Japan's overall economy.

Furthermore, since we proposed an "evolved industrial policy" four years ago, we have seen tremendous advances in AI-driven digitalization over the past two to three years. In this regard, I think it is extremely important for both the private sector and the government in Japan today to leverage AI and DX to improve the efficiency and effectiveness of internal corporate operations and government policymaking. For example, various regulations and standards have traditionally governed industries, but we may need to fundamentally restructure them. If we maintain the status quo, these regulations and standards could become obstacles just as private

companies pursue new initiatives.

In this sense, I believe that the developments brought about by AI and DX over the past two to three years represent a major industrial revolution that is transforming society as a whole, much as the advent of the locomotive and, later, the Internet brought about industrial revolutions in the past.

Against this backdrop, unless both the private sector and the government can adapt effectively to these changes in industrial structures, we will increasingly find that regulations and institutional frameworks based on conventional ways of thinking no longer suit the new realities.

Fundamentally restructuring these systems is extremely challenging. Excessive deregulation could create problems, but overly stringent regulations could stifle the very initiatives private companies are trying to pursue. What matters most is for the government to respond positively and flexibly. It may also be necessary to reconsider the organizational structures of individual government ministries, which have traditionally been divided along sectoral lines. In this regard, I believe that both the public and private sectors need to undertake major organizational reforms and establish new institutional frameworks.

Next, Japan faces an aging population, which has driven social security spending to its largest share of government expenditure, accounting for as much as one-third of the total. As a result, the government has less fiscal capacity to allocate sufficient resources to other priorities, such as technological innovation and education. In this regard, I believe that DX, including the use of AI and robotics, could create opportunities for people over the age of 60 to continue contributing to society for as long as possible. This, in turn, could help Japan revitalize its economy and society despite its aging population.

Another important point is that older workers must not crowd out younger generations. Instead, younger and older people should work together in a mutually complementary way, strengthening both businesses and the government. For example, Japan has recently been showing signs of a bubble-like economic boom, reminiscent of the past. However, younger generations have no firsthand experience of that era's bubble economy. I think those who experienced the bubble can complement younger generations' knowledge and skills by sharing advice based on their past experiences, helping society move in a more positive direction.

To summarize, I believe that three things are particularly important. First, both the private sector and the government need to respond appropriately to the changes brought about by AI and DX, including by adapting internal corporate structures and government policymaking. Second, in an aging society, we need to use DX, AI, and robotics to help older people keep working and contributing to society. Third, by bringing younger and older generations together in a complementary relationship – learning from past experiences while looking ahead and working toward the future – we can enhance Japan's productivity. I think these three elements are essential to Japan's future growth.

Okada: Thank you very much for your insightful remarks. You have highlighted three important points. You mentioned that younger generations have not experienced the bubble economy. I would add that, in a similar sense, many young people are also unfamiliar with a world in which interest rates are a normal part of the economic environment. Now that Japan is returning to a world with positive interest rates, I think the experience of older generations could be particularly valuable to younger people. Now, Dr. Miyamoto, may I ask for your thoughts?

Miyamoto: First, let me briefly summarize the discussions at the previous study group on evolved industrial policy.

As I understand it, the fundamental concern underlying our discussions was that wages in Japan had been declining over an extended period, symbolizing a broader decline in the country's economic strength. Against this backdrop, we argued that industrial policy should aim to achieve productivity gains and economic growth through indirect intervention, with a focus on designing and establishing appropriate incentives while respecting the autonomy of private companies.

In particular, I believe it is essential to create a competitive market environment, and that a key to achieving this is to promote greater economic dynamism and turnover. I recall that one of the central pillars of our recommendations was that Japan's future economic development would depend on promoting new market entry, reforming regulations that protect vested interests, and even renewing the political system.

Japan's national economic strength had declined over the preceding three decades, a period widely referred to as the "Lost Three Decades". We emphasized the need to identify the root causes of this decline, develop a long-term grand design spanning several decades, and pursue it as a national strategy. We also stressed the importance of halting the Japanese economy's downward trajectory and putting it back on a path of growth. I have reread our previous report in preparation for today, and I was struck by how relevant its

contents remain: it could be published today without seeming out of place. If anything, I feel that its message carries even greater weight in the current context.

While I find this encouraging, it also suggests that policies and the way society operates have not changed all that significantly over the past several years. Therefore, building on our previous recommendations, I think we need to substantially accelerate our efforts going forward.

I would now like to address several specific issues. First, let me turn to fiscal policy, which Dr. Yoshino also touched on. We discussed fiscal sustainability in our previous report, but the economic environment has changed significantly between 2022 and today. As Chairman Okada mentioned earlier, Japan is now experiencing inflation and has returned to a world with positive interest rates. When we held our previous discussions, I do not think we had yet entered such an environment. In a world with positive interest rates, however, we need to pay particular attention to fiscal sustainability.

The Takaichi administration has advocated what it calls "responsible proactive fiscal policy", with one of its fiscal sustainability objectives being to reduce the debt-to-GDP ratio. At present, the ratio has declined somewhat from its peak.

However, this decline is largely attributable to inflation. Even according to the Cabinet Office's analysis, under the baseline scenario, the debt-to-GDP ratio could well begin rising again around the mid-2030s. Of course, the outlook would differ if the economy grew. Taking a conservative view, however, fiscal sustainability may appear to be improving in the short term, but the situation warrants considerable attention over the medium to long term. I believe that fiscal policy will be one of the major issues to consider as we formulate various policies going forward.

Next, let me turn to labor market reform. As a labor economist, I identified labor market reform as a key priority in our previous recommendations. As Dr. Yoshino mentioned earlier, with the emergence of AI as a new technology, I think we are at a turning point that calls for fundamental changes in how people work, how they are employed, and, more broadly, how the labor market itself is structured.

It is essential to establish a more flexible labor market. However, simply reforming the labor market is not enough. We also need to fundamentally rethink human resource management, including wage-setting and performance evaluation systems. I think the advent of the AI era has made the need for these reforms even more pressing.

I would like to raise two additional points. The first is evidence-based policymaking (EBPM). We highlighted its importance at our previous study group, and over the past several years, EBPM has become much more firmly established within the government. In fact, an expert panel on EBPM has been established under the Government Tax Commission, and efforts are underway to ensure that various policy issues are discussed and examined on an evidence basis. I believe this is a very welcome development.

The second issue concerns the civil service. We previously emphasized that Japan is supported by the highly talented people working in Kasumigaseki, the center of national government, and that it is essential to ensure that the government continues to attract and retain highly capable personnel.

For example, I think we discussed the need to establish pay systems that reward ability rather than rely solely on seniority, ensure that highly capable civil servants receive salaries competitive with those in the private sector, reconsider the vertically segmented administrative structure, and make it easier to recruit mid-career professionals and rehire those who have left the civil service.

These issues remain just as relevant to Kasumigaseki today. As Dr. Yoshino mentioned earlier, in the age of AI it may be necessary to rethink the structure and organization of government ministries. I believe that how we reform the civil service and the broader government administrative system remains a crucial issue.

Okada: Thank you very much. As you pointed out, even when we revisit the recommendations made four years ago, there may be very little that needs to be revised. This is a testament to the quality of those recommendations, but it also raises the question of why Japan has changed so little since then. You have addressed several important issues, including fiscal policy, labor market reform, evidence-based policymaking, and the future of the civil service and government administration.

National Security, Technological Innovation & Industrial Policy

Okada: Next, I would like to turn to Mr. Kanehara. I understand that, considering changes in the security environment, you believe that from the perspective of national security Japan should strategically support research and development in foundational science and technology by linking science and technology policy with security policy. I have also heard you suggest that, in addition to providing subsidies to support R&D, the government could leverage

procurement by government agencies as a means of promoting R&D. I would very much appreciate hearing your views on these issues.

Kanehara: As Chairman Okada mentioned earlier, looking back today, the 1990s were a period of somewhat extraordinary idealism. The Soviet Union had collapsed, and Russia had joined the G8, effectively becoming part of the Western camp. China, whose economy was far smaller than it is today, had been at odds with the Soviet Union ever since the split between Mao Zedong and Nikita Khrushchev in the 1950s. Moreover, China had engaged in an armed conflict with the Soviet Union over Damansky Island in 1969. As a result, China had aligned itself with the West. In this context, it seemed that there were no enemies left.

The idea that economic considerations alone should guide policy, and that liberalism and market orientation should be the way forward, became widespread. Japan went along with this trend, abandoning subsidies and embracing liberalism and market principles, and worked hard to compete under this new approach. But what was distinctive about Japan was that national security and science and technology and industrial technology became disconnected from one another. As a result, Japan's technological capabilities weakened.

The national security sector, however, had been kept separate from the WTO framework, and there was a firmly established understanding that national security was not subject to market principles. In the US, of a science and technology budget of around ¥20 trillion, the Pentagon accounts for half. There are many excellent public- and private-sector research institutions, and they receive contracts from the Pentagon for roughly half of their research projects. This is considered entirely normal. The reason is that there is a fundamental philosophy that science and technology are what underpin the nation and its national defense.

Japan has lacked this philosophy since the end of World War II. In that sense, I believe it is only natural that Japan has fallen behind in science and technology. In the US, funding that is essentially in the form of subsidies is described as research contracts for national security purposes. This allows enormous amounts of government funding to flow to academia and industry outside the WTO framework.

Turning to the issue of procurement, the US has a system known as GOCO (Government-Owned, Contractor-Operated). Under this arrangement, for example, the US government leases an entire government-owned factory to a private company, which can manufacture weapons without having to invest in the factory's facilities and equipment. This enables the company to generate substantial profits. In 2023, Japan enacted the Act on the Enhancement of Defense Production and Technology Bases to emulate this system, but the measures fell short of what was needed. We are now seeking to put forward a revised proposal on this issue. This illustrates just how far Japan lags internationally in the field of national security.

Warfare today is also undergoing a major transformation. Advanced computing is playing an increasingly important role, and AI, which has been discussed throughout this conversation, is now being integrated into military operations. Unmanned drones are being deployed at the forefront of the battlefield. Human soldiers no longer go to the front lines themselves. In the past, military personnel would exchange information over the telephone, asking questions such as: Where is the enemy? Where are our own forces? Which ammunition from our unit should be sent to which units? And where can we obtain the ammunition we need? It would take a week or two to gather information, coordinate logistics, and prepare using telephones before soldiers could finally be deployed to the battlefield.

Today, AI systems that integrate vast amounts of data to support decision-making are increasingly being used, reducing the time required to make decisions in warfare to mere seconds. Decisions involving target detection, engagement, assessment, and logistics, which once took days, are now being made in seconds. This is known as the acceleration of the kill chain.

I believe that Japan's Self-Defense Forces (SDF) must also find ways to address these emerging domains, including space, AI, and drones. The SDF is making strenuous efforts, but Japan is seriously lagging in AI. Responding effectively to these challenges also requires the development of general-purpose technologies, particularly software. In an era when the SDF cannot operate effectively on its own, the entire Japanese industrial base must be strong enough to support it.

Furthermore, in the emerging world order, the era of idealism has come to an end. We are now seeing economic coercion being used as a tool of diplomacy, with disruptions to rare earth supply chains creating serious difficulties for Japanese industry.

Finally, I would like to make one last point. Since the end of World War II, Japan has pursued an unwaveringly pacifist course, driven by deep remorse over its prewar past. As a result, all sectors of society, including the government, industry, the financial sector, and academia, have turned away from national security. For 80 years, Japan has failed to integrate science and technology with national

security.

It was only toward the end of the administration of Prime Minister Shinzo Abe that the government finally began to link science and technology with national security, and industry now seems to be gradually moving in the same direction. Even among companies commonly regarded as defense contractors, defense-related business accounts for only around 10% to 20% of their overall business. Most of these companies are therefore primarily engaged in civilian markets, making their relationships with overseas civilian markets equally important. To encourage industry to change its mindset, I think the government needs to take the lead, sending a clear message that contributing to national security is not something to be ashamed of, and actively supporting industry in this effort.

The financial sector has also been considerably slow to catch up. However, a newspaper recently reported that Mitsubishi UFJ Bank has finally begun shifting its policy toward expanding lending to companies involved in dual-use technologies and national security-related businesses. This is very significant news. Until now, the financial sector had refused to provide any funding to military-related businesses, creating a major obstacle to their development.

Academia has been very reluctant to engage with national security. However, since the administration of Prime Minister Fumio Kishida, efforts have been made to gradually build understanding through the K Program (Economic Security Critical Technologies Development Program). I believe that these efforts are finally beginning to gain traction.

Japan is now many steps behind the rest of the world in integrating national security with science and technology, and I think we must make every effort to catch up. In terms of funding, most scientific and technological advances have dual-use applications, so I think we should strengthen these capabilities by making greater use of budgets allocated to economic security and national security. Furthermore, if Japan is to increase defense spending to 3% of GDP, I think the defense budget should also encompass science and technology funding, as well as related facilities and infrastructure. As I see it, we have entered an era in which the full strength and capabilities of the nation as a whole must be mobilized to support national security.

Okada: Thank you very much. Mr. Kanehara has explained the importance of recognizing that science and technology underpin national security, and noted how the US supports the development of defense technologies through procurement and other forms of engagement. In Japan, too, organizations such as the former Japanese National Railways and NTT once played a role in advancing research and development through their procurement activities. But these organizations were privatized, and it may be that the mechanisms through which major public-sector entities or government-affiliated organizations funded R&D have largely disappeared. We need to build a strong defense industrial base.

The same issue arises in industry and finance, but there are also many universities that categorically refuse to engage in R&D related to defense. I am concerned that unless we address these issues, cutting-edge technologies will not be able to spread to defense technology or to broader science and technology.

Industrial & Social Challenges & Government Responses & Policies

Okada: As our next topic, I would like to discuss the Japanese government's policy measures and responses, the policy responses of industry, and broader societal challenges.

First, I would like to turn to Dr. Miyamoto. As we discussed earlier, you have argued that Japan should do much more to increase labor market mobility to strengthen the competitiveness of Japanese industry and promote the growth of the Japanese economy. In particular, you have emphasized the need for fundamental changes in labor markets and in how work is evaluated in the age of AI and DX. At the same time, looking at the labor force from a somewhat different perspective, Japan is facing severe labor shortages in sectors such as construction, and some have even suggested that these shortages are becoming a bottleneck to economic growth.

As Japan seeks to develop a new industrial policy and achieve economic growth, I would like to hear your thoughts on the key challenges that stand in the way and the directions in which policy and practice need to change.

Miyamoto: I believe that labor market reform is extremely important, particularly in promoting labor mobility and making the labor market more fluid. To achieve economic growth, we need to improve productivity. The economy is a living organism: while some sectors and companies decline, others emerge and grow.

The extent to which economic resources – people, capital, and money – can move smoothly from declining sectors to growing ones determines productivity across the economy as a whole, or what we call macroeconomic productivity. If labor mobility is limited, workers remain in declining industries rather than moving into growing ones. This prevents the economy from undergoing the process of renewal

and restructuring that it needs, resulting in lower productivity at the macroeconomic level. In this sense, I think labor market reform is critically important.

Furthermore, a more fluid labor market makes it easier to achieve the right match between workers and jobs. This also contributes to productivity improvements at the micro level, that is, at the level of individual firms. I therefore believe that labor market reform can enhance productivity at both the macro and micro levels.

The issue of labor shortages was raised earlier, and in Japan this has become a structural problem. Labor shortages are not simply the result of a strong economy; rather, as the population declines, the available workforce is gradually shrinking, leading to persistent labor shortages. This could become an increasingly serious problem, particularly in the years ahead.

However, Japan still has untapped labor potential in three groups: senior citizens, women, and foreign workers. It is essential to create an environment in which these groups can work more easily and encourage their participation in the workforce.

I am particularly interested in the labor market for older workers. This relates to a point Dr. Yoshino raised earlier. According to a report published by the International Monetary Fund (IMF) in 2025, health scores among older people have improved significantly. Put simply, today's 70-year-olds reportedly have cognitive and health scores that are almost equivalent to those of people in their 50s in the past. In effect, they can be considered to be 20 years younger than their chronological age would suggest. One distinctive feature of Japan is that older people have a very strong desire to continue working. I think it is important to provide an environment in which they can remain motivated and actively engaged in the workforce. This is another reason why greater flexibility in the labor market is essential.

That said, the workforce will continue to shrink over the long term, making investment in labor-saving technologies and automation, including systems that can operate without human intervention, indispensable.

Another issue we need to consider in this context is AI, which has been a major topic of discussion today. With the advent of generative AI, there are concerns that it could take jobs away from people. According to IMF research, generative AI is expected to affect 60% of jobs in advanced economies. But this does not mean that all these jobs will disappear. Half of the jobs affected may offer opportunities to boost productivity by working alongside AI, while the other half face the risk of being replaced by AI. This could lead to lower wages and, in some cases, job losses.

Looking back at past technological innovations, however, we can see that the emergence of new technologies has also created new industries and jobs. In this sense, I believe AI could trigger a major restructuring of the labor market, and that this process has already begun to some extent in parts of the world. As a result, creating an environment in which people can move flexibly between jobs will become increasingly important. Japan therefore needs to press ahead with labor market reform.

One further point I would like to make about AI is that structural reform will be a key factor. One area in which AI is particularly effective is software development. According to a study conducted in the US, coding – the core activity of writing code in software development – is a task at which AI excels, and the use of AI can increase productivity by a factor of 7.5 compared with traditional methods. However, while the volume of code written may increase by a factor of 7.5, software shipments have actually increased by only 20%.

Why is this? Even when productivity in the core task of software development – writing code – increases dramatically, there are many other steps involved, such as reviewing the code, issuing press releases, bringing products to market, and acquiring customers. If these other processes continue to rely on human labor in the same way as before, bottlenecks arise, preventing companies from fully realizing AI's potential. In other words, simply introducing AI is not enough. Businesses need to rethink their workflows and organizational structures with AI as a given.

Although this is a micro-level issue, it also applies to the economy as a whole. Going forward, we will need to redesign society with AI in mind. This is precisely what structural reform entails, and I believe how quickly Japan can implement such reforms will significantly affect the future development of its economy.

Okada: Thank you very much. Regarding the labor market, you have highlighted the importance of making it more fluid to promote economic growth, thereby enabling workers to move smoothly from declining sectors to growing ones. You also mentioned the potential of three groups to help address labor shortages – senior citizens, women, and foreign workers – and noted that, in the case of older people, healthy life expectancy is increasing.

This reminds me of Nagano Prefecture, which is known for its long-life expectancy and very low medical expenditure. In other words, it is well known as a prefecture where people live long, healthy lives. When I look at employment rates among older people in Nagano, I find they are somewhat higher than in some other

prefectures. This makes me wonder whether staying active in the workforce helps people remain healthy and energetic. You have also shared your thoughts on how AI will transform the industrial structure in the years ahead.

I would like to turn to Mr. Kanehara and ask about the relationship between science and technology and national security. As we have heard, the US and other countries are pursuing science and technology and national security as an integrated agenda. You also mentioned that Japan has been making relatively little progress in this area. Could you share your thoughts on the main obstacles holding Japan back, the directions in which policy should evolve, and how we might overcome social resistance to the changes that are needed?

Kanehara: I think what we need is a fundamental shift in mindset. For the 80 years since the end of World War II, Japan has pursued a policy centered exclusively on peace. But we were able to afford that luxury because the US was overwhelmingly powerful. Today, the US accounts for 25% of the global economy, while China's economy has grown to more than half the size of America's. This means that a contingency involving Taiwan is a real possibility. However, such a contingency must be avoided at all costs. I believe it is essential that we take a clear-eyed view of reality.

Modern warfare clearly relies primarily on dual-use technologies. Today's weapons are essentially bundles of software. The era when hardware was the dominant factor is over. Nuclear weapons are, fundamentally, weapons that cannot be used in practice. Today, drones are the weapons deployed on the battlefield, and AI is being integrated into them at a tremendous pace. What underpins these capabilities is software.

As for what weapons will look like in the future, they will be much like smartphones. The hardware will remain largely unchanged, while the applications running on them will be constantly updated and replaced. Weapons will be modularized, so that whenever the software is updated or replaced, only the relevant module will need to be swapped out.

This means that we will need to maintain an up-to-date inventory of all the software installed in each weapon system, so that we can keep track of exactly what software is running where. Furthermore, if even one component in a newly installed software module has a cybersecurity vulnerability, it could compromise the entire weapon system. For this reason, there is growing recognition of the need to maintain a comprehensive and continuous overview of three key areas: modularization, management of the overall software inventory, and cybersecurity management. These must be managed consistently throughout the entire lifecycle, from development and equipment procurement through to actual deployment in combat. The US and other countries are increasingly moving in this direction, and Japan needs to catch up.

As a result, this is no longer a domain limited to traditional heavy industries and electrical equipment manufacturers. It will involve a wide range of startups and virtually every sector of industry. Focusing on this point, how Japan can strengthen its overall national capabilities is directly linked to the country's national security. This is no longer a matter for the SDF alone. It must be supported by the nation as a whole.

The key to all of this is, above all, science and technology. Academic societies, in particular, have been reluctant to engage in military research. However, today's students are starting their own companies and developing technologies such as drones, so a generational shift is gradually taking place. The very foundation of national security is ensuring that the Japanese people can survive, earn a decent living, and enjoy happy lives. To achieve that, we must take responsibility for our own security rather than relying on others. The US, too, is less powerful than it once was, and the time has come for Japan to make a major shift in its thinking. The government's mindset is beginning to change, and the business and financial communities are finally starting to change as well. I believe we have reached a point where Japan must bring together the full strength of the nation, including its academic community, to enhance its overall capabilities.

Finally, I believe defense spending will continue to rise. However, I would like to emphasize that spending on defense is far less costly than going to war. Furthermore, procuring weapons and other equipment from Japanese industry would also help stimulate the domestic economy and drive technological development. I therefore believe Japan should shift its approach and direct more of its defense-related spending toward these objectives.

Okada: Thank you very much. You have emphasized the importance of a fundamental shift in mindset when considering the relationship between science and technology and national security. As you pointed out, when we watch recent television news reports showing the battlefields in Ukraine, we see young people entering military service and going into rooms in apartment buildings filled with rows of monitors, where they fight in what looks like a video game. It seems to me that warfare has evolved into something completely different from what we have seen in the past. In this context, you

explained that while advanced technologies such as large missiles remain important, drones – which are essentially bundles of software – their control systems, and cybersecurity are becoming increasingly critical.

Next, Dr. Yoshino, you have expressed the view that industrial policy should be pursued from a broader regional perspective, extending beyond Japan to include other Asian countries, for example. You have also shared your views on the qualities and capabilities required of public officials responsible for formulating policy. With these points in mind, I would appreciate hearing your thoughts on the roles of the government and the business community, among other things, in the context of new approaches to industrial policy and science and technology.

Yoshino: From 2014 to 2020, when I served as Dean of the Asian Development Bank Institute, I traveled extensively throughout Asia. Drawing on my own observations, I would like to share my perspective on the relationship between Japan and the rest of Asia. After Japan's economic bubble burst, it continued to grow for many years, expanding its overseas production bases and establishing factories abroad through foreign direct investment. I believe this pattern of development, known as the "flying geese" model, symbolized Japan's role in leading economic development across Asia. Unfortunately, I feel that Japan's leadership role has weakened considerably in recent years. One reason, I think, is that Japan's aging population has put increasing pressure on public finances, leaving the country with fewer financial resources available for overseas assistance.

The second reason is that Asian countries have become much better at gathering information on their own. In the past, they obtained information from books and through face-to-face meetings with various people. Japan had access to far more information than other Asian countries, so they turned to Japan to learn how the US and other countries viewed issues. This enabled Japan to serve as an intermediary hub. Today, however, countries across Asia can obtain information independently through the Internet, so Japan no longer needs to play that role.

Furthermore, as I mentioned earlier, Japan's assistance to other countries has declined, and China has stepped in to fill the gap. China has also emerged as a major player in technology, including electric vehicles and robotics. I think Japan needs to experiment with various approaches and explore ways to once again take the lead in Asia through its strengths in science and technology.

To do this, it must provide risk capital. Bank loans can fund technologies that have reached a certain level of maturity and are relatively safe investments. But when it comes to technologies whose prospects for success remain highly uncertain, providing risk capital is crucial. Recently, Japan's stock market has grown somewhat, and I think one possible channel would be to establish mechanisms that effectively direct funds from the stock market toward these kinds of ventures.

A second channel for providing risk capital would be funds such as Furusato Investment Funds, which are crowdfunding-based investment funds that enable individuals to make small investments. I think it would be wonderful to foster a system in which people across Japan contribute small amounts of money to such funds, thereby supporting promising technological development and, in turn, contributing to national security.

The third point concerns international standards. If Japanese products comply with international standards, they can be marketed successfully worldwide. In the past, there were no such international standards, and Japanese products could compete globally simply by offering high quality at low prices. Today, however, even in the smartphone market, Japan has found that its own approaches are not necessarily accepted internationally. I think Japanese government officials' expertise is critical in meetings where international standards are set. The need to ensure that Japanese products are recognized as compliant with international standards is becoming increasingly pressing.

More broadly, Japan must hold its own in international organizations and negotiations, build effective coalitions with other countries, and work strategically to get its proposals adopted and advance its national interests.

In addition, Japanese government officials are typically reassigned every two to three years. In other countries, however, the same individuals often continue participating in the same meetings for five or even 10 years. As a result, their overseas counterparts accumulate far more knowledge and information, putting Japan at a disadvantage in negotiations. I believe Japan needs to reconsider its personnel rotation system, under which officials are reassigned every two to three years. In international negotiations, officials should work in the same field longer so Japanese technologies can be incorporated into international standards and Japanese products can be successfully marketed worldwide.

In this regard, the need for highly capable government officials who can maintain a high level of expertise, collaborate with their international counterparts, and effectively communicate Japan's positions in English is becoming increasingly important.

Okada: Thank you very much. You have explained how Japan's presence in Asia has diminished compared with the past, while China has emerged as a major player. In this context, you proposed several measures Japan should pursue, including the provision of risk capital and the development of investment schemes such as Furusato Investment Funds. You also highlighted the importance of Japan taking a leading role in developing standards and certification systems, and emphasized the need for government officials to develop greater specialization and remain in their fields for longer periods, enabling them to negotiate on an equal footing with their counterparts in Asia and other countries, who have often been involved in the same international forums for many years.

I recall that when I attended various meetings, including APEC, several years ago, I met many trade ministers from Asian countries who had held their positions for more than 10 years. I agree with your point that continuity and specialized expertise of this kind will become increasingly important for Japan in the future.

Conclusion

Okada: To conclude, I would like to invite each of you to offer a few final thoughts. If there is anything in particular you would like to emphasize, any point you consider especially important, or any issue to which you believe we should pay particular attention, I would be grateful for your recommendations or comments. Let me turn once again to Mr. Kanehara.

Kanehara: Let me briefly add just three points that I forgot to mention earlier. I find myself in agreement with Dr. Yoshino on several points. Private companies have shareholders to answer to, which limits their ability to take risks. National security is a high-risk field, and the technical specifications involved are extremely demanding. I think the government must therefore commit substantial funding to this area. In the US, however, private-sector financing also plays an important role. By providing upfront funding and assuming the initial risks, the government makes it easier for private financial institutions to provide loans. This creates a leverage effect, whereby a relatively small amount of public funding can attract a much larger volume of private capital.

There has been discussion within NATO about establishing an investment bank dedicated to defense equipment. I strongly hope that Japan's financial sector will also rethink its approach to this area. We need a mechanism through which the government provides seed funding to help get such initiatives off the ground and attract private investment.

Furthermore, Japan makes very little use of its intellectual property. If companies are to continue developing new technologies, they need to establish an intellectual property strategy from the outset, determining how to leverage their intellectual property and which aspects of their technologies should remain confidential.

Finally, if Japan is to lead and coordinate these efforts as a whole, I think it needs to move beyond the current fragmented, siloed approach and establish a comprehensive basic law. Specifically, Japan should enact a Basic Act for the Promotion of Security-Related Technologies and establish a dedicated headquarters to drive its implementation and oversee the entire effort. By coordinating these initiatives centrally and committing substantial funding, Japan must act swiftly; otherwise, it risks falling behind.

Okada: Thank you very much. Dr. Miyamoto, would you share your thoughts?

Miyamoto: I would like to make just one brief point. The Japanese economy has long been described as in deflation, but since around the spring of 2022 it has been transitioning to an inflationary environment. Much of the current attention is focused on how to respond to this shift, particularly the immediate challenge of rising prices. However, while the Japanese economy was stuck in the "hole" of deflation, the environment surrounding it changed significantly.

One of these is demographic change. Japan's population is declining and aging. At the same time, technological innovation is advancing, as exemplified by the emergence of generative AI. There is also a growing push toward decarbonization in response to climate change.

These trends will bring about major changes in Japan's social and economic structures. I call them "megatrends" and I believe Japan needs a national grand design built around them. For example, continued population decline and aging are virtually inevitable. Of course, measures to address the declining birthrate and population aging are important. But even if these measures prove successful, Japan's population will continue to decline over the next 20 to 30 years, and its workforce will shrink accordingly. If we are to plan for the next 20 to 30 years, we need to consider what actions to take based on these demographic projections. Many of Japan's existing government structures and institutional frameworks were established when the population was younger and growing. While some of these arrangements remain effective today, others no longer

suit current circumstances. I think it is important to adapt those arrangements to meet the needs of the times.

I believe one of the key themes in developing this national grand design is providing the public with a sense of security and reassurance. Needless to say, national security is the fundamental prerequisite for peace of mind and safety. Economic security, meanwhile, depends on ensuring solid economic growth and establishing safety nets, including social security systems.

Social security is not limited to pensions, long-term care, and healthcare. It is also important to establish a comprehensive social security system that serves all generations, including support for child-rearing. Public finance is the foundation of such a system. I think we must carefully consider how we can achieve both economic growth and fiscal sustainability.

Okada: Thank you very much. You offered a broad perspective, and I think you have raised a number of very important points. Finally, Dr. Yoshino, could you offer a few closing remarks?

Yoshino: As I mentioned at the outset, one priority should be to reduce public spending on older people in the areas of public finance and social security. Given the shortage of labor, I believe we can create a society in which older people, too, have abundant opportunities to work by making use of AI and robotics. It is a waste of valuable human potential to have healthy, active older people sitting idle at home. The first priority should be to enable these active seniors to contribute to society. Developing robots and AI to support their participation and help them make these contributions is, I believe, another important priority.

Second, it is said that advances in AI and other technologies could eliminate around 60% of jobs involving routine manual tasks. I think it is essential to provide education and training for skills development. We should create online skills development programs that are available free of charge, 24 hours a day, 365 days a year. People who are willing to study hard and want to enhance their abilities beyond the routine work they have been doing should be able to access these programs at no cost. I believe the Ministry of Health, Labour and Welfare, the Ministry of Education, Culture, Sports, Science and Technology, the Ministry of Economy, Trade and Industry, and other relevant ministries should work together to develop such programs.

This would also help reduce inequality. People who are motivated to learn and make an effort to improve their skills could use these free online programs to upgrade their skills and qualify for better-paying jobs. It is important to build a society in which wages reflect productivity. This principle should apply equally to the private and public sectors. By hiring people with higher skill levels, both businesses and government agencies could improve productivity and, in turn, contribute to economic growth.

Finally, to reiterate a point I have already made, I believe it is essential to continue developing globally competitive human resources through education and vocational training. In the past, Japanese students were known for their outstanding mathematical abilities and ranked among the best in the world. Unfortunately, Japan is gradually losing this advantage to countries such as China.

I think we need to provide a wide range of educational and training programs free of charge to everyone across Japan, 24 hours a day, 365 days a year, through video broadcasts and online platforms, so that people can learn without having to attend private cram schools or preparatory schools. We should continuously deliver programs that teach physics, mathematics, English, and the practical skills needed to make effective use of AI and DX. If we could record and distribute video lectures by Japan's most effective teachers and technical instructors, people would be able to access and understand these programs on their smartphones, regardless of where they live. People who have been engaged in routine manual work should also be able to access skills development programs to improve their abilities. I think this approach would help reduce social inequality and create a society in which those who work hard to improve themselves can reap the rewards of their efforts. I would therefore like to propose the provision of free educational and training programs, including those aimed at developing human resources, for everyone across Japan.

Okada: Thank you very much. As Prime Minister Takaichi also noted, the international order is undergoing profound changes, and society is facing major transformations. In this context, I think we have had a highly meaningful exchange of views on how we should address the challenges ahead, particularly in the areas of science and technology and industrial policy.

At the beginning of our discussion, it was noted that the recommendations we put forward four years ago remain relevant and worthwhile even when reread today. My hope is that when we look back on today's discussion four years from now, we will be able to say that much of what we discussed has been put into practice, that our earlier recommendations have become outdated, and that the very structure of society has changed. To achieve this, we must work to transform society in the years ahead, and I would like to do everything I can to support those efforts.

Thank you very much for joining us today.

JS

Written by Haruhisa Somaya, editor-in-chief of *Japan SPOTLIGHT*, with the cooperation of Tape Rewrite Co.

Japan's Growth Strategy & Fiscal Sustainability

By Keiichiro Kobayashi



Author
Keiichiro Kobayashi

1. The Historical Positioning of Growth Strategy: an Antidote to End Times Apocalyptic Fascism

In July 2026, the Japanese government decided to push forward with public and private investments exceeding 370 trillion yen by 2040 in 17 strategic areas, including AI and semiconductors, as part of the "Japan's Growth Strategy". Pursuing economic growth has always been a standard goal of economic policy. But nowadays, the importance of a "growth strategy" comes from a deeper sense of stagnation and structural challenges unique to our era, beyond just the issue of boosting GDP numbers.

Right now, mainly in the West, there's a rising trend of far-right, religious populism that could be called "end times fascism". At first, it might seem a bit removed from the Japanese context, but to understand the issues our country is facing, we need to start by unpacking this concept. The main reasons behind this phenomenon shaking the West are things that also potentially exist in Japan today.

End times fascism is a political phenomenon that arises from dissatisfaction with extreme inequality, set against the backdrop of the collapse of the white middle class and existential crises – such as environmental issues, nuclear threats, and AI risks – that could potentially lead to human extinction. The masses, angry about inequality, crave a strong leader or a scapegoat for their frustration, and as a result end up tolerating authoritarian rule. Meanwhile, dictatorial leaders and tech ultra-rich riding the AI wave turn their backs on solving the existential crises facing ordinary people, retreating into fortified isolated cities or private islands to try to secure survival for themselves alone (Klein and Taylor, 2026).[1] Klein and Taylor point out that the complete divide between this ruling class and the general public, along with the "denial of humanity" of the average person by the leaders, is what is on the verge of becoming a dystopian reality today.

To maintain sustainable stability in the economy and society, a "detox" to stop the advance of this apocalyptic fascism is essential. It has to be something that effectively corrects the extreme inequalities that modern society is facing. That's because strong public dissatisfaction with extreme inequality strengthens popular support for fascism and populism, allowing their influence to grow. Japan shares the same issue of widening inequality. On top of that, Japan also has the problem of a general decline in living standards due to years of economic stagnation.

To tackle these issues, pursuing "growth" emerges as one possible option. Trying to quickly and directly correct disparities often carries the risk of falling into centralized, controlled economic methods. Klein and Taylor (2026)[1] argue for the effectiveness of a modern "New Deal" policy, but policies that focus too much on pure redistribution can lead to excessive state intervention in the market, which could end up sapping the economy's vitality.

We (Japan or the world) can't survive without a free and open global economic system. Global inequality is an undeniable evil, but if we try to fix it by rejecting the free market economy itself, we'd be making the mistake of "throwing out the baby with the bathwater".

So, what we need to recognize is that "one antidote to apocalyptic fascism that can coexist with a free market economy is a growth strategy." By creating sustainable wealth through a growth strategy and using it to inclusively ease and correct disparities, raising the overall standard of living for everyone, we can fundamentally heal the anxieties of the masses that lean toward populism or fascism.

This kind of thinking – that is, the approach of "achieving economic growth through policy intervention, and thereby maintaining and developing a free economic society" – can be called "Growth-oriented Liberalism". This is quite different from the usual demand-stimulating active fiscal policy. Active fiscal policy for growth is a promising option for reviving liberalism in today's world, which faces the threat of apocalyptic fascism.

2. The Dilemma Between the Effectiveness of Growth Strategies & Fiscal Sustainability

Can aggressive fiscal policies actually lead to long-term economic growth? Traditional mainstream macroeconomic theories are either skeptical about the long-term growth effects of fiscal spending or have just ignored that possibility from the start. But recent empirical studies are starting to show that the right kind of fiscal policy can boost long-term economic growth.

For example, according to a study by Antolin-Diaz and Surico (2025),[2] increased funding for research and development (R&D), as represented by the Defense Advanced Research Projects Agency (DARPA) of the US Department of Defense, has been shown to significantly boost long-term economic growth. Just like how DARPA's communication systems eventually developed into the Internet, this is a clear example of how military and advanced research can have huge technological spillover effects into the civilian economy.

However, fiscal policy (in the context of this paper, industrial policy) doesn't necessarily boost economic growth. Especially considering our country's past experience (there's a lack of notable success stories), we can't help but say that the hurdles to overcome are really high. The lessons we should take from past cases can basically be summed up in two main points.

• **Eliminating competition breeds corruption:** The government doesn't have the ability to predict the market or pick winners. If you protect certain companies and eliminate competition, organizations will inevitably become corrupt. Instead, you need a contest-style system that encourages fierce competition among companies eligible for subsidies and concentrates financial resources on the promising ones through a survival-of-the-fittest process.

• **Advantages of investing in research and education:** Instead of arbitrarily supporting specific individual companies, providing financial support for broad foundations like basic research, education, and human resource development tends to give a higher return on investment for society as a whole.

In other words, only when financial resources are effectively allocated in a competitive and transparent market environment can fiscal spending truly lead to higher productivity and trigger private investment.

But there's a big dilemma here. If government spending piles up debt, we might eventually have to give up on growth policies themselves just to keep the government debt sustainable.

So, how sustainable is our country's government debt? Several studies from over a decade ago using standard neoclassical models suggested that in order to make fiscal policy sustainable, it would require about a 14% improvement in the fiscal balance relative to GDP (essentially turning the primary balance into a surplus). That's roughly equivalent to raising the consumption tax rate by around 30%. Moreover, a more recent analysis (R. Anton Braun, Aug. 24, 2026, in the *Nihon Keizai Shimbun 'Keizai Kyoshitsu'*) points out harshly that we still need to raise the consumption tax rate to 25%.

If achieving such a huge fiscal surplus is absolutely necessary, then keeping an active growth strategy would become impossible, and the policy would end up in a "no-exit" situation.

But we need to pause for a moment and question the assumptions behind the usual arguments. The view that a large fiscal surplus is essential is based on the common notion that "the value of government debt must be fully backed only by future fiscal surpluses", meaning it assumes **"the value of government debt equals the discounted present value of future fiscal surpluses."** But what if government debt actually has **"additional value"** that's different from future fiscal surpluses?

3. New Horizons for Fiscal Sustainability

As we saw in the previous section, if we stick to the standard view that treats the value of government debt solely as the "discounted present value of the stream of future fiscal surpluses", then managing our country's finances with such a huge accumulated debt seems like a dead end. But in recent years, there's been a drastic paradigm shift in macroeconomics and finance regarding fiscal sustainability. At the heart of this shift is the rediscovery of the fact that government bonds aren't just "bonds that are repaid with interest", but actually provide an "intrinsic value" beyond just principal and interest payments.

Specifically, for example, government bonds provide market participants with the following three additional values:

• **Providing liquidity:** They serve as a stable and readily cashable means of settlement in the financial markets, functioning as top-notch "collateral" in a wide range of repo and derivative transactions.

• **Offering an insurance function:** In macroeconomic environments with extremely high volatility, they act as safe assets with stable value, serving as a hedge against various risks in society.

• **Providing a stable savings option:** In a society facing an aging population and a lack of private investment opportunities, when there are no other assets offering appropriate returns, they become a safe long-term investment destination.

Because these functions are priced in the market as their own "value", the market value of government bonds will always exceed the "discounted present value of future fiscal surpluses" in theory. Therefore, even if the government doesn't necessarily achieve large fiscal surpluses, or if a baseline fiscal deficit continues, it's theoretically possible for government bonds to maintain high value.

A prime example of this new approach to fiscal sustainability is the dynamic theory of "safe assets" proposed by Markus Brunnermeier, Sebastian Merkel, and Yuliy Sannikov (Brunnermeier, Merkel, and Sannikov, 2024).[3]

Looking at the finances of major countries, you could say that reality actually proves the validity of this theory. There hasn't been any major advanced country – not Japan, the United States, or any European nation – that has consistently maintained a fiscal surplus

over the past several decades. Japan and the US have had persistent budget deficits, and European countries, even while enforcing strict fiscal rules, have also accumulated deficits. Yet in none of these regions has there been a catastrophic event like a collapse of the government bond market. If the value of government bonds were determined solely by "future fiscal surpluses" as a fundamental condition, it would be impossible to explain how bonds from major countries, where deficits are expected in the future, can still maintain high value.

Brunnermeier and others thought that the reason major countries' government bonds remain stable is that they have non-fundamental value coming from functions like "liquidity, insurance, and a means of saving", which means a kind of "stable bond bubble" keeps forming in the market. They also theoretically proved that this bubble-like value isn't just temporary, but can be maintained indefinitely within a general equilibrium model.

The most insightful finding their theory presented is that even if there's an ongoing fiscal deficit, as long as the government clearly commits to a sustainability defense – saying that "in the unlikely event of an emergency where government bond values drop, we will immediately shift to proactive tax hikes or spending cuts to ensure a fiscal surplus and firmly support bond values" – and the market believes in that commitment, then a government bond bubble won't collapse.

That said, this result doesn't mean we can just keep increasing the fiscal deficit as much as we want. In a quantitative analysis modeled on the US economy, Brunnermeier and others[3] showed that if the fiscal deficit is around 2% of GDP or smaller, government bond prices can remain stable. By the way, Japan's current primary balance (PB) is running a deficit of just under 1% of GDP. In recent years, a growing body of studies also pointed to the existence of a government bond bubble beyond Brunnermeier and others. These studies offer two important lessons for Japan's growth strategy and future fiscal management.

First of all, even if we don't rush to implement huge tax hikes or create massive fiscal surpluses, as long as reasonable and flexible fiscal discipline is maintained, fiscal stability will last. So, there's still plenty of room to boldly direct fiscal resources toward the growth-strategy investments needed to realize a "growth-oriented liberalism", like R&D and investment in people.

Second, under a fiscal deficit, the condition to ensure the stability of government bond values is that the government's commitment to sustainability – "we'll achieve a fiscal surplus when it really counts" – is trusted by the market. Or, as ongoing research by Tomoyuki Nakajima and I shows, even if a large, permanent surplus isn't possible, if the PB can be maintained as at least a very slight surplus over the long term, the market value of government bonds remains stable at a high level. Fortunately, Japan today is roughly achieving a balanced PB (almost zero). So, the goal of "stably maintaining a tiny PB surplus" is by no means unrealistic.

No matter which path we take, the most important thing is that the market keeps believing in the government's willingness and ability to sustain its finances. If the government can build a regime that earns this kind of financial trust, it's entirely possible to push forward a bold and appropriate growth strategy while keeping fiscal sustainability stable and avoiding the risk of a government bond crash.

So how can the government get the market to trust its commitment to fiscal sustainability? For this, we need to set up some institutional frameworks. Specifically, creating an independent fiscal institution seems to be a promising approach. An independent fiscal institution is a public organization consisting of economic and fiscal experts who, in a politically independent position, make long-term projections on fiscal sustainability over several decades. These long-term projections are then used as fundamental information that guides actual fiscal management. By setting up such an institution, the market's trust in the government's commitment can be strengthened.

To add a final note, the shift from the conventional standard theory of fiscal sustainability, which says "a fiscal surplus is necessary", to the new "stable government bond bubble theory", which says "as long as there's enough discipline to maintain credibility, a large fiscal surplus isn't needed", could be a major paradigm shift in fiscal management. To put it in perspective, it's a paradigm shift comparable to the global monetary system moving from the gold standard to a managed currency system. Even when the gold standard broke down, market economies found a new equilibrium and followed a reasonably stable path. What the new theory suggests about fiscal management is that even if the constraint of running a surplus is removed, market economies will somehow find a stable equilibrium path. We can have more faith in the resilience of market economies.

4. Conclusion: the Historical Role of Rebuilding Liberalism & Growth Strategies

The history of liberalism since the modern era has been like a swinging pendulum, moving back and forth over the inequalities brought about by the development of a market economy. The laissez-faire approach of 19th-century classical liberalism left extreme disparities unchecked, and after the disasters of two world wars and the Great Depression in the 20th century, there was a forced shift toward a welfare-state approach that prioritized reducing inequality through government intervention. However, the rigidity caused by an oversized state led, from the late 1970s onward, to the rise of neoliberalism, which rejected government intervention and placed supreme value on market competition. While this trend helped grow the global economy, it also accelerated the concentration of wealth to the extreme, creating divisions and crises in civil society that are hard to bear today. The rise of the "apocalyptic fascism" discussed in Section 1 is a natural consequence of the structural exhaustion of neoliberalism.

Looking at the flow of history as a whole, we're at a turning point where government intervention is needed to fix inequality and stabilize society. But history has shown that a command economy isn't the answer. The best solution could be "growth-oriented liberalism", which opens up new paths while keeping a free global economy. This means the government boldly invests in basic research and cutting-edge innovation through fiscal policy, expanding the macroeconomic pie to boost people's lives and reduce inequality at the same time. The key policy driving this engine is the "growth strategy".

Modern growth strategies aren't just temporary economic stimulus measures. They have to be a long-term national vision that aligns with fiscal sustainability, backed by the "intrinsic value of government bonds" and "market confidence in fiscal policy" looked at in Section 3. Whether they really succeed depends on whether we can effectively tackle issues like inequality and stagnant living standards while making the most of market mechanisms.

If Japan can present a new growth-oriented liberal model to the world, it could make a big impact on the confusing global society. A growth strategy corrects inequality through growth. Or it effectively pushes forward inequality correction through the distribution of resources necessary for growth. By doing so, it restores social stability, suppresses the pathologies of populism and fascism that eat away at liberalism from within, and passes on an open economic society to the next generation. This is another historical role entrusted to growth strategy, in addition to the formal goal of achieving high economic growth rates.

References

1. Naomi Klein and Astra Taylor. "Rerun or sequel? Naomi Klein and Astra Taylor on end times fascism", *Financial Times*, September 05, 2026.
2. Antolin-Diaz, Juan, and Surico, Paolo (2025). "The Long-Run Effects of Government Spending", *American Economic Review*, 115(7), 2376–2413.
3. Brunnermeier, Markus. K., Merkel, Sebastian, & Sannikov, Yuliy (2024). "Safe Assets", *Journal of Political Economy*, 132(11), 3749–3795.

JS

Dr. Keiichiro Kobayashi has experience in the economic policy-making process as a former government official at the Ministry of Economy, Trade and Industry. His interest in economic research led him to join RIETI and pursue an academic career. His current interests cover areas such as innovation and income inequality.

Building a More Resilient Japan: Supply Chains, Industrial Policy & the Global South

By Yasuyuki Todo



Author Yasuyuki Todo

1. Japan's Supply Chains Remain Vulnerable

In recent years, Japan, like many other countries, has experienced sudden disruptions to trade caused by geopolitical tensions, economic coercion, and armed conflict.

Rare earths provide one example. China introduced export controls on seven rare-earth-related products in April 2025. After Japan-China relations deteriorated further following Prime Minister Sanae Takaichi's remarks on Taiwan in November 2025, China introduced additional export-control measures targeting Japan in early 2026. Chinese exports of the seven rare-earth products to Japan in the first half of 2026 were 51% lower than a year earlier.[1]

Japan has experienced similar disruptions in other areas. In August 2023, China imposed a ban on imports of Japanese seafood following the start of the discharge of Advanced Liquid Processing System (ALPS)-treated water into the sea. Although the ban was partially lifted in June 2025, it was imposed again in November 2025.[2]

In 2026, disruption to shipping through the Strait of Hormuz created another shock. Japan's import volume of crude oil between April and July fell by roughly one-third from the same period a year earlier, while the import volume of naphtha also fell by 22%.[3] The Japanese government responded by releasing oil reserves and accelerating imports from alternative suppliers.

Why do these trade disruptions matter so much? The reason is that their effects do not stop with the companies directly involved in international trade. Instead, the shock spreads and can become much larger, as it propagates through domestic supply chains.

A simulation study I conducted with Hiroyasu Inoue of the University of Hyogo[4] illustrates this mechanism. Using data on more than one million Japanese firms and four million buyer-supplier relationships, we simulated various disruptions to Japan's international trade. In one severe scenario, in which imports from China were reduced by 80% for two months, total value added in Japan fell by about 40%.

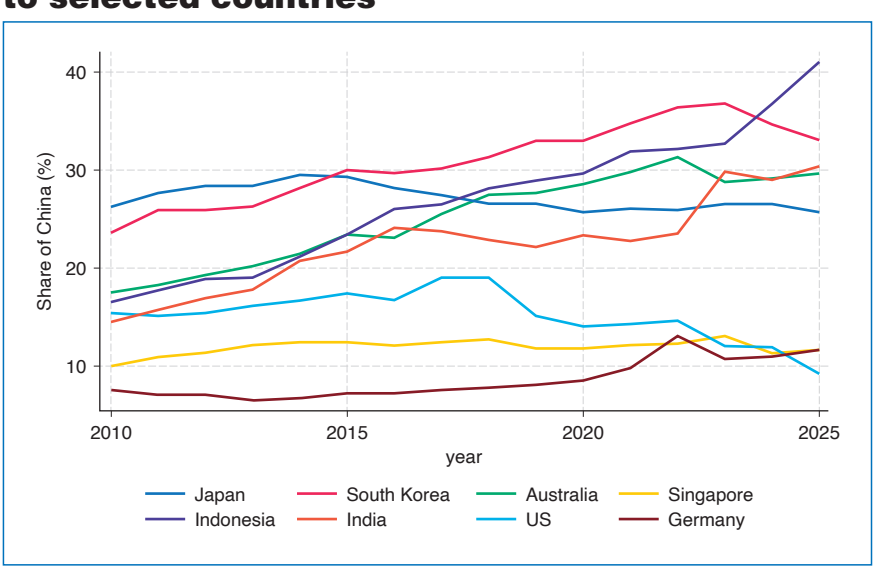
China is particularly important because Japan remains heavily dependent on Chinese suppliers. When imports of materials, parts, or components from China are disrupted, the consequences extend far beyond the companies that import them directly. An importer forced to cut production may reduce its purchases from domestic suppliers. At the same time, its customers may be unable to obtain the parts they need and may also have to reduce production. The shock therefore spreads both upstream and downstream.

Despite these risks which have been increasing recently due to rising Japan-China tensions, Japan's dependence on China has changed surprisingly little. As *Chart1* shows, China's share of Japan's total imports of parts and components has not declined significantly over the past five years. Japan's high dependence, although lower than other Asian countries, contrasts with the United States, which has substantially reduced its reliance on China since the beginning of the US-China trade conflict.

The concentration is even more striking in some strategically important industries. China's share of Japan's automobile-parts imports increased from 36% in 2018 to 44% in 2025. For electrical

CHART 1

China's share in imports of parts & components to selected countries



Source: UN Comtrade

and electronic equipment, China's share has remained at around 45%. Over the same period, the US substantially reduced its dependence on China from 17% to 9% in the former and from 43% to 16% in the latter category.[5]

These figures suggest that supply-chain resilience requires reducing excessive reliance on China in supply chains. One approach for this is to strengthen domestic production capacity in strategically important industries through carefully designed industrial policy. Another is to diversify international supply chains toward a broader range of countries, including rapidly growing economies in the Global South.

These two approaches need not be alternatives. Greater domestic capacity can reduce exposure to external shocks, while broader international networks can prevent excessive dependence on any single country. The central challenge is therefore not to eliminate international supply chains, but to make them more diversified and resilient.

2. Industrial Policy Can Strengthen Resilience – But Its Design Matters

To strengthen domestic production of critical goods, Japan and many other countries have increasingly turned to industrial policy, i.e., government support targeted at strategically important industries using subsidies, tax incentives, and trade protection.

For decades, many economists were skeptical of such policies. Governments may support the wrong industries, subsidies may keep inefficient firms alive, and protected companies may lose the incentive to innovate. The disappointing experience of import-substitution policies in many developing countries from the 1950s through the 1980s reinforced this skepticism.

Recent research, however, suggests that industrial policy can work under the right conditions. A study of South Korea's promotion of heavy and chemical industries in the 1970s, for example, finds that the policy increased production, productivity, and exports, with benefits spreading through supply chains to downstream industries.[6] Research on China's shipbuilding and solar-panel industries likewise finds that government support contributed substantially to their rapid expansion largely through technological improvements.[7] Recent research on semiconductor subsidies across countries also suggests that such policies can expand domestic production and generate international spillovers through knowledge sharing and collaboration.[8]

At the same time, the evidence makes clear that industrial policy or government support does not always succeed. Studies of broader firm subsidies produce much less favorable results. China's subsidies to companies in the late 1990s and early 2000s were found to be more effective when competition within an industry remained strong.[9] Another study using more recent Chinese data finds that subsidies disproportionately went to less productive firms and increased their employment but decreased productivity.[10] Evidence from Europe is similarly cautionary: subsidies increased employment at recipient firms but not their productivity, while harming the sales, employment, and productivity of competing firms. Once these effects on competitors are taken into account, the estimated aggregate effect is negative.[11]

Taken together, the literature points to several principles that appear to matter for effective industrial policy. Support is more likely to produce lasting benefits when it

1. targets sectors with economies of scale or spillovers across sectors;
2. preserves competition rather than protecting individual firms from rivals;
3. remains open to foreign markets and technology;
4. builds supply-chain and knowledge networks that spread benefits beyond subsidized firms;
5. and promotes innovation rather than simply expanding production.

Evaluation of Japan's recent industrial policy

Japan's recent semiconductor policy incorporates several of these features. A prominent example is the government's support for TSMC's semiconductor plants in Kumamoto, Kyushu. An important feature of this policy is its openness to foreign investment and foreign technology. Rather than attempting to develop the entire semiconductor industry behind national barriers, Japan has provided substantial support to attract one of the world's leading semiconductor manufacturers. Government support for the first TSMC plant in Kumamoto amounted to as much as 476 billion yen.

The policy has also emphasized research and innovation. In addition to the plants in Kumamoto, TSMC established its R&D center in Tsukuba in 2021, provided with subsidies from Japan. This research center conducts research on advanced three-dimensional integration and packaging technologies in collaboration with Japanese firms, research institutes, and universities.[12] Such international research networks can facilitate the transfer and creation of knowledge rather than simply relocating production capacity.

The arrival of TSMC has also been accompanied by a broader expansion of the semiconductor ecosystem in Kyushu. Producers of materials, components, and semiconductor-manufacturing equipment, as well as firms that use semiconductors, have announced substantial new investment in the region of 5.7 trillion yen in 231 projects. Government initiatives have facilitated these investments by creating networks among firms, universities, financial institutions, and public organizations, with the aim of promoting information exchange, human-capital development, and collaboration across the regional supply chain.[13]

Rapidus offers a second example. Established in 2022 with substantial government support, Rapidus aims to rebuild Japan's capacity to manufacture leading-edge logic semiconductors. A distinctive feature of the project is its utilization of international

knowledge networks. Rapidus dispatched approximately 150 engineers to IBM's facilities in Albany, New York, to acquire advanced process technology. By 2025, about 80 had returned to its plant in Chitose, Hokkaido, where they were applying this knowledge to its pilot production line. In July 2025, Rapidus announced that it had successfully obtained electrical characteristics from its 2-nanometer-generation GAA transistors.[14] It should be emphasized that this is not a closed policy in the sense that Rapidus will have to compete with established global manufacturers, including TSMC, rather than operate in a protected domestic market.

It is still too early to judge whether these semiconductor policies will ultimately be commercially successful. But their design contains several elements emphasized by the recent industrial-policy literature: openness to foreign technology, international research collaboration, development of regional supplier networks, and continued exposure to domestic and international competition.

Investments in the 17 strategic fields should be open and innovation-oriented

These lessons are becoming increasingly important because Japan is now extending industrial policy far beyond semiconductors. The Japan Growth Strategy adopted in July 2026 identifies 17 strategic fields and 62 major products and technologies, ranging from AI and semiconductors to quantum technology, aerospace, biotechnology, critical minerals, energy, and defense-related industries. The associated roadmap envisages more than 370 trillion yen in cumulative public and private investment through fiscal 2040. Importantly, this figure refers to combined public and private investment, not government expenditure alone.[15]

The semiconductor experience suggests one way to assess such programs. The key question is not simply how much public money is spent, but how much additional activity that spending generates. Public support can be particularly valuable when it induces much larger private investment, creates regional supply chains, generates international knowledge networks, or facilitates innovation that continues after the subsidy itself ends. By contrast, a project that requires continuing government support simply to remain viable provides much weaker evidence that new industrial capabilities have been created.

The literature also highlights the importance of exit mechanisms. Large initial support may sometimes be justified when economies of scale or coordination failures require a "big push". However, some studies show that subsidies are provided to less productive firms to survive without any positive impact on the entire economy, suggesting that support should be selective and short-lived. Technological progress, private investment, and networks with other firms provide observable benchmarks against which policies in a particular industry can be assessed. Policies that consistently fail to generate such outcomes can then be reconsidered rather than automatically receiving additional support.

Japan's investments in the US can be used for domestic industry development

Another related suggestion arises from the large Japan-US strategic investment initiative agreed in 2025. The two governments established a framework involving up to $550 billion of Japanese investment in the US in areas including semiconductors, pharmaceuticals, energy, advanced materials, quantum technology, and other strategically important industries. Japan subsequently established a new Japan Bank for International Cooperation (JBIC) facility to support overseas investment in fields important for economic and national security.[16]

Although these Japanese investments are not aimed to develop domestic industries in Japan, they can be utilized for that purpose if they are associated with knowledge flows from the US. One possibility is to link these investments more closely to joint research and development. Japanese companies investing in the US can collaborate with US universities, national laboratories, startups, and technology companies. The Rapidus-IBM partnership illustrates how overseas investment and international knowledge transfer can reinforce one another.

For example, the projects already selected under the Japan-US strategic investment framework include investments in the synthetic diamond industry, in which Japan has strengths in diamond semiconductor technologies whereas the US has advanced capabilities in military and space applications. Therefore, joint R&D associated with the investment could promote mutual learning and innovation.

The Japanese government should therefore encourage joint R&D to be incorporated into projects under the US-Japan investment framework. Doing so could transform these large-scale investments into opportunities to deepen knowledge networks with US firms, universities, and research institutions and thereby strengthen Japan's own innovation capacity.

Seen in this way, investment in the US need not conflict with Japan's industrial policy. If public support for overseas investment helps Japanese firms gain access to advanced technologies, build international research networks, and transfer the resulting knowledge back to Japan, it can become an important measure of open industrial policy.

3. Diversification Toward the Global South Can Also Strengthen Resilience

Domestic production alone cannot make Japan economically secure or resilient. Japan will continue to depend on overseas sourcing and production because modern supply chains are highly internationalized and specialized. Even in semiconductors, no country can efficiently reproduce the entire global supply chain within its own borders.

Therefore, the second pillar of resilience should be to diversify Japan's supply-chain partners across a wider range of countries and

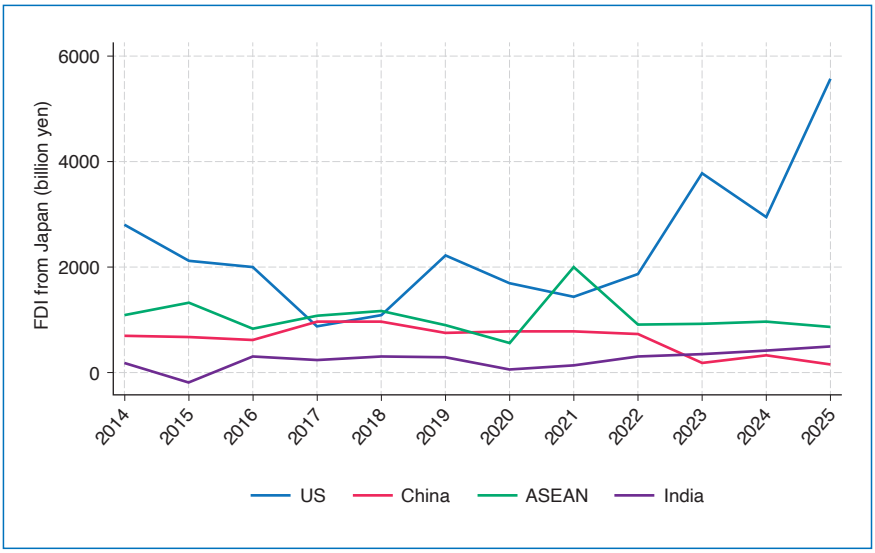
reduce its heavy dependence on China shown in *Chart 1*. The Global South, developing and emerging economies, should play a central role in this strategy for three reasons.

First, production and procurement in many Global South countries remain more cost-effective than in advanced economies. Second, these countries are already major markets and are likely to become even more important. The combined GDP of ASEAN, as well as the GDP of India, is already comparable to that of Japan. Third, some Global South countries have significant reserves of critical minerals and other materials whose production is currently concentrated in China.

Yet Japan has made only limited progress in diversifying its supply chains toward the Global South, despite the growing emphasis on economic resilience. *Chart 2* shows that Japanese manufacturing FDI in ASEAN has remained broadly stagnant for many years. Investment in India has increased recently, but its scale is still much smaller than investment in ASEAN.

CHART 2

Foreign direct investment in the manufacturing sector from Japan to selected countries/regions



Source: Bank of Japan

Two factors may be particularly important in explaining this limited diversification. One is intensifying competition with China over official finance, including official development assistance (ODA), in the Global South. The other is the burden created by environmental regulations imposed by advanced economies, including Japan, which can be difficult for firms and producers in developing countries to meet.

Official finance should be effectively utilized

China moved earlier than Japan and many other advanced economies to deepen its economic ties with the Global South. Through the Belt and Road Initiative (BRI), it combined infrastructure investment, public finance, trade, and private investment. Empirical studies find that the BRI strengthened economic links between China and participating countries: Chinese FDI increased, and exports from BRI countries to China also expanded. By contrast, Japan did not experience a comparable increase in investment links with these countries, while its relative presence in infrastructure investment and diplomatic relationships weakened.[17]

Whatever its geopolitical implications, the BRI highlights an important economic lesson: supply chains do not develop automatically. Infrastructure, information, finance, and trust all influence where firms choose to invest and trade. Public policy can therefore play an important role in shaping the geography of supply chains.

Japan already has institutions that can serve this purpose. ODA through Japan International Cooperation Agency (JICA) and other official finance through institutions such as the JBIC can improve infrastructure, reduce information barriers, share investment risks, and help Japanese firms establish relationships in markets they might otherwise be reluctant to enter. Empirical research has indeed found that Japanese ODA can encourage subsequent Japanese FDI in recipient countries.[18] In this sense, official finance can serve not only recipient countries but also Japan by helping create new international production networks.

Japan has recently strengthened these policy instruments. An amendment to the JICA Act that took effect in April 2025 expanded JICA's financial tools, including guarantees and bond acquisition, with the aim of mobilizing more private-sector capital for development.[19] Further reforms involving the JBIC in 2026 introduced additional instruments for overseas projects related to economic security, including financing mechanisms that can take greater risks in order to encourage private investment.[20]

These reforms make it easier to use public finance as a catalyst rather than relying solely on traditional ODA. This is particularly important because Japan cannot and need not compete with China simply by matching the scale of its public spending. A more effective strategy is to use limited public resources to leverage much larger private investment. ODA and other forms of official finance can help Japanese firms enter new markets, build supplier relationships, and diversify supply chains toward the Global South.

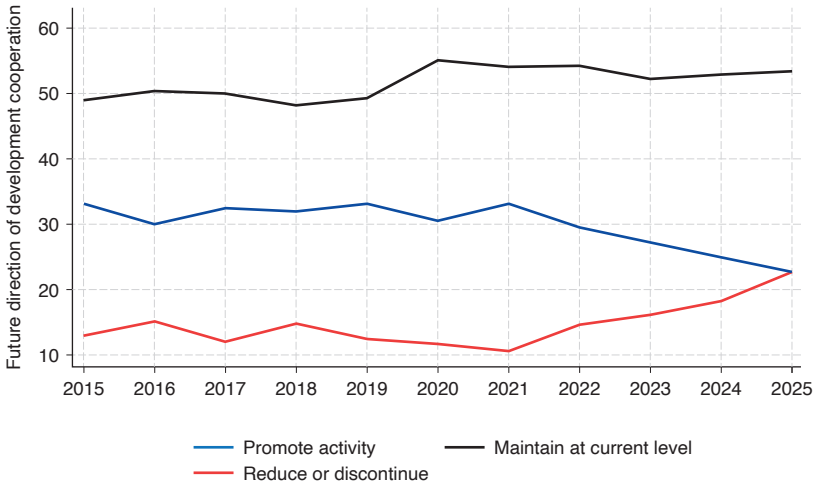
However, there is an important domestic constraint. Public support for development cooperation in Japan has weakened in recent years. According to the Cabinet Office survey, the share of respondents favoring a reduction or termination of development

cooperation rose from 10.6% in 2021 to 22.8% in 2025 *(Chart 3)*.[21] At a time of fiscal pressure and rising living costs, public support for overseas assistance cannot be taken for granted.

This makes it increasingly important for the government to explain that development cooperation is not simply a transfer of resources abroad. When it helps build infrastructure, create business networks, diversify procurement, and reduce excessive dependence on a small number of countries, it can benefit both recipient economies and Japan. Framing ODA and official finance in this way, as instruments for both domestic economic growth and supply-chain resilience, may be essential for sustaining public support.

CHART 3

Japanese citizens' view of development cooperation



Source: Cabinet Office, Public Opinion Survey on Diplomacy

A more flexible approach to the green transition is needed

Another obstacle to Japan's expansion of supply chains into the Global South is the burden created by environmental regulations in advanced economies. The EU's Carbon Border Adjustment Mechanism (CBAM), fully implemented from 2026, imposes carbon-related costs on imports of products such as steel, aluminum, and cement according to the emissions generated in their production. Such measures can contribute to global decarbonization, but they may also disproportionately affect developing economies, where firms often have less access to low-carbon technologies and financial resources. Simulation studies suggest that the CBAM could reduce production and exports in many developing countries.[22]

Similar tensions arise in energy finance. OECD countries, including Japan, have sharply restricted official support for new unabated coal-fired power generation. China, by contrast, has continued to support some overseas coal-related projects despite its 2021 pledge to stop building new coal-fired power plants abroad.[23] This difference can make Chinese finance more attractive to developing countries that continue to prioritize affordable and reliable energy supplies alongside decarbonization. Recent disruptions to global energy markets, including the Strait of Hormuz crisis, have further highlighted the importance of balancing climate objectives with energy security and supply-chain resilience.

Japan should therefore pursue a gradual and flexible approach to decarbonization in the Global South. Developing countries need to reduce emissions, but they must also secure affordable energy, employment, and economic growth. The Japan-led Asia Zero Emission Community (AZEC) reflects this idea through its principle of "one goal, various pathways", supporting measures such as energy efficiency and the use of lower-emission transition fuels where appropriate.[24] More recently, Japan launched POWERR Asia, providing approximately $10 billion in financial cooperation to strengthen energy supply chains, diversify energy sources, expand stockpiling, and improve energy efficiency.[25]

By combining decarbonization with energy security and economic development, Japan can offer the Global South a pragmatic path toward the energy transition. Such an approach can strengthen trust in Japan, create opportunities for Japanese technologies and firms, and at the same time support the diversification of Japan's supply chains. Environmental and energy cooperation can therefore become an important part of Japan's broader strategy for economic resilience.

4. Summary & Conclusion

Economic security should not mean retreating from globalization. For Japan, which depends heavily on international trade, investment, energy, resources, and foreign technology, self-sufficiency is neither realistic nor desirable. The more appropriate objective is resilient interdependence: preserving the benefits of international integration while reducing excessive dependence on particular countries, suppliers, technologies, and transport routes.

At home, this requires an open form of industrial policy that strengthens strategic production capacity while preserving competition, encouraging private investment, and connecting Japanese firms to international technology and knowledge networks. Abroad, Japan should diversify its supply chains toward ASEAN, India, Africa, and other parts of the Global South. ODA and other official finance can support this process by improving infrastructure,

reducing investment risks, and mobilizing private investment. Japan should also pursue a pragmatic approach to decarbonization that balances environmental goals with energy security and economic development in partner countries.

The central principle is therefore diversification combined with openness. Resilience comes from having multiple suppliers, energy sources, production locations, and knowledge partners, not from economic isolation. Japan's economic-security strategy should aim to broaden its international networks while strengthening its domestic capabilities. In this sense, economic security is not about disconnecting Japan from the world, but about connecting it to the world in a broader, more flexible, and more resilient way.

References

1. *Nikkei Asia*. Aug. 8, 2026. https://asia.nikkei.com/business/materials/china-rare-earth-exports-to-japan-us-plunge-after-restrictions
2. *The Guardian*. Nov. 19, 2025. https://www.theguardian.com/world/2025/nov/19/china-suspends-seafood-imports-from-japan-as-taiwan-row-escalates
3. Trade Statistics of Japan, Ministry of Finance. https://www.customs.go.jp/toukei/info/index_e.htm
4. Inoue, H., and Todo, Y., 2023. "Disruption of international trade and its propagation through firm-level domestic supply chains: A case of Japan", *PLOS ONE 18*, e0294574.
5. UN Comtrade. https://comtradeplus.un.org/
6. Lane, N., 2025. "Manufacturing revolutions: Industrial policy and industrialization in South Korea", *The Quarterly Journal of Economics* 140, 1683-1741.
7. Kalouptsidi, M., 2018. "Detection and impact of industrial subsidies: The case of Chinese shipbuilding", *The Review of Economic Studies* 85, 1111-1158. Banares-Sanchez, I., Burgess, R., Laszlo, D., Simpson, P., Van Reenen, J., and Wang, Y., 2026. "Ray of hope? China and the rise of solar energy", Working paper.
8. Goldberg, P.K., Juhász, R., Lane, N.J., Forte, G.L., and Thurk, J., 2024. "Industrial policy in the global semiconductor sector", NBER Working Paper, No. 32651, National Bureau of Economic Research.
9. Aghion, P., Cai, J., Dewatripont, M., Du, L., Harrison, A., and Legros, P., 2015. "Industrial policy and competition", *American Economic Journal: Macroeconomics* 7, 1-32.
10. Branstetter, L.G., Li, G., and Ren, M., 2023. "Picking winners? Government subsidies and firm productivity in China", *Journal of Comparative Economics* 51, 1186-1199.
11. Marques, L.B., and Toprak, H., 2024. "A bitter aftertaste", IMF Working Paper, No. 24/250, International Monetary Fund.
12. AIST. 2025. https://unit.aist.go.jp/cpo-eleman2022/ASMA/
13. METI, 2026. https://www.kyushu.meti.go.jp/seisaku/jyoho/oshirase/260319_1_3.pdf
14. Rapidus. 2025. https://www.rapidus.inc/en/interview/it0002
15. Cabinet Secretariat, 2026. Japan's Growth Strategy. https://www.cas.go.jp/jp/seisaku/nipponseichosenryaku/pdf/jgs2026en.pdf
16. Ministry of Finance. 2025. https://www.mof.go.jp/policy/international_policy/economic_assistance/jbic/jbic_facility_250926.html
17. Todo, Y., Nishitateno, S., and Brown, S., 2025. "The impact of the Belt and Road Initiative on foreign direct investment from China, the United States, and major investor countries", *Journal of the Japanese and International Economies* 77, 101365.
    Li, H., and Todo, Y., 2025. "The direct and indirect effects of the Belt and Road Initiative on exports to China", *The World Economy*, https://doi.org/10.1111/twec.70159.
    Nishitateno, S., and Todo, Y., 2026. "Economic and diplomatic impacts of the Belt and Road Initiative on western nations in infrastructure investment competition: Evidence from Japan", *Review of International Economics* 34, 1032-1043.
18. Kimura, H., and Todo, Y., 2009. "Is foreign aid a vanguard of foreign direct investment? A gravity-equation approach", *World Development* 38, 482-497.
    Choi, W., 2026. "Selection bias in aid effectiveness: Evidence from aid for trade and foreign direct investment", *The World Economy*, https://doi.org/10.1111/roie.70068.
19. Ministry of Foreign Affairs. 2025. https://www.mofa.go.jp/mofaj/ic/dapc/pagew_000001_00001.html
20. Cabinet Office. 2026. https://www.cao.go.jp/houan/pdf/221/221_1gaiyou.pdf
21. Cabinet Office. 2026. https://survey.gov-online.go.jp/diplomacy_defense/202511/r07/r07-gaiko/
22. Sun, X., Mi, Z., Cheng, L., Coffman, D.M., and Liu, Y., 2024. "The carbon border adjustment mechanism is inefficient in addressing carbon leakage and results in unfair welfare losses", *Fundamental Research* 4, 660-670.
23. Reuters. 2024. https://www.reuters.com/sustainability/cop/hold-china-still-backs-overseas-coal-plants-despite-2021-pledge-research-shows-2025-04-29/
24. Ministry of Economy, Trade and Industry. 2025. https://www.meti.go.jp/english/policy/energy_environment/global_warming/azec/azec_en.html
25. Ministry of Economy, Trade and Industry. 2026. https://www.meti.go.jp/english/press/2026/0421_002.html

JS

Yasuyuki Todo is a professor at the Graduate School of Economics, Waseda University and a program director at the Research Institute of Economy, Trade and Industry (RIETI). He specializes in empirical research in international economics and development economics. His current research focuses on the role of supply chains and knowledge networks on economic growth and resilience.

Japan's Science, Technology & Innovation Strategy: Strategic Prioritization, Open Science & Economic Security

By Kazuyuki Motohashi



Author
Kazuyuki Motohashi

Introduction

Japan's Seventh Science, Technology and Innovation Basic Plan, adopted in March 2026, represents a significant reorientation of the country's science, technology and innovation policy. Covering fiscal years 2026–2030, the Plan is based on a diagnosis that scientific knowledge is becoming increasingly important as a source of technological innovation, and the proximity between science and innovation is shortening. At the same time, intensifying geopolitical tension has made advanced science and technology an increasingly important element of national and economic security.

The Plan seeks to respond to these changes through six pillars: the "revitalization of science" as the foundation of knowledge; strategic prioritization of technology fields; organic linkage between science and technology policy and national security; upgrading the innovation ecosystem connecting industry, academia and government; strategic science and technology diplomacy; and reform of governance and implementation. The overall objective is to rebuild Japan's research capabilities and translate them more effectively into national strength. The Integrated Innovation Strategy 2026, adopted on July 14, 2026, serves as the first annual implementation strategy under the Seventh Basic Plan and translates these six pillars into measures to be pursued particularly during FY2026 and FY2027.

I agree with two basic propositions underlying this policy shift. First, Japan needs to rebuild its scientific capability because science is becoming increasingly important to technological innovation. Second, because science has become more closely connected to economic value and technological capability, science and technology policy can no longer be considered independently of economic security.

My concerns relate less to these diagnoses than to how they are translated into policy. I focus on two issues. The first is strategic prioritization. The Plan identifies 17 strategically important technological fields, but the innovation processes underlying these fields are highly heterogeneous. Prioritization should therefore move beyond identifying important technologies toward understanding how innovation actually occurs in each field. The second issue concerns economic security. Once this heterogeneity is recognized, the appropriate point of security intervention must also differ across technologies. The relevant distinction is not simply between academia and industry, but between open knowledge creation and activities sufficiently close to strategically sensitive technological capabilities from national security perspectives.

Science & Innovation Are Becoming Closer – But Not Uniformly

The Plan's emphasis on the growing proximity between science and innovation is supported by empirical evidence. In our study of the relationship between scientific publications and patents in Japan, we used text information from approximately 1.7 million research papers involving Japanese authors and 12.3 million patents filed at the Japan Patent Office. By placing papers and patents in a common semantic space and identifying neighboring documents on the basis of textual similarity, we constructed indicators of the degree to which patented technologies are linked to scientific research.

The results show a clear long-term increase in the science intensity of inventions. Patents have increasingly appeared in technological spaces in which related scientific publications already exist. This trend is particularly pronounced for patents involving universities and public research institutes and university–industry collaboration. At the same time, however, the relationship is asymmetric: technology increasingly draws on science, but scientific research itself has not become correspondingly oriented toward existing technologies.

This distinction matters. The growing importance of science for innovation does not mean that science and innovation have become identical activities. Indeed, 58.2% of patents in our dataset had no scientific paper among their 200 closest neighboring documents. Large areas of technological development therefore continue to have little direct overlap with academic science.

More importantly for policy, science–technology relationships differ substantially across technological fields. Some technologies are strongly stimulated by advances in scientific understanding. Others evolve through engineering, production experience, changing customer requirements, new product architectures, standards, and market competition. This heterogeneity has direct implications for the Seventh Basic Plan's strategic prioritization.

Strategic Prioritization: Different Technologies Follow Different Innovation Regimes

The Seventh Basic Plan identifies 17 important technology areas, including six designated as national strategic technology areas: AI

and advanced robotics; quantum technologies; semiconductors and communications; biotechnology and healthcare; fusion energy; and space. The rationale for concentrating resources on strategically important technologies is understandable. In addition, the Integrated Innovation Strategy 2026 accordingly places the 17 areas at the center of its strategic technology policy. The government has articulated broad criteria for strategic selection, including economic and social importance, technological promise, and Japan's existing or potential capabilities. The issue is therefore not simply the absence of criteria. Rather, the selection process of these technologies is not transparent. Furthermore, it does not seem that the government take into the account the differences in innovation process by technologies to come up with priority fields.

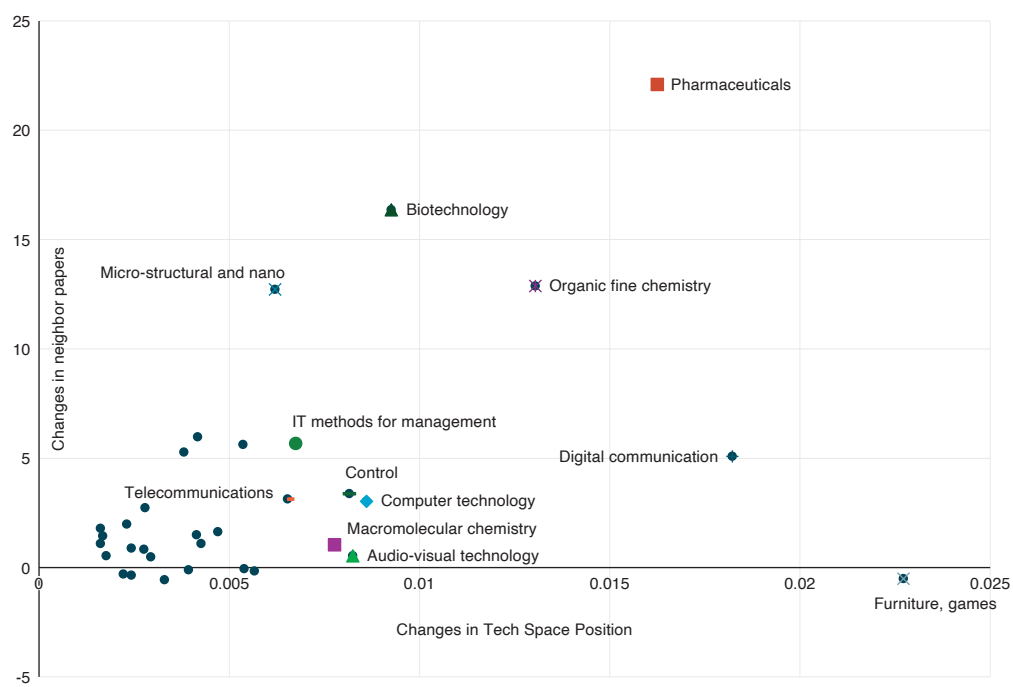
The *Chart*, extracted from our empirical analysis based on research paper and patent documents, compares 35 technology fields along two dimensions. The horizontal axis indicates the degree of technological change between the 1990s and the 2010s, measured by the movement of each technology field in patent-text space. The vertical axis represents the change in science intensity, measured by changes in the number of scientific papers located close to patents in the same technological space.

The pattern is revealing. Pharmaceuticals, biotechnology, organic fine chemicals, and nanotechnology combine substantial technological change with a significant increase in science intensity. These fields can broadly be interpreted as exhibiting a science-push innovation regime: changes at the scientific frontier generate new technological opportunities that can subsequently be translated into inventions and commercial applications.

In contrast, in other technologies such as digital communication and furniture and games, substantial movement in technology space is observed while the science intensity is very low and shows almost no change. Digital communication technology has changed substantially in this decade, by communication speed and quality (e.g. 3G to 5G in mobile telecommunication service). The changes in furniture and game is found in an advancement of mobile Internet gaming. In both cases, such technological progress is not driven by

CHART

Changes in science intensity & technological position across technology fields



Source: Motohashi, Koshiba, and Ikeuchi (2024), "Measuring science and innovation linkage using text mining of research papers and patent information", Scientometrics, 129: 2159-2179, Fig. 14. The horizontal axis measures changes in technology-space position between the 1990s and the 2010s, while the vertical axis measures changes in science intensity through the number of neighboring scientific papers around patents.

scientific progress, but suppliers' reactions to market demand.

This distinction should not be interpreted as one between "scientific" and "non-scientific" technologies. Scientific knowledge matters in virtually all advanced technological fields. Rather, it concerns the relative forces directing technological change. In some fields, new scientific knowledge itself creates technological opportunities. In others, customer demand, engineering improvements, production learning, standards, new product architectures, or market competition play relatively greater roles. The distinction can therefore be understood as a continuum between science-push and market- or engineering-driven innovation. Biotechnology provides a relatively clear example of the former. Digital communications lie closer to the latter.

Given such heterogeneity in the nature of technological progress, I will illustrate more detailed features of six strategic fields in the Plan, and recommend policy instruments for each *(Table)*.

The mechanism connecting science to innovation substantially varies by technology field, so that the policy instrument for technological competitiveness is different. Biotechnology is a typical case of science-driven technology. A similar characteristic is found both in quantum technology and fusion energy. In these fields, frontier scientific capabilities with specialized research infrastructure are required to make them technologically competitive. In contrast, the semiconductor and communication field requires more industrial technological development, so that a relevant policy is for facilitating a firm's activity of ecosystem formation and technological standardization. In the AI field, the pass-breaking technologies such as transformer models came from an industry, and hyper-scalers are implementing them into foundational AI models. Therefore, the issues in AI innovation are computing resources and engineering talents to make them into new products and services. Finally, space technology is a system's innovation based on complex models, so that public procurement is important to overcome coordination problems with a variety of technological components.

Again, it is important to re-evaluate the criteria for prioritization, described in the Plan, i.e., economic and social importance, technological promise, and Japan's existing or potential capabilities, seen from an innovation system's lens. It is also important for the government to identify where technological opportunities originate, where Japan's principal bottlenecks lie, which actors are responsible for moving knowledge toward commercialization, and how strongly the innovation process depends on international scientific, technological and production networks.

The annual nature of the Integrated Innovation Strategy provides an institutional opportunity to take into account the heterogeneity in the nature of technology operational. Rather than simply repeating a list of 17 important technologies each year, the Strategy could attach an "innovation profile" to each priority field. The profile would identify the field's dominant innovation regime, and specific policy instruments for each technology field should be identified as an implementation plan.

Such technologies themselves move along the science–market spectrum, so that the profiles should be periodically revised rather than treated as permanent classifications. AI, for example, has shifted rapidly from a field strongly associated with academic research toward one in which computing infrastructure, applications

TABLE

Technology regime & potential policy instruments for priority technology fields

National strategic technology area	Dominant innovation regime	Illustrative focus of policy
AI and advanced robotics	Mixed: science + market/engineering	human resource development, compute/ data infrastructure
Quantum technologies	Mainly science-push	basic research investment, science-to-technology transfer
Semiconductors and communications	Mixed, strongly engineering/market-driven	ecosystems, supply chains, standards
Biotechnology and healthcare	Mainly science-push, with downstream market regulation	science, commercialization, startup and regulatory ecosystems
Fusion energy	Science/mission-push	public R&D and large mission-oriented projects
Space	Engineering/mission-driven with growing market component	procurement, public infrastructure, commercial ecosystems

Source: Compiled by the author

and industrial deployment play increasingly important roles. Strategic prioritization therefore needs to be updated regularly.

Economic Security: Intervention Should Follow Technological Risk

The growing proximity of science and innovation inevitably raises economic-security concerns. The Seventh Basic Plan explicitly treats science and technology as important components of national security, while current government policy seeks to combine research security with the maintenance of an open and free research environment and international collaboration.

I agree that economic security must now be incorporated into science and technology policy. Traditionally, science policy such as funding to non-profit academic institutions was not within the scope of national security. However, as the proximity of science and innovation gets closer, the scientific progress becomes to influence technological competitiveness directly. In addition, the distinction between military and civil uses of technology is blurring, particularly in emerging technologies such as AI and quantum computing. Therefore, there is no question that the science and technology policy takes into account the economic security issues. The question is where and how intervention should occur.

An overly simple distinction between open academic science and proprietary corporate technology is no longer adequate. The more relevant boundary is the proximity of an activity to deployable technological capability.

In a strongly science-push field, a large domain of academic research may remain far upstream from identifiable commercial or security applications. Researchers explore many scientific trajectories, only a small fraction of which eventually generate economically valuable technologies. International conferences, researcher mobility, joint publications and informal exchange are important mechanisms through which this frontier advances. Restricting them too early may reduce precisely the pool of knowledge from which strategically important innovations subsequently emerge.

This consideration is especially important for Japan. Japan cannot reproduce the global scientific frontier within its national borders. Access to international research networks and leading researchers is therefore an input into domestic scientific capacity itself. Excessive restrictions on upstream science could weaken rather than strengthen Japan's long-term economic security.

However, in relatively market- or engineering-driven strategic fields, university research itself can be close to commercially or strategically relevant applications. University–industry projects in semiconductors, communications, robotics, cybersecurity or applied AI may involve prototypes, production processes, sensitive data or proprietary know-how. Institutional location within a university does not necessarily imply that the activity belongs to upstream basic research.

This institutional distinction has also become increasingly blurred by the rise of the entrepreneurial university. Beginning most visibly in the United States and subsequently spreading to other countries, universities have become active participants in the commercialization of research through patenting, licensing, industry-sponsored research, university spin-offs, and other forms of technology transfer. This trend has also reached Japan through policies promoting technology licensing organizations, university ownership and management of intellectual property, and university-based startups. Universities therefore remain nonprofit institutions with public missions, but they can no longer be treated simply as actors located outside commercial innovation. In many fields, they participate directly in the process through which scientific knowledge is converted into proprietary technologies and marketable assets. The appropriate principle for academic science is therefore not non-intervention, but a presumption of openness combined with risk-based safeguards.

International scientific collaboration should remain the default for open knowledge creation. Safeguards should become progressively stronger as research approaches identifiable intellectual property, sensitive data, prototypes, production know-how, commercially deployable technologies or capabilities with clear military or dual-use relevance. In market-driven strategic fields, this boundary may arise relatively early; in fundamental science-intensive fields, it may arise later.

This risk-based approach is broadly consistent with Japan's current policy direction. The government states that research security should be strengthened while maintaining an open and free research environment and promoting international joint research. What remains difficult is translating this general principle into operational distinctions at the level of particular fields and research activities. A further complication concerns government reach. There is an important difference between where government *should* intervene and where it *can* intervene effectively.

Universities and public research institutions are comparatively accessible to government policy because competitive grants, institutional funding and public research infrastructure provide channels through which disclosure requirements, due diligence, cybersecurity rules and research-security procedures can be imposed. Privately financed corporate R&D is more difficult to control directly. Governments have instruments such as export controls, investment screening, procurement, subsidy conditions and intellectual-property rules, but these offer only partial leverage

over internal corporate knowledge creation and international technological exchange.

This asymmetry creates a potential regulatory bias, that is, the activities that are easiest for government to regulate are not necessarily those that pose the greatest security risk. If research-security policy focuses disproportionately on universities simply because public funding makes them administratively easier to control, the government could restrict valuable international scientific exchange while leaving more commercially consequential knowledge flows comparatively difficult to address.

Recently, some cases of restricting research grants to international students have been spotted, which should be scrutinized by the security risk profile of each type of project, which I would propose as a second component to innovation profiles for prioritization in the previous section. The two profiles would answer different questions. The innovation profile would ask: How does innovation occur, and where is Japan's bottleneck? The security profile would ask: Where does strategic sensitivity arise, through what channels could capability be lost or controlled by foreign actors, and what intervention is proportionate and feasible?

For example, in biotechnology, the security profile should assess the dual-use potential of particular research outputs, datasets, biological materials, and platform technologies, as well as the consequences of their transfer to foreign actors. The key issue is whether such assets could contribute to military or public-security applications, or whether their loss could create strategic dependence in technologies that are difficult to replace.

In semiconductors, the relevant risks are different. A security profile should identify technological choke points in advanced processes, equipment, materials, design, and manufacturing capability; assess the risk of critical know-how moving abroad; and examine whether Japan could become dependent on foreign suppliers for technologies it cannot readily substitute domestically. Such dependence would become a serious economic-security vulnerability if geopolitical tensions or export controls were used to restrict exports of advanced semiconductor products or production equipment to Japan. Security assessment should therefore cover both outbound leakage of strategic technology and inbound vulnerability arising from the loss of domestic capability.

The Integrated Innovation Strategy, because it is updated annually, is well suited to this task. Each year, the government could review the 17 strategic areas on the basis of updated innovation and security profiles, rather than treating designation itself as the endpoint of strategic policy. This would also make it easier to explain why policy instruments and degrees of openness differ across fields.

Conclusion

The Seventh Science, Technology and Innovation Basic Plan represents an important step in Japan's effort to rebuild its scientific and technological capabilities. Its emphasis on revitalizing science is well founded, as is its recognition of the growing proximity between scientific research and innovation. The incorporation of economic security into science and technology policy is also unavoidable in an era of geopolitical and technological competition. The challenge lies in avoiding excessive uniformity.

The first issue is strategic prioritization. Six fields in the Plan provide useful signals of national importance, but a technology list alone is not a strategy. The *Chart* demonstrates empirically that technological fields differ substantially in the relationship between scientific knowledge and technological change. Pharmaceuticals, biotechnology and nanotechnology show patterns consistent with relatively science-push innovation, whereas digital communication illustrates technological dynamism in which market change and product development appear to play a more prominent role.

Priority-setting should therefore be accompanied by an innovation profile for each strategic field, specifying its innovation regime, Japan's bottlenecks, major actors, international dependencies and appropriate policy instruments.

The second issue follows directly from the first. Economic-security policy must also vary across innovation regimes. Some academic science remains far upstream and benefits greatly from openness and global exchange. Other university research, particularly in market- and engineering-driven fields, may already be close to deployable technology. A simple academia–industry distinction is therefore inappropriate.

Each innovation profile should consequently be paired with a security risk profile, identifying where strategically sensitive capabilities arise, the nature of the risks involved, and the most proportionate and feasible means of addressing them. Updating both profiles through the annual Integrated Innovation Strategy would allow Japan to move from static technology selection toward dynamic portfolio management of strategic technologies.

Ultimately, the Seventh Basic Plan should be judged not by how many technologies it identifies as strategic or how many restrictions it introduces, but by whether it can simultaneously maintain access to the global scientific frontier, build domestic technological and industrial capabilities, and protect genuinely strategic knowledge.

JS

Kazuyuki Motohashi is a professor at the Research Centre for Advanced Science and Technology, the University of Tokyo, and Faculty Fellow of the Research Institute of Economy, Trade and Industry. Until this year, he had held a variety of positions in METI as well as being an economist at the OECD.

Maintaining Competitive Neutrality Through International Coordination of Industrial Policy: Lessons from China's Electric Vehicle Policy



Author Mariko Watanabe

By Mariko Watanabe

For developing countries, industrial policy is an indispensable instrument of national economic growth. As long as a country remains a small player in the world of international trade, the effect of its own industrial policy on the international economy can safely be ignored. When a large country with a major presence in the global economy pursues industrial policy unilaterally, however, the result is a "production relocation externality": just as when a large country unilaterally imposes a tariff, the policy destroys the industrial base of other countries. These negative effects fall more heavily on emerging economies and small countries such as Vietnam, Turkey and India than on advanced economies such as Japan, the United States and European nations. What is needed is a stronger framework that prevents the scramble for markets that unilateral industrial policy sets in motion, and that allows the gains from economies of scale to be shared internationally.

Friction Economic & Industrial Policy

The economic friction between the US and China had already begun to take shape during the administration of President Barack Obama. Attributing the overwhelming cheapness of Chinese products to China's state-owned enterprise system and to unfair government support, the Obama administration imposed countervailing duties on a wide range of imports from China. Yet the argument that "invisible subsidies" constitute an unfair trade practice was not accepted by the WTO dispute settlement mechanism.

Subsequently, following the US-China negotiations under the first administration of President Donald Trump after the 2016 election, the two countries each raised their import tariffs on the other above the WTO most-favored-nation (MFN) rates. The administration of President Joe Biden then maintained these tariffs on China. The result was that the level of Chinese exports to the US was sustained, with goods rerouted through Mexico and Vietnam.

The Biden administration went further. Through the Inflation Reduction Act and the CHIPS Act it adopted an explicit agenda of industrial promotion, requiring that electric vehicles and other products be manufactured within the US, and implementing measures that excluded the use of Chinese-made automotive batteries. As discussed below, this was in effect an adoption, in a different guise, of the very methods that China had used in its industrial policy for electric vehicles.

Behind the US-China friction lies the fact that China, in the course of its rapid industrial growth, acquired economies of scale, and that as a consequence the capture of markets and the abuse of monopoly power – carried out in the name of economic efficiency – have reached a level that can no longer be overlooked. Precisely because industrial policy is a means of securing economies of scale, it has become the focal point of economic friction. This is exactly the same structure that produced the Japan-US economic friction of earlier decades.

In their analysis of Japanese industrial policy in 1987, Ryutaro Komiya summarized the problems that industrial policy creates and the means of avoiding friction as follows:

> *"(Industrial policy) becomes a problem when one country alone carries out extreme policy intervention and pushes aside industries already established in other countries – that is, when it secures its own gains by taking away the gains of others. Accordingly, international rules on policy intervention in research and development and in learning are necessary, and it is desirable to form an international consensus on horizontal specialization among countries, and on the international dispersion of production bases through direct investment and industrial cooperation, so that no single country monopolizes the advantageous industries."*

The instruments available under the current WTO-centered trade rules are insufficient to correct the economic frictions generated by economies of scale and need to be strengthened.

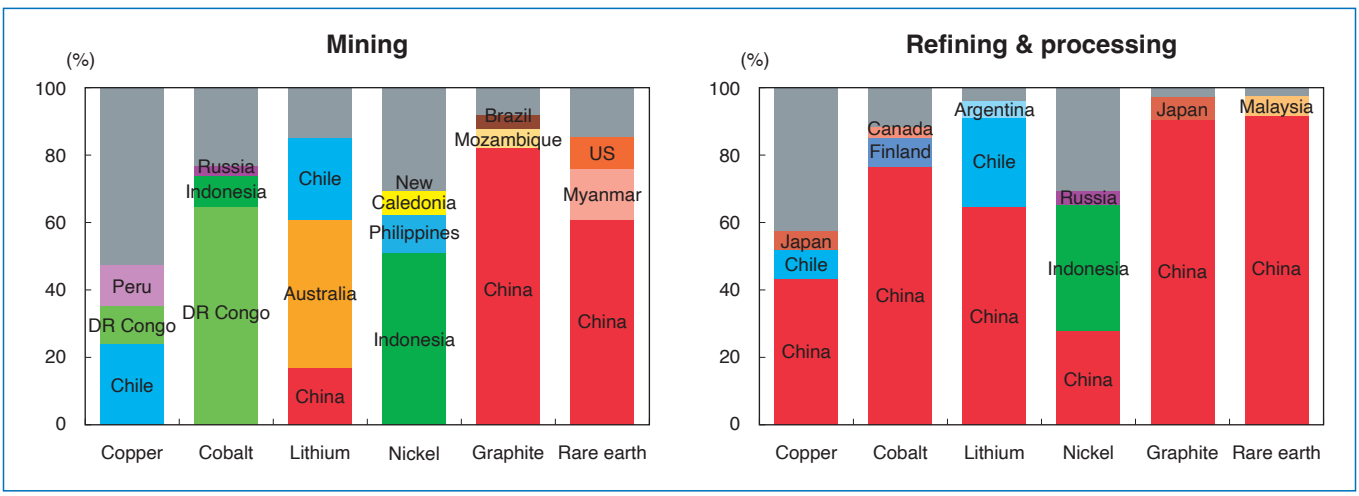
Economic Security & Trade Rules

In recent years, moreover, the need to raise awareness of economic security has been voiced repeatedly in Japan. Behind this lies the fact that China has built up enormous productive capacity across many industries, and that (1) it has strengthened its monopoly power in those industries; (2) the exercise of that monopoly power has produced the harms of monopoly in the economic sense – economic transactions have been halted arbitrarily or accidentally, and supply volumes have been cut; and (3) that monopoly power has increasingly come to be used as a means of political pressure.

As for (1), China now holds a dominant position across a wide range of industries. In rare earths, where geology limits the location of mining, its dominance is concentrated in the refining stage (*Chart 1*, from the 2025 White Paper on International Economy and Trade).

CHART 1

Country shares in the mining & refining of rare earths



Note: The data is from 2023. The category of rare earths only covers rare magnet elements. Original chart title: "Shares of mining and refining/processing of critical minerals" (Figure II-1-4-1). Left panel: mining; right panel: refining and processing. Columns from left to right: copper, cobalt, lithium, nickel, graphite, rare earths. Data for 2023; rare earths cover magnet rare-earth elements only. Compiled from IEA (2024).

Source: White Paper on International Economy and Trade 2025 (METI)

In steel, it accounted for roughly half of world production in 2024. The same pattern extends to masks and other medical products, consumer appliances such as televisions, air conditioners, and refrigerators, general-purpose semiconductors, solar panels, ships, electric vehicles, and pharmaceutical intermediates such as those for penicillin: in each, Chinese capacity supplies a large share of world demand.

In the second type of case, dependence on China's monopoly power combined with natural disasters and other shocks to produce economic hardship. Examples include the shortage of masks and medical supplies during the Covid-19 pandemic and the halt in automobile production when general-purpose semiconductors "evaporated" from the market following the US sanctions of around 2018.

The third concern, now widely shared, is "economic coercion": the use of monopoly power in an industry to achieve political aims. During the confrontation with Japan over the Senkaku Islands, China restricted exports of rare earths to put pressure on Tokyo in 2010. Japan challenged the restrictions at the WTO and prevailed, and China withdrew them in 2012. In 2025, China restricted rare-earth exports again, this time to gain leverage in tariff negotiations with the US and, in Japan's case, to retaliate for Prime Minister Sanae Takaichi's remarks on a Taiwan contingency.

There are also cases in which economic coercion has been exercised not through supply power but through monopoly power on the demand side, that is, by using the size of China's market as leverage. Estonia, which had built friendly relations with Taiwan, was subjected to a de facto sabotage of export procedures. Australia, which had criticized China's response to the pandemic, faced import restrictions on barley and wine.

In response to these developments, countries have pursued "supply-chain resilience" and "industrial policy" with the aim of reducing dependence on particular countries and securing the resilience of their own industries, and have begun to set out the pursuit of "strategic autonomy" and "strategic indispensability" as explicit goals.

When such strategies are to be reflected in trade rules, two questions have been identified as the crux of the matter: (1) whether it is right to continue granting MFN tariff rates unconditionally to a country that holds high monopoly power in a particular industry; and (2) how the "market failure" whereby economies of scale damage the economic foundations of other countries should be corrected.

China's Industrial Policy: the Case of Electric Vehicles

What, then, is required when thinking about the direction in which trade rules should be updated? Before developing concrete ideas, I would like to present, as an example of the process by which a particular country builds monopoly power in a particular industry, China's policy towards electric vehicles (EVs) and the results that policy has produced.

China's EV and automotive-battery industries can be regarded as a success story in which the "catalogue-driven industrial policy" that China has cultivated through trial and error since the 1990s combined effectively with outstanding entrepreneurship. At the same time, they can be characterized as an industry in which all of the positive and negative features of Chinese industrial policy are condensed.

Chinese industrial policy has three distinguishing features: (i)

guidance of the direction of development through the presentation of catalogues; (ii) the active provision of subsidies; and (iii) the deliberate protection of domestic firms.

The first feature, catalogue-based industrial policy, is a mechanism peculiar to China. Since around 2005, the Chinese government has periodically updated a catalogue of recommended industries known as the Guiding Catalogue for Industrial Structure Adjustment, through which it indicates the direction of industrial development. To date, the 2005 edition, the 2011 edition, a revised version of the 2011 edition published around 2013, the 2019 edition and the 2024 edition have been released. Each has been published roughly one year before the start of a Five-Year Plan.

With the aim of strengthening the linkages among domestic industries, the catalogue identifies the "weak links" in the value chain and lists "encouraged industries" targeted for development, "restricted industries" in which entry is regulated in order to curb expansion, and "eliminated industries" that are required to cease operations because of pollution or other harms. By linking these organically, the catalogue has reinforced economies of scale in the form of Marshallian externalities (Liu, 2019)[1].

Chart 2 shows the system of technologies classified as encouraged, restricted or eliminated in the Guiding Catalogue editions relevant to the EV industry. Fields related to the electric vehicle industry appeared for the first time in the 2011 edition and have continued to be listed in the 2019 and 2024 editions.

The first point to note is that the targets of restriction or elimination are almost entirely confined to internal-combustion-engine vehicles. Highly polluting and energy-intensive technologies were designated for restriction. In the 2024 edition, moreover, the construction of new production lines for low-speed three- and four-wheeled electric vehicles was restricted.

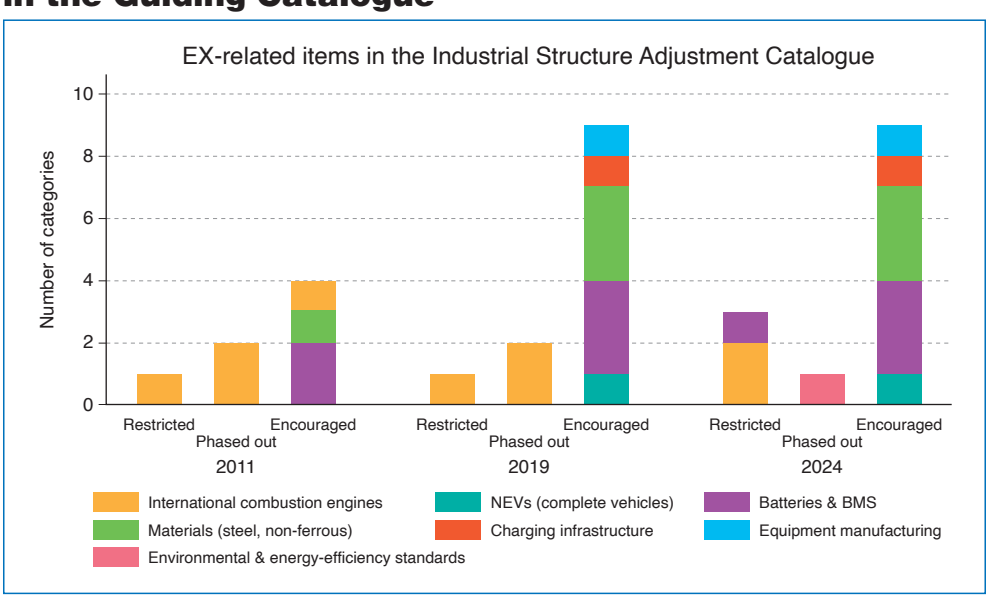
By contrast, the fields designated as encouraged industries span a wide range of technologies centered on the battery, the power source of the electric vehicle: cathode and anode materials and electrolytes for batteries; recycled lead; core technologies and equipment for the production, storage and transport of hydrogen energy and for fuel-cell manufacturing; storage batteries; battery management systems and their integration technologies; lightweight materials such as alloys; and steel products. The development of charging infrastructure, indispensable to the diffusion of EVs, and its "smartening" are also included in the list.

In this way, the catalogue is structured so as to fill in carefully each link of the value chain needed for the EV industry to take off. On the basis of this catalogue set out by the central government, individual government departments and local governments formulate their own specific plans.

Furthermore, financial institutions and investment funds refer to the catalogue when selecting borrowers and investment targets, and educational programs at universities and elsewhere are adjusted or newly established in line with the same policy direction. Because the entire industry enters in a synchronized fashion, the cost of entering a new industry falls even for inexperienced or small firms.

CHART 2

Technologies related to electric vehicles recommended in the Guiding Catalogue



Note: Chart title: "Classification of EV-related items in the Guiding Catalogue for Industrial Structure Adjustment". Vertical axis: number of categories. Within each year, the three bars are, from left to right, Restricted, Eliminated, and Encouraged. Legend: internal-combustion engines; charging infrastructure; finished NEVs; equipment manufacturing; batteries and BMS; environmental and energy-efficiency standards; materials (steel and non-ferrous).

Source: Compiled by the author from the 2011, 2019 and 2024 editions of the Guiding Catalogue for Industrial Structure Adjustment

The second feature is subsidy policy. To promote the diffusion of EVs, generous subsidies were paid to consumers, and at the same time receipt of those subsidies was made conditional on the purchase of lithium-ion batteries from designated firms. In addition, a system was introduced obliging automakers to produce a certain proportion of EVs.

Third, support for the lithium-ion battery sector took the form of blatant preferential treatment of nationals. As a condition for receiving consumer subsidies, lithium-ion batteries had to be procured from firms listed on a "whitelist". The whitelist published in 2017, the year the 13th Five-Year Plan began, contained 57 firms, all of them Chinese. This blatant national-preference policy was gradually modified, however: in 2019 wholly foreign-owned battery production was permitted, and in 2021 both the purchase subsidy scheme for new energy vehicles and the domestic-battery requirement were terminated.

The outcomes of these industrial policies for electric vehicles were twofold. On the one hand, two excellent companies with competitiveness on a global scale emerged. On the other hand, the large number of firms that entered in response to the encouragement policy created what can only be called excess capacity, which led to loss-making competition at home and a flood of exports abroad, and developed into economic friction with Europe.

BYD and CATL, both of which possessed superior accumulated technology in the battery field, grew into some of the world's largest automotive battery manufacturers in the short space of just five years. BYD was a company that had earned its profits from smartphone batteries and from contract manufacturing for Huawei; judging that the growth of those markets was reaching its limits, its chairman, Wang Chuanfu, decided to enter the automobile industry. The company then rode the tailwind of the 13th Five-Year Plan to establish its position as an automotive battery manufacturer. As of 2026, it is an excellent company that trades and conducts joint development with Toyota and Tesla in blade batteries, powertrains and EV platforms. It is by no means a bloated firm dependent on subsidies.

At the same time, however, the vigorous entry induced by catalogue-driven industrial policy generated excess production. Although 57 Chinese firms were listed on the nationally preferential whitelist described above, the firms that currently hold a meaningful share of the world market are limited to BYD and CATL. The remaining firms have failed to acquire sufficient competitiveness, yet exit has not proceeded, and excess production continues.

In the latter half of the 2010s, the overseas expansion of China's EV-related industries consisted mainly of exporting automotive batteries as components to finished-vehicle manufacturers in Europe and elsewhere. As domestic EV production capacity became excessive, however, from around 2021 the export of finished vehicles themselves intensified. The result was a direct contest for markets with European finished-vehicle manufacturers such as those in Germany; the EU, unable to withstand this, imposed additional tariffs of up to 63% on Chinese-made EVs. China has challenged these at the WTO.

According to the research by Jia, Barwick and co-authors (Barwick, P.J., et al. (2025))[2], (1) consumer subsidies raised social welfare, in the sense that they gave consumers access to inexpensive electric vehicles and allowed firms to earn profits. On the other hand, (2) because China's nationally preferential "whitelist" policy was applied in the early stage of production, when battery costs were extremely high, it enabled Chinese firms to capture exclusively the economies of scale generated by the learning curve and to bring down production costs rapidly.

As a result, batteries from Japan's AESC and Panasonic and South Korea's LG and Samsung, which at the time held the advantage in quality, were progressively replaced by Chinese batteries that had not yet reached maturity. For consumers, this initially meant being forced to use products of lower quality; for the Japanese and South Korean firms, it meant that their markets were taken away by subsidies.

In my view, Japan and South Korea should have challenged this nationally preferential whitelist policy as a violation of the WTO agreements at the time it was implemented. *Chart 3* shows the extent to which (1) consumer subsidies in the US, Europe and China and (2) the scale effects of the learning curve expanded EV sales in the world's top 13 countries. Even without subsidies, the price reductions brought about by learning-driven cost cuts have had a strong effect in boosting sales; but without subsidies, world EV sales would have grown considerably more slowly.

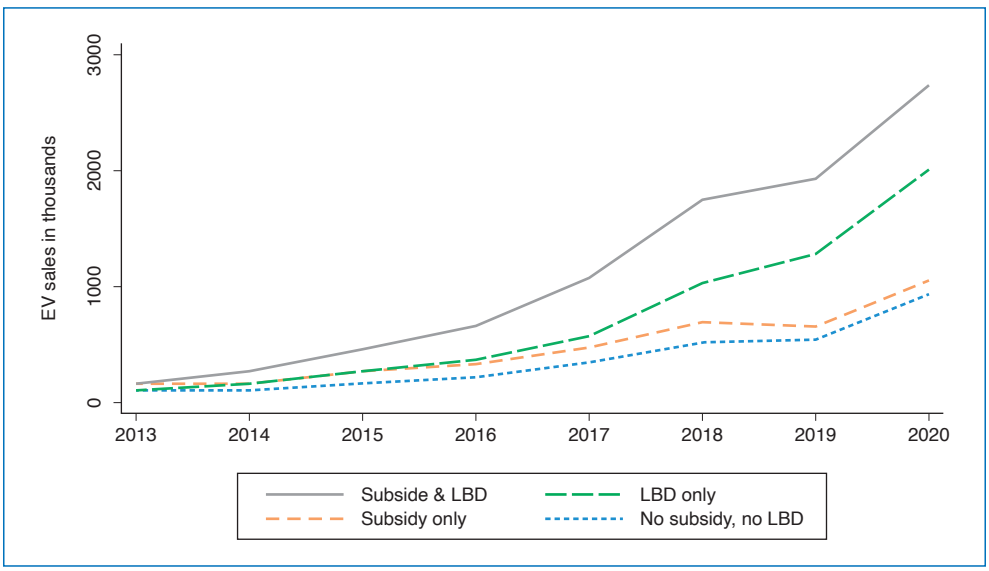
Compared with a world in which neither learning effects nor subsidies existed, learning effects alone are estimated to have expanded sales volume by 90%, and the addition of consumer subsidies to have led to an expansion of 204%. Consumer subsidies have been provided not only in China but also in the US and Europe (notably Norway); yet whereas US subsidies raised world EV sales by roughly 900,000 units, Chinese subsidies raised them by roughly 4.5 million units – an impact five times as large. *Chart 4* shows that China's nationally preferential whitelist policy resulted in the "capture" of the markets of Japanese and South Korean firms.

By favoring Chinese firms at the stage when initial average costs were extremely high, the whitelist policy created a market for Chinese-made batteries by taking away the market for batteries made by Japanese and South Korean firms (*Chart 4,* panels (a) and (b)). Had only consumer subsidies been implemented in the first five years, with national-preference support introduced in the following five years, the results show that the market as a whole would have expanded while the markets of the Japanese and South Korean firms were preserved, and Chinese firms too would have secured a market (*Chart 4*, panels (c) and (d)).

The learning curve represents an efficiency that any country and any firm can acquire by accumulating experience, and to regulate or prohibit it as such would be inefficient for the world economy. What this research demonstrates, however, is that a national-preference

CHART 3

The market-expanding effects of subsidies & learning-by-doing



Note: This chart illustrates total EV sales across the top 13 EV countries under various scenarios. The solid black line at the top represents observed EX sales with both LBD and consumer subsidies in effect. The second green line shows EX sales with LBD but no subsidies, while the third dash-dot orange line represents EV sales with subsidies but no LBD. The dotted blue line at the bottom shows EV sales with neither LBD nor subsidies. LBD greatly amplifies the sales-expansion effect of subsidies.

Source: Jia-Barwick et al. (2025)

policy succeeds only by taking markets away from other countries; it has a zero-sum effect, forcing consumers to use lower-quality products at the outset, and it distorts social welfare.

Key Points for Rebuilding Trade Rules, & Japan

As the foregoing shows, when a particular country builds an outsized industrial supply capacity in a particular industry, the asymmetric effects produced by economies of scale intensify economic friction.

At the time of the Japan–US friction, Japanese researchers pointed out that international rules were needed to correct the negative, zero-sum effects of economies of scale, but the problem remains unresolved. As perspectives for improving the situation, I would like to make the following points.

The first concerns how to correct the "market failure" whereby economies of scale damage the economic foundations of other countries. Three points deserve attention.

(1) Where the proportion of loss-making firms among market participants in a particular industry within a country exceeds a certain threshold, an "anti-dumping" duty should be imposed on that country's exports of the product as a whole, at a rate effective in curbing the output of the loss-making firms, so as to restrain their exports and shrink domestic production. Identifying the loss-making producers more precisely and imposing "countervailing duties" on them would, in theory, have the same restraining effect.

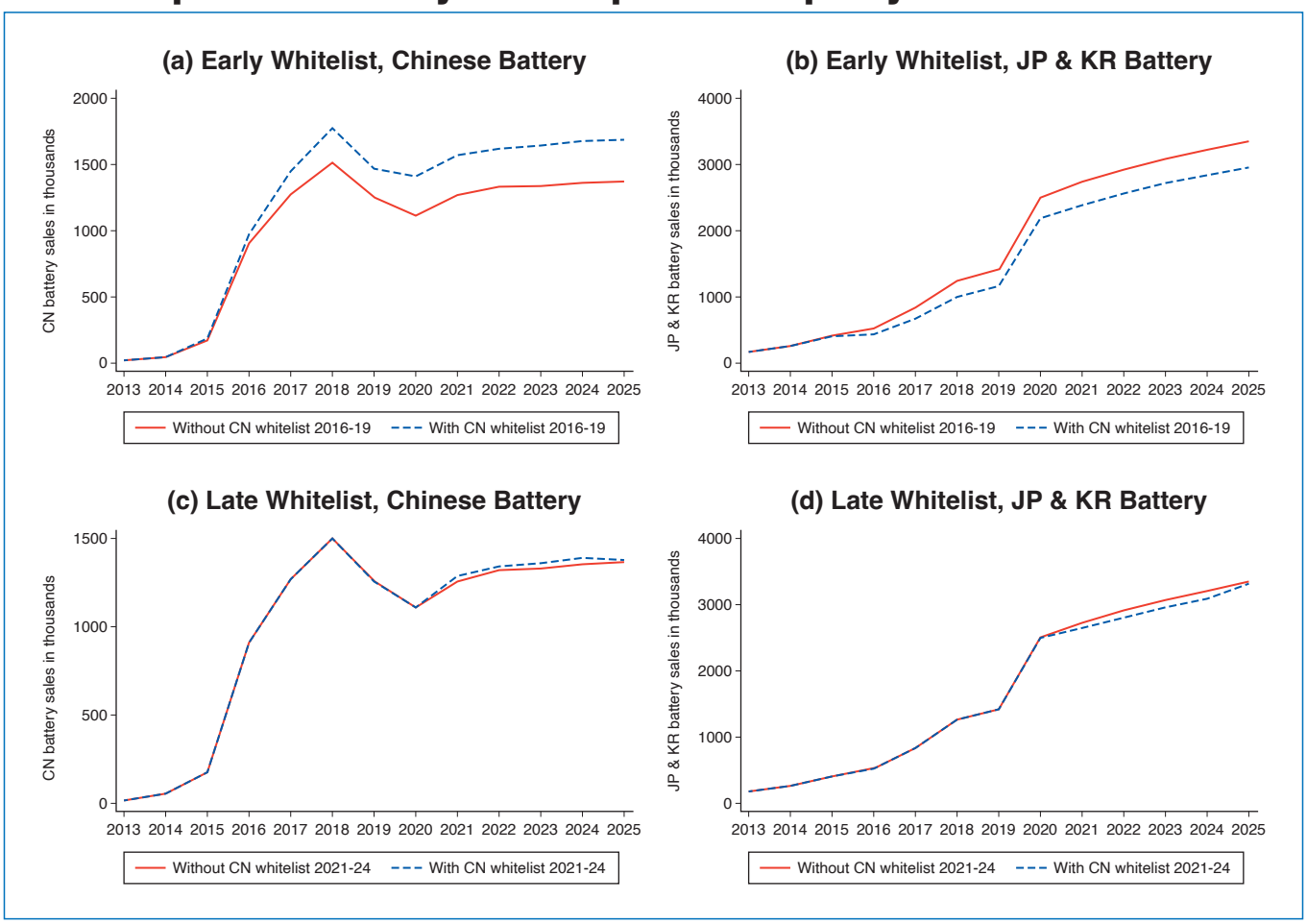
(2) Against moves to abuse politically the power of scale held by a country with a globally dominant position in a particular industry, consideration should be given to raising, by an additional margin, the special duty rates applied under the trade remedy measures permitted by current WTO rules – anti-dumping duties, countervailing duties and safeguards. In the EV case discussed above, scale effects amplified the harm caused by subsidies roughly threefold. In setting the level of additional duties, the amplifying effect of economies of scale needs to be taken into account explicitly.

(3) The principle of national treatment stipulated in current WTO rules should be enforced rigorously, and objections to national-preference policies should be raised more actively. As the case of EV batteries shows, nationally preferential policies in the nascent stage of an industry have an especially large market-capturing effect. Even where infant-industry promotion is undertaken, one option would be to introduce the idea of "time management": first achieving a certain expansion of market size through consumer subsidies, and only then introducing measures to foster domestic industry.

Second, once mechanisms to deter such abuses of scale have been built, it is important to put in place a framework for sharing the gains from scale internationally. Concretely, one could link the promotion of international horizontal specialization through zero-tariff measures in particular industries, and the international

CHART 4

Market capture induced by national-preference policy



Notes: Panel (a) illustrates EV battery production by Chinese suppliers under scenarios with and without China's observed whitelist policy in 2016-2019. Panel (b) presents battery production by non-Chinese suppliers under the same scenarios. Panel (c) and (d) repeat the exercise and depict the impact on forward-simulated buttery production if the whitelist policy was implemented between 2021 and 2024 instead.

Source: Jia-Barwick et al. (2025)

dispersion of production bases through direct investment, with tariff measures that correct for the gains from scale. Such efforts should first be advanced through bilateral negotiations and regional free trade agreements such as the CPTPP, and then extended into the general rules of the WTO.

By updating trade rules along these lines and making active use of them, it becomes possible to prevent the capabilities that Japanese firms have built up over the years from being irrationally destroyed, while at the same time creating an environment in which they can concentrate on fostering emerging industries. In securing the economic security of Japanese firms, the role played by trade rules and intergovernmental negotiation is exceedingly large.

References

1. Liu, E. (2019). Industrial policies in production networks. *The Quarterly Journal of Economics*, 134(4), 1883–1948. https://doi.org/10.1093/qje/qjz024
2. Barwick, P. J., et al. (2025). Drive Down the Cost: Learning by Doing and Government Policies in the Global EV Battery Industry (NBER Working Paper No. 33378). National Bureau of Economic Research

JS

Mariko Watanabe is a professor of the Faculty of Economics, Gakushuin University.

Interview with economist and politician Philip M. A. Hoffmann, MdB (Mitglied des Bundestages), Member of the German Parliament

Market Excels Bureaucracy in Stabilizing the Economy Against Geopolitical Risks

By *Japan SPOTLIGHT*

Konrad Adenauer Stiftung Tokyo Office organized an interesting roundtable – "The Strait of Hormuz Crisis: Implications for Global Trade, Supply Chains and Sustainable Investment" – on Sept. 16 and 17 in Tokyo with distinguished trade, economy and energy experts from Europe and Asia. The theme overlaps with the cover story of the *Japan SPOTLIGHT* Nov./Dec. 2026 issue on innovation, growth and security.

***Japan SPOTLIGHT* had an opportunity to interview Philip M. A. Hoffmann, MdB (Mitglied des Bundestages), a member of German Parliament who took part in that roundtable. He was trained in banking, and before entering parliament spent more than nine years working in Luxembourg's fund industry.**

(Interviewed on Sept. 17, 2026)

Assessment of the Current Global Economy

JS: First, a very big question. How do you assess the current global economy, considering the rising geopolitical risks? There are lots of issues here, but I'd like to know your opinion about the general landscape of the world economy.



Philip M. A. Hoffmann

Hoffmann: The global economy and growth are much more resilient than we may have expected. But the geopolitical risk is very high at the moment. We have had two energy shocks in five years, first with Ukraine and now with the Strait of Hormuz. Different political interests make the situation uncertain. It also exacerbates the energy crisis. It is negative on both sides – on the production side, because it is much more expensive to produce, but also on the demand side, as households have less money available. Such inflation also has other consequences. Central bank policy to increase interest rates makes markets less efficient, and the government's borrowing costs increase, meaning the government has to pay more to service its debt. For me in Germany a 1% increase in the interest rate means, in the first year only a small amount, for example 2.5 billion euros, but in the long term it is 20 to 30 billion more, because the bonds don't all end at the same time. So it has huge consequences. Considering these aspects, the world economy is still very resilient. Also we have had considerable growth through Artificial Intelligence. But there are growing concerns, with some economists saying there could be a bubble, and others saying that it will all work out in the end and that markets will adjust over time. Even leading AI experts in the United States are increasingly raising concerns about the risks involved. There are still many open questions, and we are navigating a period of considerable uncertainty.

Despite the challenging economic environment, Germany has returned to growth after several years of stagnation. The outlook is still not where we want it to be, but after seven years, seeing the economy grow again is an important step forward. And our policies are beginning to make a difference.

JS: I am very curious about the impact of the shocks. As you said, it is unexpectedly small and I too thought there would be a much more negative impact on the global economy. But there's not so much. So does that mean that world policy practitioners are now well prepared for shocks, after their experiences of the oil shock, Covid-19, and so on?

Hoffmann: I think you cannot prepare for such shocks, because it's a bit like climate change. As a winemaker, I see that every year climate change has a new face. Some years it is very hot, or very wet, or too cold. Economic shocks are similar. They always show another face. Of course, if you are a politician and are used to dealing with one

shock, then it is much easier to deal with another one. But circumstances differ every time so you cannot say that one shock has the same answer as another does. I wouldn't even say that there's the same answer for one shock for different countries, because every country has particular challenges that require individual answers.

Growth Strategy Now

JS: What do you think is the key to encourage global economic growth? In our view, economic growth is still very important. Of course, social concerns like equality or the environment are vital. However, without economic growth, we cannot solve such social concerns.

Hoffmann: I totally agree. It's one of the main problems we are facing in Germany, because if we don't adapt our social welfare system, combined with demographics, we'll be overwhelmed. Firstly, the answer should not be demand stimulus because we are in an environment in which the supply is limited by demographics, energy prices, and other factors, and if we increase the demand, the only thing we will end up with is inflation. So we have to focus on the supply side.

There are several key factors. One is certainly productivity. AI and robotics have come at exactly the right time to help us to become more productive. That counts for Japan as well as for Germany. We are already seeing sectors where staff shortages are becoming a real constraint, with some restaurants, for example, having to close because they simply cannot find enough employees. Technology can help us bridge these gaps and make better use of our workforce. Increasing productivity also means less bureaucracy. Take a company with 10 employees. As the generation of my parents retires, that number may shrink to just seven. If four of them are then tied up with bureaucracy, only three are left to focus on the actual business. This illustrates why reducing bureaucracy is so important. We have to reduce bureaucracy to give companies the possibility to concentrate on their work.

The second key is investment. You have to make investment more attractive because in Germany and Europe, we have tons of savings, but they are not being invested. A substantial share of European savings is invested in the US rather than in Europe. Every year, more than 300 billion euros in European savings flows into foreign assets, with the US being the main destination. This illustrates this structural challenge: Europe has significant savings, but we need to create better conditions to channel more of that capital into European businesses and innovation. To make investments more attractive, we need a capital market union in Europe. This is a longstanding topic. When I left university 12 years ago, I was discussing about a capital market union. When I returned to politics after working in the financial industry, I realized we are still talking about the same subject today. Nothing has substantially changed. We need a capital market union in the EU, but it is not the only key. We see so much money going to the US, and we don't have a capital market union with the US. They have profitable projects that are financially attractive. Profits also make investment. Ultimately, investment follows returns. We need to make Europe a place where businesses can grow, generate profits and attract private capital. And we also need to make it easier for people to invest their savings in European businesses.

The third point is an open and rules-based economy. By that I mean we should diversify more and not decouple. We face issues with tariffs by the US and the growing dominance of the Chinese industry, for example in the car industry. Diversification, as we have just intensified with new trade agreements, will help to find new partners. Trade agreements, such as with Japan, Canada, Mexico, and South American countries, will help a lot to rebuild the economy. Germany, like Japan, is an exporting country.

AI as a Key Innovation

JS: AI is very important technology. The role of new industry, entrepreneurship, and innovation driven by AI could be very important in encouraging potential on the supply side.

Hoffmann: Of course. In Germany it is surprising because this year, we see a lot more startups than we have ever had and many of them are in the AI sector. I see AI as a double-sided coin. It brings many advantages but there is no free lunch, as they say; there is nothing in the world that brings only advantages. AI will also certainly bring challenges, disrupting the way we work today. For countries with demographic problems, such as a shrinking workforce and growing labor shortages, it will help, but there's always another side to the coin, and we shouldn't forget that.

Market Should Lead Investment, Not Bureaucracy

JS: You mentioned the importance of investment in comparison to savings. I agree. But there should be investment opportunities. New industries could create new opportunities for investment.

Hoffmann: There are opportunities in Europe and Germany, but too often, the conditions are more attractive elsewhere. As I said, every year, more than €300 billion euros in European savings flows into foreign assets, with the US being the main destination. That's a question of efficiency and also of the bureaucratic framework. In Germany, it takes three months to build a company. This might mean that maybe you have a good idea for a business but if it is too difficult for you to set up a company, you will never do it, you will stay in public service.

JS: So you think bureaucracy should be improved.

Hoffmann: Yes, it should be significantly reduced. We have so many rules and it's getting too complicated to set up a company. We need to simplify the process and make it easier for people to turn their ideas into successful businesses.

Coping with Depopulation

JS: The third question is population. As you know, Japan is an aging society, suffering from depopulation. I looked at the German data, where there is not depopulation, but zero growth.

Hoffmann: Germany's population started to decline again in 2025, and we are facing some of the same demographic challenges that Japan has been dealing with for much longer. Japan has been experiencing population decline since 2008, while Germany has only recently reached this point. That is one of the reasons I am here in Japan. Of course, I am here for the conference, but I also want to learn from Japan's experience in dealing with demographic change and its impact on the workforce and the role of government. Our government is far away from where Japan is today in terms of public debt, but we are also taking on significantly more debt as we finance higher levels of public investments. I want to see and learn what's happening here, because we need to make sure that higher investment does not come at the expense of long-term fiscal stability.

With an aging population, there's a simple equation – the number of hours worked and the output per hour. If one half of this equation, the number of hours, decreases as the working population shrinks, then you have to either increase the output per hour, meaning become more efficient, or stick to the same number of hours, which means less output. We need to work on both – number of hours worked and the output per hour. In Germany, we recently introduced measures to make it more financially attractive for people who have reached retirement age to continue working. It's not meant to make everybody work full-time until they're 70, but for everyone who wants to continue working we've made it more attractive regarding taxes, so that eligible employees can earn up to 2,000 euros a month tax-free. That helps us on the labor-supply side of the equation. For the right side of the equation, the productivity side, we must become more efficient, reducing bureaucracy. Take the example of 10 people at a company, with four taking care of bureaucracy, you must reduce it to two, in order to stay as efficient. And we need to make better use of AI and other technologies that can streamline processes, improve efficiency and reduce workloads.

JS: How about raising the fertility rate? Is there any current policy in Germany on this?

Hoffmann: What's the main problem regarding the fertility rate? It is to combine family life with work life. Many people of my age want both a career and children. This has to be more attractive but also financially viable. I am the father of two kids and my wife is working. So I know how important access to childcare is: Kindergarten helps a lot; my kids can go there from an early age. Of course, politics cannot dictate how many children people have. What it can do is create better conditions and make it easier for people to realize their plans to have a family. And we should also recognize that declining fertility is a global trend. The global trend is fewer children. You need 2.1 to keep the population stable. If everyone in my circle of friends had two children, that would certainly help – but that's not the reality. Ultimately, these are deeply personal decisions, and the role of politics is to make it easier for people to have the family they want.

JS: French people say that they have potential "grey growth". That is, an aging society could provide business opportunities such as health care and medical equipment. So while an aging society is not necessarily good news, because productivity declines, at the same time, there is good news, as there could be business opportunities. What are your thoughts?

Hoffmann: In 2011 I wrote a bachelor's thesis on demographic change and the consequences for the economy, politics and infrastructure. One of the results was that there are also benefits of demographic change, but the question is how it is financed. Additionally, there is also a negative side for investments as the level of risk aversion increases in an aging population. And that's not a good sign for investments in riskier assets. For example, my parents' generation is more risk-averse than I am.

JS: I know that immigration is a very sensitive issue. Unfortunately, Japan's current administration is not enthusiastic about increasing immigration. But our Foundation issued a report in collaboration with some researchers suggesting that we should increase immigration in order to cover the demerits of depopulation. Do you have any advice for Japan?

Hoffmann: It depends. In Germany we want to generate growth, so we need immigration for our economy – people coming to Germany to work and contribute to the economy. What we don't need, as we had in the past, is immigration to our social system only. Immigration to the economy is very helpful on several fronts: it covers the lack of workforce, on the left side of the equation, the number of hours worked. It brings knowledge, skills and experience from other countries, which can help businesses become more productive and innovative, which may also make the Japanese economy more efficient. I'm not familiar enough with the Japanese social security system to comment on it in detail. But in Germany, immigration can also help stabilize our pension and health insurance

systems, provided that people are in employment and paying contributions. From an economic perspective, I consider immigration necessary.

Back to the Short-Run Prospect of the Macroeconomy, Risk of Stagflation?

JS: In the short term, with rising energy prices and faced with the risk of inflation, assuming that our growth potential is limited, this means the possibility of stagflation. What are your views on this?

Hoffmann: When energy prices rise, inflation is almost a given and there is also a second round of inflation. When energy prices rise, the production costs of, for example, farming rise, and therefore food also gets much more expensive. If the market fails, some producers will quit. Then you have a supply problem, which leads to even more inflation. In my view, central banks are much smarter than they were in the past. The US Federal Reserve underlined its independence by increasing the interest rate. The ECB is also very independent. I assume that the Japanese Central Bank is also following this trend.

Back to the first question, what should we do to generate growth in the economy. Diversifying our energy supply and developing new energy sources could be important parts of the answer. That could be one key change for Japan, as for Germany, if we use the energy crisis as an opportunity to improve efficiency rather than relying primarily on state intervention. Again, reducing bureaucracy can help, as can putting everything to the test and seeing where we can save money in energy production. And we need innovation, because we will need more and more energy in the future, including because of AI. This part of the equation can help to generate growth for the future, while also helping us to contain inflationary pressures.

Rising Interest Rates & Fiscal Sustainability

JS: Interest rates will rise all over the world and fiscal sustainability will be the next question. Is the Japanese debt model sustainable or not? We have already reached a $25 billion budget deficit, almost 2.5 times as large as our GDP. An enormous debt. And we'll need to spend more on the aging society, the military, national security, and so on. Is this sustainable?

Hoffmann: I'm worried about developments like these. But I think it's not enough to only compare the debt GDP ratio because economies differ. Compare Japan's debt with the government bond crisis we had in the EU. In Greece, Spain, Portugal, etc., that level was much lower. But the underlying circumstances were very different. The debt in Japan is mainly denominated in your own currency. And there is another difference. On the active side of the balance sheet, you have plentiful assets which other countries may not have to the same extent. If you deduct all the real estate and wealth of Japan, then the debt ratio is not that high.

It is certainly true that raising interest rates is getting more and more dangerous. We were used to low, sometimes zero, interest rates, and Germany was even facing negative interest rates. But if you look back in history over the long term, we have also had very high interest rates.

Through the Strait of Hormuz only 20% of the world's energy is delivered, but the shocks affecting even such a small portion can change everything: the world, energy prices, overall costs. It's very dangerous and we have to be very careful. I am convinced that at such times it is good to invest in security and infrastructure. But in Germany, only 20% of total investments comes from the government; the vast majority is driven by private investment. We have to make it more attractive for the private sector to invest; not everything can come from the government. It's OK for governments to make these investments, but we have to be careful because a growing share of the budget is already committed to areas such as social security, defense and interest payments. These are areas where there is much less room for political choices once the money is committed. I am also on my city council, where we have a lot of debt and can no longer change as much as we would like to because the debt is too high. I don't want this for national governments. Not for Japan, Germany, or other big countries like the US, where debt-service costs are also becoming an increasingly important issue.

JS: Today, one country alone cannot achieve macro-economic stability, because of globalization. So that means at least the G7 countries' governments should work together to achieve fiscal macro-economic sustainability. If one country's debt rises too much, that is bad news not only for that country, but also for the rest of the world.

Hoffmann: This is even more true for Germany, because the interest rates of our neighbors are all connected to the interest rate of the German bond. For example, the interest rate on my mortgage is ultimately influenced by developments in government bond yields. I am happy that I fixed my rate for 10 years, but if I took this loan now, I would have to pay more than twice as much. So it is a dangerous game. There are some reasons to play this game, but we have to find a way out, we cannot continue like this forever and continue increasing debt and interest burdens indefinitely.

JS: Currency value could have implications for macro-policy. For example, Japan has been undergoing a serious yen depreciation that has increased the risk of inflation. The US has cooperated with Japan to intervene to stabilize the yen's value.

Hoffmann: That was also in the interests of the US because Japan

holds a lot of American government bonds. But I do not see only the downside, as Japan is an exporting country. I see also an advantage, because in the past when we didn't have the euro in Germany, exports were sometimes low because the Deutsche Mark was too strong. If the Japanese yen weakens, exporting becomes more attractive. As long as you export more than you import, you benefit.

Merits & Demerits of Industrial Policy

JS: How do capital markets support long-term investment under changing monetary conditions? Is industrial policy focused on certain strategic sectors useful for supporting long-term investment? The government of Prime Minister Sanae Takaichi today has set 17 important investment areas, mostly high-tech sectors including AI and IT. Is this kind of industrial policy important to stabilize the macro-economy?

Hoffmann: We had this conversation this morning in a panel. The other economists said that it was always a bad idea to let politics decide where to invest, because sometimes they invest in the wrong thing and don't get out. That's why I'm very critical. For industrial policy you can certainly support and accelerate developments in specific areas. If you want to push AI in Japan, for example, you can do so with government investment or guarantees of private investment, but you should never replace them because private investors always follow returns. Private investors are guided by expected returns and can usually react much faster than governments. If politicians take the wrong position, using not their own money, they might stick to it even if it doesn't make sense. I say this as an economist, not as a politician. That's why I think there is a role for government, and we will use these instruments as well in Germany to help startups scale up. In Germany and the EU the problem is not that we lack ideas on startups. The problem is financing when those companies start to grow. We need to take more risks. Certainly, we need help with government banks and funds and so on. But the state should never put all its eggs into one basket.

JS: So you trust the market mechanism?

Hoffmann: Yes, I strongly believe in the market mechanism. Of course, sometimes the market doesn't work, and we have to intervene. But as a general rule, markets allocate resources more efficiently and respond faster than governments can.

JS: What innovation and industrial policies can secure future competitiveness?

Hoffmann: You cannot repeat it often enough: we need more energy and a cheaper energy supply, less bureaucracy, more growth capital, as well as economic measures such as decreasing corporate taxes and improving efficiency, such as to not have 27 different investment schemes in the EU. One important area where Japan and Germany have been too slow to react in recent decades is raw materials. This doesn't necessarily mean that we have to build or create a mine, it could be a partnership with Australia or Canada in order to gain access to raw materials through trusted partners. Other countries have been doing this for 20 years. We also need to be a bit smarter in economic cooperation. We are happy to help others in the world but we also have our own interests. If our economic interests and our development cooperation are moving in completely different directions, we end up with a one-way street that does not create sustainable partnerships. Good relationships between people and between countries should be based on mutual interests and mutual benefit.

JS: Keidanren, the Japan Business Federation, recently issued a report about the recycling of metals or goods to be used for energy. This might achieve economic growth, be environmentally friendly, and also help economic security because we won't have to import so much.

Hoffmann: In my state there is a company that makes oil from used vehicle tires. You can recycle tires and produce something new. Oil is used in the car industry for fuel and also in the plastics industry. It was also fascinating when they showed me the products created from my old tires, even things like chewing gum or toothpaste. I hope there will be many more innovative ideas like this. Regarding sustainability in steel production, if you use existing steel through recycling, you need much less energy. And recycled steel can be produced using electricity in electric arc furnaces, which opens up opportunities to use renewable energy. Of course, this is not yet big or efficient enough to be the solution on its own. But if there is any chance, we should invest in it. Then we'll have a sustainable, circular economy, making us less dependent, helping to generate growth at home. So if it works, there's no better idea.

JS: Thank you so much for your time. Please enjoy your stay in Japan. JS

Written with the cooperation of Jillian Yorke, an interpreter and translator, who worked for more than a decade for the Public Relations Office at the Minister's Secretariat of the Ministry of Economy, Trade and Industry in Tokyo. The co-author of several books, she now lives in New Zealand, where she is curator of the Japan Library: Pukapuka.

Interview with Dr. Alberto Prina Cerai, Research Fellow at the Italian Institute for International Political Studies (ISPI)

Industrial Policy Coordination Needed in Struggle for Economic Security Between EU & Japan

By *Japan SPOTLIGHT*

Economic security is a common concern worldwide. We interviewed an Italian expert on economic security in global supply chains, Dr. Alberto Prina Cerai, research fellow at the Italian Institute for International Political Studies (ISPI). Pursuit of EU-Japan industrial policy collaboration will take place against the background of growing intricacy among technology, geopolitics, and the global environment.

Introduction

JS: Economic security is an important concern today against the background of rising geopolitical risks. I'd like to ask you some questions about how we can guarantee economic security, but first could you briefly introduce yourself as an expert on supply chains for critical minerals and economic security?



Dr. Alberto Prina Cerai

Cerai: Thank you. I had been researching critical minerals and related supply chains, starting with independent consultancy work, before moving to Fondazione Eni Enrico Mattei (FEEM), which is an academic institution in Italy. Then I moved to the Italian Institute for International Political Studies (ISPI), where I integrated the geoeconomic perspective. I also have certification from the International Roundtable on Materials Criticality (IRTC) as a "Raw Materials Risk Manager" capable of identifying and taking action to mitigate specific company supply chain risks. This certification is conducted in accordance with the International Organization for Standardization (ISO). I'm particularly interested in rare earths, battery minerals, and electro-tech industries, because I think these sectors are experiencing material convergence and demand competition, especially for a range of minerals like lithium, rare earths, and other critical materials. In general, I try to deploy a multidisciplinary approach, because I think that criticality is an inherently complex topic, and take into account different perspectives.

Overview of Economic Security Worldwide of Critical Minerals

JS: Thank you. What is your overall view of the economic security question for critical minerals in the world? You are an expert on lithium, but what else do you think would be critical in terms of global economic security? In what context would economic coercion by superpowers be more harmful for the rest of the world regarding these products?

Cerai: Generally speaking, in my research I approach critical minerals in what I call the geography of control. I think the key question is not simply where a mineral is extracted, but also who controls the different stages through which it becomes an industrial input that could be deployed, for example in batteries when you talk about lithium. Lithium is extracted from different minerals, and you need to have chemical conversion and specialized technology to transform usable lithium chemicals for batteries. This distinction is important because it means that supply diversification, especially when pursued through the lens of economic security, does not necessarily mean supply chain diversification. For example, Europe may import a mineral from one country, while that supplier still relies on Chinese processing technology or intermediate products.

From my perspective, therefore, economic security requires a clear understanding of vulnerabilities at each stage of the value chain, be it geographically leveraged (chokepoints) or technologically leveraged (export controls). However, many of these industries consolidated during the high point of globalization, when

specialization was the dominant principle. Of course, we cannot realistically or magically reverse this process, because it consolidated over decades, but we can identify where the pursuit of efficiency has created or could create strategic dependence, and decide which vulnerabilities need to be mitigated. Economic security, thus, requires a trade-off: making the cost of prevention part of the strategic planning. Especially when the deliberated denial of these crucial inputs has both geopolitical and economic consequences.

And besides lithium and rare earths, I would also highlight other very important materials, for example, helium, which has been in short supply since the war broke out in the Gulf. Also, gallium, germanium, indium, tungsten, and antimony, which have been in short supply from the war in Ukraine. In this sense, criticality is always application-specific; the same mineral can be marginal in one sector but irreplaceable in another industry This means that criticality is also subjective, because there is no shared methodology across the G7 countries that perform criticality assessments.

The most serious coercive leverage, I would say, could therefore be from controlling a narrow processing or manufacturing bottleneck and not necessarily the mine itself. This is why we must move from the geography of deposits, just mapping out what resources are in the ground, and start thinking about the geography of industrial-technological control, which means specialized refining capacity. Think, for example, about the latest export restrictions that were announced by China in October 2025, then postponed until November this year. They refer to extraterritoriality control and processing equipment that will be needed, and requests for export licenses. These are potentially coercive measures because they are features of production networks. You can't take a mineral without considering all the technology and all the specialized input that is needed for providing the technical-grade material to the end users.

Criticality of Security Evolves as Innovation Goes On

JS: Thank you for your detailed explanation. This tells us that perhaps you cannot judge criticality without some expertise in specific technologies. However, as our economy evolves with new technologies like artificial intelligence, perhaps the criticality question will change or evolve in light of technological development and new innovation?

Cerai: Well, criticality is a methodology that evolved over the past 10 to 15 years, and of course in these last few years priorities have changed with technology, which is inherently difficult to anticipate. For example, you mentioned AI. There is this increasing and forecasted demand, for example, for rare earth magnets for robotics, for humanoids. Unless we develop different magnets, this emerging sector will add pressure for rare earths also demanded from more mature sectors like EVs and wind turbines. Technology itself is also going to reshape how we perform these assessments.

Semiconductors are certainly among the most critical products, because they support a lot of modern technology and industries. But we also know that we need to make distinctions. For example, there are the leading-edge semiconductors that are required for advanced computing for AI data centers, but there are also major nodes of semiconductors that are less known but are very important for industrial ecosystems. For example, power semiconductors used for high voltage equipment, which rely on compounds materials like gallium arsenide (GaS) or silicon carbide (SiC). If you think about the list of critical materials that the US compiled in 2023, they list uniquely silicon carbide as a potential critical material.

It depends on what technology you are prioritizing in your assessment. You also mentioned the criticality of some technology linked to the green transition. Of course, these are very important in terms of decarbonization, but they represent different forms of risk compared with fossil fuel systems and the need to import fossil fuels. Once you install renewables like solar panels or wind turbines, basically the dependence shifts to controlling your assets, managing the grids, instead of controlling hydrocarbon flows that are subject to a very different set of risks. This does not eliminate geopolitical leverage, because if you have industrial capacity for manufacturing this technology, of course you have some leverage at the international level.

JS: This means that the expansionary use of new technologies in things like green and digital technology is basically a very good thing that can encourage economic growth. On the other hand, my understanding is that criticality or the question of economic security will face very serious challenges as technology evolves. Is that correct?

Cerai: Yes, I think that encouraging technological adoption and innovation also brings a very different kind of potential economic security risk. For example, permanent magnets based on rare earths were developed to create a better, reliable product than samarium-cobalt magnets in the 1970s because there was a shortage of cobalt. That kind of technological innovation, later spurred by globalization and with a different geopolitical stage, was not perceived as a potential risk because it helped to solve a problem. But now, with China increasingly controlling the manufacturing capacity for rare earth magnets and these assets being so crucial, it's posing a challenge in terms of economic security. From my perspective, innovation is a solution for reducing criticality, but it is not a silver

bullet. As mentioned, criticality is a perspective that helps identify and rank potential priorities, while innovation follows as one of the possible responses to address them.

Dual Use of Products Under Review as Military Security Evolves

JS: Thank you. Military security is another very serious question related to this rising geopolitical risk. And in talking about military risk and security, we have to think about the dual use of many ordinary products. Will that complicate this criticality further?

Cerai: I'm not a military expert, but taking your question from the criticality perspective, especially thinking about dual-use application and dual-use materials, there are a lot of critical minerals that are very important, for example for a green transition, but are also very important and greatly used in different grades for military or dual-use applications. Drones, for example, require very important technological inputs like batteries and electric motors, which are also important for decarbonization. This creates a competition in demand between different kinds of technologies requiring similar materials. I think the red line is fluid, especially with artificial intelligence applications, since electrification is making a convergence of industries. I think your question is very important, and that it's also very difficult to foresee technological innovation in this sense.

Solutions for Supply Chain Resilience

JS: Let's move to solutions. How do we strengthen supply chain resilience for these critical products? Could you refer to the EU's policy in this regard?

Cerai: From the EU perspective, especially talking about critical raw materials, one of the first tools that was deployed was trade policy. I think that while trade policy, especially signing free trade agreements or strategic partnerships, is good and can facilitate diversification of supply, it cannot ensure it. Opening markets or reaching out to potential research-rich countries does not automatically create mines, refineries, or qualified industrial suppliers. Trade flows are lagging indicators in this sense, because before a new trade flow appears in our statistics, someone must finance a project, build the processing capacity or sign an offtake agreement for a specific and qualified material. This is why I distinguish market access from supply creation. And the Critical Raw Materials Act, which was signed in 2023 and brought into law in 2024, was an important step because it recognized that different stages had to be addressed, from extraction, processing, and recycling, as a more integrated strategy for addressing the supply chain risk.

But the real challenge from an European perspective, now that we have set a clear benchmark and objectives, is the bankability of projects. The EU needs to collect strategic capital, including bringing in public entities to finance these projects, because without industrial capacity, especially at the refining level, we cannot ensure that diversification from trade partners will ensure supply security.

JS: Yes, it's sort of a collaboration of industrial policies among different partners, and I think that's a very important point. But people talk about another aspect of industrial policy, strategic indispensability for mitigating this risk on your own, the Buy American Act for example. Some people argue that Japan should adopt a similar policy.

Cerai: I completely agree with you, because as critical raw materials are widely recognized as a common challenge across G7 countries and industries, there is this kind of proliferation of industrial policies with different ranges and scopes. The industrial policy that is basically deployed in the US is very different from what is currently being discussed at the European level, because the US has a degree of federal leverage and a very different architecture that can react to these geopolitical shocks. I think that industrial policy is a response that is emerging across different G7 countries to counter-balance the "China Shock 2.0". But as you mentioned, I think that to pursue "strategic indispensability" compared with strategic autonomy, you have to create common ground with your partners, because we are starting this discussion talking about how these industries have evolved during the last 20 years of hyper globalization. There are countries that are very specialized in very different industrial inputs, for instance Japan in electronics and chemicals. I think it would be very harmful for their economies if every G7 country started to pursue their own industrial policy for achieving strategic autonomy, without considering the opportunities and the convergence at the industrial level with other partners. I think industrial policies should be coordinated to some extent to identify specific bottlenecks across the G7 countries, and that countries should try to figure out how to mobilize collective capital and tools to address shared industrial chokepoints. The Pax Silica, in this sense, is a clear example of such needed coordination.

JS: I see. The exchange of critical information is very important in terms of industrial policy coordination, meaning we need to have trust among partners.

Cerai: I think that especially across G7 countries, with like-minded partners, we can put together a list of critical technologies that are

very important for our economies and think about ways to address specific vulnerabilities that are shared across our economies. It would also be interesting to see cooperation starting from a bottom-up approach, looking at shared dependencies across critical minerals and then seeing what kind of specializations are within the G7 to de-risk some critical steps, including midstream stages (for instance, cathodes in South Korea, rare earth metals in Japan). If we had this kind of shared "criticality thinking" across minerals, then what is the next step? What are the other industrial stages that are critical for our economies, and can they be addressed with collective action?

JS: How do you think we could make policy coordination or cooperation credible for counterbalancing economic coercion by superpowers?

Cerai: At this moment we have two main superpowers in terms of technological prowess, and they have already shown their willingness to coerce each other using economic statecraft. The US has deployed a lot of export controls, in semiconductors for example, and China has retaliated with similar measures on critical and other important strategic materials. I think there is an important role for "middle powers" to step in, trying to de-escalate this kind of economic weaponization from having harmful effects on other countries like EU members, Japan, South Korea or Canada. I think that collective action is essential. However, credible tools for economic retaliation should be reinforced because *"you cannot reason with a tiger when your head is in its mouth."* In the age of geoeconomics, the new reality is that economic relationships built on trust in distant times are now the source of leverage. We need to find our own sources of enforcement (be they regulatory or industrial) to preserve our economic security. .

EU-Japan Collaboration for Supply Chain Resilience

JS: Do you think the EU and Japan can achieve that kind of institutional framework for collaboration?

Cerai: I think the EU and Japan face similar structural problems, especially in the realm of critical materials and economic cooperation, because both have sophisticated downstream industries but very limited domestic mineral resources. But I think that they also possess complementary financial, technological, and industrial capabilities. For example, I think Japan's experience with the Japan Organization for Metals and Energy Security (JOGMEC) is very informative for the EU in terms of solutions and institutions to be developed to address resource security. Security, as I mentioned before, does not require geological self-sufficiency. You have to address that with different solutions. It can be also addressed through strategic investment and public-private partnerships.

There is a lot of potential collaboration in specific niches of the critical raw material industries. And as we discussed before, a lot of work is being done in terms of exchanges of economic intelligence, especially in supply chain mapping and collaboration from geological institutes for mapping resources. And of course, finance is very important here, especially for creating credible demand. For example, Japan has a clear understanding of its needs and vulnerabilities, and has been trying to resolve its independence, especially with China. And this kind of approach could also be shared with European institutions to address our vulnerabilities, especially through exchanges in technological and industrial know-how. I think it will be very important to move from an architectural strategy, which is being implemented with the Critical Raw Materials Act, to the execution phase, which is lacking to some extent. I think the execution phase will be very important and efficient if we can cooperate.

Future Research Plans

JS: Thank you for your very clear presentation. My last question, could you tell us about your future research plans?

Cerai: I will continue to examine the relationship between critical raw materials, electro-tech supply chain and their nexus with geoeconomics. This is the main framework of my research. I have done extensive research on lithium-ion battery supply chain, developing a database on entities and capacity. And as I mentioned before, I'm also interested in the role of strategic investors because I think there is a missing link between political ambition and making production capacity bankable: institutions can identify strategic projects but they also have to mobilize patient capital. I think these will be the two main issues and two main topics that I'll research going forward.

JS: Thank you very much for your time, we've learned a lot from you. JS

Written with the cooperation of David S. Spengler, who is a translator & consultant specializing in corporate communications.

Interview with Environmental Economist Brilé Anderson & Senior Economist Antoine Dechezleprêtre, OECD

The New Era of Industrial Policy

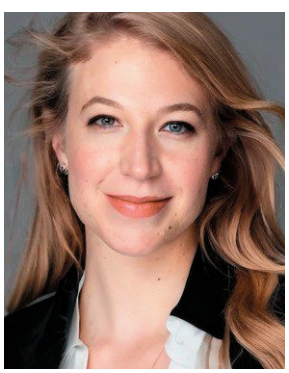
By *Japan SPOTLIGHT*

The OECD issued a report on industrial policy spending across 20 countries in May 2026. Industrial policy is attracting growing attention today against the rise in geopolitical risks and the importance of economic security. *Japan SPOTLIGHT* interviewed the authors of the report, Brilé Anderson, who has been working at the OECD for around nine years, and Antoine Dechezleprêtre, who is senior economist at the OECD.
(Interviewed on Sept. 16, 2026)

Self-Introduction

JS: Could you please briefly introduce yourselves with reference to your expertise?

Anderson: I am an environmental economist and have been working at the OECD for about nine years. I currently work on Antoine's team in the Industrial Policies Unit.



Brilé Anderson



Antoine Dechezleprêtre

Dechezleprêtre: I am a senior economist at the OECD's Directorate for Science, Technology and Innovation, in the Productivity, Innovation and Entrepreneurship Division, where I lead the Industrial Policies Unit.

Industrial Policy in the Spotlight

JS: Industrial policy has gained traction all over the world. This interest was, perhaps, initiated by China's aggressive industrial policy. There is a tough race to raise industrial competitiveness. What is your opinion of today's industrial policy around the world? Do you think international competitiveness forces industrial competitiveness?

Dechezleprêtre: There are many reasons behind the rise in industrial policy globally. The Covid-19 crisis led to many supply restrictions and concerns over the increased integration of global value chains. There was a lot of discussion about reshoring and friend-shoring at that time. We've experienced other crises recently, like the energy price crisis, which led governments to try to protect businesses from the shock. We are confronted with major challenges, such as decarbonization, which may require some industrial policy as well. We have a slowdown in productivity growth, which has been going on for decades. All of this explains the comeback of industrial policy. However, what we see in the data that we collect, is indeed a rise in government spending associated with industrial policies in OECD countries, but not an explosion of spending. In the five years of data that we have collected – between 2019 and 2023 – the increase in grants and tax expenditures related to industrial policies. This is significant – clearly, governments are spending more to support the business community – but it's not as if they were flooding businesses with subsidies.

Anderson: Just to add, one of the *assets* of the OECD's dataset compared to other datasets – such as those looking at the aggregate number of policies – is that the OECD QuIS database actually quantifies spending. There are more policies being announced, but actually, in practice, the spending is not increasing as much as one would think.

JS: Well, one of the reasons why we have this rise in industrial policy is that it's somewhat related to the geopolitical crisis. Many countries are now very eager to strengthen strategic positions in certain industries and reduce dependencies on other countries. What do you think about this narrative?

Dechezleprêtre: This is clearly something that we observe with our members. There are a lot of discussions at the OECD about strategic dependencies, about economic security. One of the sessions of the next meeting of our committee, the Committee on Industry, Innovation and Entrepreneurship, will be dedicated to a discussion among our

members about economic security. So this concern, which again dates back to the Covid crisis, is clearly growing and attracting a lot of interest from OECD Member countries.

Key Findings of the OECD Report on Subsidies

JS: You said that one of the key findings of the OECD data project is that subsidies have not increased substantially. Probably, the subsidy areas have changed. Could you please shed some light on the key findings of your report?

Dechezleprêtre: I think one key finding is the persistence of industrial policy instruments. What we see is that once an industrial policy is in place, it tends to stick. According to our estimate based on current policy discontinuation rates, half of the policies would remain in life. This persistence is a very important finding because it means it is very important to get policies right, to design them well, because once they are in place, they will be around for a long time. This is why a lot of work that my colleague Brilé has been doing is precisely on how to design these instruments well. This persistence also makes it very important to evaluate the effect of these policies on the economy, because evaluation is what is needed to potentially reform policies that are not performing very well.

Another important finding is that countries do things very differently: there are lots of differences in terms of total spending and the type of instruments that are being used. Some countries use a lot of tax expenditure while others prefer direct grants and subsidies or financial instruments.

Regarding the focus of industrial policies, spending directed at specific economic sectors is still the main target of industrial policies: it represents about one-third of the measures that we cover. The question then is, are they targeting sectors that are growing or sectors that are not growing? On average, we find this negative correlation which you mentioned between public support and the sector's Relative Comparative Advantage. We also see that there is an increasing focus on support for investment and support to energy costs, but less focus on labor costs.

Anderson: We have a forthcoming project which is trying to look more at the targeting of industrial policy spending. At the end of the paper on QuIS, we touched on the finding related to relative comparative advantage, but now we're trying to examine more closely at whether countries are using industrial policy to address market failures. This forthcoming research goes more into depth on the targets of spending.

Regarding our work on designing industrial policies, we recently published the *Industrial Policy Handbook* (https://doi.org/10.1787/ff099713-en), which in the second half proposes how to reflect on industrial policies when countries pursue them. The first step is the rationale: are you addressing a market failure and then thinking more concretely about who the target is? And the scope, the shape, and then how to select firms – but the final key piece, as was touched upon by Antoine, is the evaluation component and having some sort of sunset clause such that the instruments don't persist past their utility.

JS: A well-designed industrial policy persists longer, but it may cause some economic inefficiency because, after all, it's a kind of market intervention and may distort the market to some extent. What is your take on this point?

Anderson: One thing to consider when designing industrial policies is the need to do a proper diagnosis of the economy, and one of the messages that we try to convey throughout many aspects of the work is that since economies are connected, countries need to understand the connections of their sectors to upstream and downstream sectors so that they can actually target efficiently. Understanding these linkages is pretty crucial to minimizing those distortions.

Dechezleprêtre: This is a very important point. Industrial policies, if they are well designed, can actually address and correct inefficiencies in the market. One very well-known example is the under provision of investment in research and development. It's very hard for companies to appropriate all of the benefits that are generated by innovation and so the market itself will not generate enough R&D spending. Industrial policies that support innovation activities by companies can actually correct this market failure and address inefficiency in the market. Of course, industrial policies, if they are not well designed, can also generate inefficiencies. They can protect incumbents and there are very common critiques of industrial policies such as "the State picks winners, losers pick the State." If governments are not well informed, then things can go wrong. So what our work at the OECD is focused on is first finding out whether these policies are efficient or not and then how we can design them better so that they are actually efficient and effective and help governments address the productivity slowdown and all of the other challenges that I mentioned before.

JS: I guess that's a very difficult analysis. You have to compare the efficiency of the policies with the non-economic policy goals to be achieved by a certain industrial policy, such as geopolitical policy goals.

Dechezleprêtre: It is very complicated because resilience, in the context of increased geopolitical uncertainty, can be a very important objective for some governments. And increased resilience might come at the expense of efficiency, obviously, because if you relocate your industry domestically, it might increase costs for customers. So the difficulty for governments is to measure the cost of this added resilience and the benefits in terms of lower risk of supply disruptions, for example. This is very complicated, but this is an area where we are also hoping to be able to help our Member countries better measure these costs and benefits.

Evidence-Based Policy Assessment

JS: Tell me a bit about your method for finding out whether a policy is well designed or not. Today, as you know, evidence-based policy assessment is very

common. So you have to carry out a lot of quantitative analysis or use quite a few econometric tools to prove relevancy.

Dechezleprêtre: Yes, absolutely. The efficiency of a policy really depends on its design and the domestic and international context. So what needs to be done is a proper econometric evaluation of a particular policy. It is not possible to make statements about industrial policies in general. It is not that industrial policies are good or bad; what matters is how they are designed. So you need to do proper evaluation using up-to-date econometric techniques for specific policies. We have done that a lot at the OECD in the STI Directorate, especially for R&D tax credits, for example, or R&D grants; but there is much more limited evidence of the efficiency of many policies that have not yet been properly evaluated. So there is a lot of work ahead of us to carry out more evaluations, especially of the large industrial policies, to assess their efficiency.

Anderson: We also discussed in the *Handbook* how this needs to be done. There is also a temporal element. This has to be done over time as well and be embedded from the start. Some countries do this quite actively. For example, France has a review every few years, which the evaluators make public and report on. This is something that we would advocate as part of doing industrial policy in the right way.

Observation on Government Procurement

JS: Industrial policy should contain a wide range of policy tools, not only subsidies but also tax exemptions and finance. And among these, there could be a policy option related to government procurement. Have you done some work on government procurement as well in your research?

Dechezleprêtre: First, it is very important to keep in mind that, at the OECD, we have a fairly broad definition of industrial policies. Industrial policies are defined as all interventions that are aimed at improving the performance of the business sector. So they include not only tax expenditures, subsidies, and financial instruments like loans or loan guarantees, but also demand-side policies like public procurement or standards and other complementary policies like labor market policies, competition policies, trade policies. These framework conditions also matter a lot for efficiency.

In the "Quantifying Industrial Strategies" project, we include grants, tax expenditures and financial instruments. We have not yet included public procurement in the data. We think it's a very important avenue for future research and we want to include it but we have not done it yet because there can be some disagreement between countries as to whether public procurement is industrial policy or not. So we first need to discuss it with our members.

Reports as Peer Review of Industrial Policy

JS: Moving on, what policy consequences do you expect from your project? Do you think the peer review exercise would be instrumental in stopping inefficient spending?

Dechezleprêtre: I think this is exactly what our project aims to do. What we have been doing is providing a standardized measure of industrial policy spending across the countries that participate in our project. And this is already very novel because, before our project, there was no available measurement of how much countries are spending on industrial policy. It's not that, in your annual budget document, there is a line called "industrial policy" and you can just read the number. So we needed to compute this and we did it for the first time. This is very helpful for countries because it allows them to compare themselves with each other – to do some benchmarking. It increases the transparency of industrial policy. It can help countries, perhaps, better coordinate their industrial policies with their main trade partners or neighbors. And it is also very important because it is, we think, the first step towards the evaluation of these policies. As I explained before, we find a strong persistence of industrial policies. Many governments now have strong fiscal constraints. So they might want to reallocate some funding away from inefficient towards more efficient policies. That requires evaluation, and this is what we are trying to push and to help our Member countries with at the moment.

JS: Well, you know, industrial policies may be well designed, but there may be some policies that should be abandoned as quickly as possible but still go on for political reasons. Have you noticed such policies?

Dechezleprêtre: This is not what the project tries to do. What our Member countries want to know is how much they are spending, using what instruments, for what type of objectives – is it to support sectors, is it to support labor costs and energy costs, investment in R&D, investment in fixed assets, and so on. This is what we do with this project. This gives Member Countries information on what they are actually doing and which instruments they should evaluate if they want to improve their policy landscape, but this is something that is left to our members to do.

Anderson: We do have the desire to add to the database whether a policy instrument in a given country has or has not been evaluated and we are presently doing a pilot exercise with one country. So there is a hope that in the future, you would be able to see whether policies have been evaluated or not. And then perhaps you could even make some more interesting analyses surrounding that information. So it is on the agenda to try to include this evaluation component, but it's still very much work in progress.

Information Sharing on Policies

JS: Information sharing is very important for industrial policies today, because we are faced with a geopolitical crisis. It's often pointed out that like-minded countries cooperate with each other to pursue economic security. In that sense, this kind of exercise will have some merits for those who seek

such industrial policy cooperation. Do you think so?

Dechezleprêtre: That is exactly one of the objectives of our project – provide this information and enable countries to better assess and coordinate on these industrial policies.

JS: In the WTO, there is an argument that we should have a level playing field. Do you think we need to have common rules for industrial policy spending among OECD nations or other nations for a level playing field?

Dechezleprêtre: Our point of view on this is that governments are pursuing industrial policies. It is a growing trend. It's not exploding, but it's growing; and it is important to get these policies right and as well designed as possible. So this is really what we try to help our Member countries with, in particular with the Handbook on industrial policy. It is there precisely to help our Member countries design better industrial policies.

Industrial Policy for Innovation & Entrepreneurship

JS: Do you think industrial policy spending for innovation or entrepreneurship is growing or not growing fast enough?

Dechezleprêtre: We see some growth of spending by governments on supporting R&D and innovation. We also see increased support for small firms and young firms and startups, in particular using financial instruments, including government venture capital. This is something that seems to be growing across Member countries, and it is an area where industrial policy is clearly justified. As I mentioned before, the well-documented existence of knowledge spillovers is a market failure that the government needs to address. The financial constraints that are faced by young companies are also very well documented. These are the areas where there is a strong theoretical justification for governments to intervene and support innovation and entrepreneurs.

JS: It's very difficult for us to enhance economic growth because macroeconomic policies don't work very well. What do you think?

Dechezleprêtre: Supporting innovation and entrepreneurship is clearly an important way to enhance economic growth. We know that a lot of the new jobs that are created come from these new startup companies. This is where the most radically new innovations typically come from. So I agree that these are the areas where government intervention is justified.

JS: There are countries where the labor force is not large enough. So labor mobility becomes very important. A well-designed industrial policy must, therefore, encourage labor mobility. Do you think so?

Dechezleprêtre: What we report in our data are supply-side expenditures. So it is only support to labor which goes through the companies. If the government helps companies providing training to their employees, then it is reported in our database. But if the government supports the workers directly by providing them with lifelong training, it is not included in our database. There is another data source that is available from the OECD, the OECD employment database, which monitors labor market policies, including government spending. These labor market policies are a very important aspect of industrial policy that does not go through the tax expenditures and subsidies and financial instruments that we report. It is part of these framework conditions that are extremely important for businesses to operate efficiently. There is a very important role for these types of policy as part of the full industrial policy package.

Project Follow-Up

JS: Could you please tell us about your follow-up project?

Dechezleprêtre: To begin with, we want to keep expanding the coverage of our data. First, we want to add new countries to the database so that they can compare themselves more easily. Maybe we can also go back in time, because the data starts in 2019, and we will also keep updating it. The second possible expansion involves adding more demand-side policies like public procurement. The third direction is our work on policy targeting, which tries to understand what is targeted with those industrial policies and why.

Anderson: The targeting project is looking at whether or not industrial policy spending aligns with economic theory. So is spending motivated by a market failure rationale, or is it more strategic thinking to decrease dependency on certain types of imports, or is it more related to growing versus declining sectors. So that's the next phase of the project, that is, truly dive deeper into these dynamics.

JS: The OECD has been working on outreach activities. So does it mean that this kind of exercise will be expanded towards non-Member countries like China?

Dechezleprêtre: This is something that needs to be discussed by our Member Countries and that we are ready to do, if they tell us to do so. The decision as to what we work on at the OECD is made by our Member countries in the committees. So if our Member Countries so wish, this could be an avenue.

JS: Thank you very much. This has been very instructive and we've learned a lot today. JS

Written with the cooperation of Rajesh Williams, who is a professional editor and a writer with a background in instructional design, technical writing, technical editing, and teaching.

The Transformation of the International Order Driven by Resources (Part II) – The Rare Earths War: US-China Rivalry & the Age of Resource Blocs



Author Guo Sizhi

By Guo Sizhi

The global reconfiguration surrounding energy and natural resources is not merely a shift in markets: it marks the beginning of a new geopolitics that shakes the very foundations of national power and the international order. Europe has severed its dependence on Russia; the United States, European nations, and Japan are moving to reduce their reliance on China; and major powers are expanding their spheres of influence by riding the wave of resource bloc formation. The world has now entered an era of "multi-layered competition" in which energy, resources, technology, military power, and diplomacy are intricately intertwined. This article traces the realities of this new geopolitics: the US-China confrontation, the scramble for the Arctic, and the quiet battles over strategic resources.

I. US-China Resource Hegemony: a New Geopolitics of Renewables, Batteries & Rare Earths

A shift in resource hegemony from fossil fuels to decarbonization technologies

During the 2020s, the structure of global hegemony has been changing quietly but unmistakably. For decades, oil and natural gas stood at the center of international politics, and national power was determined by control over Middle Eastern oil fields and pipelines. Today, however, the growth of global energy demand is driven by the "electrified" sectors – solar, wind, batteries, electric vehicles, data centers, and hydrogen – and these depend on new strategic resources such as rare earths, lithium, nickel, cobalt, and polysilicon.

This shift is not merely an industrial transformation: it is a civilizational turning point in which the very source of national power is moving from "control of fossil fuels" to "control of decarbonization technologies". Just as oil determined hegemony in the 20th century, hegemony in the 21st century will be determined by how much control a nation can exert over supply chains for renewables, batteries, and rare metals. The US-China rivalry has evolved beyond military, trade, and technological competition into a struggle for resource and supply-chain dominance.

The geopolitics of decarbonization is now under intense scrutiny. Recent data from the IEA delivered a sobering reality: China accounts for **80–90% of global solar panel production**, **over 70% of lithium-ion batteries**, and **87% of rare earth refining**. These figures imply that the future of decarbonization rests in China's hands.

This is not a mere statistic: it is a shock comparable to the oil crises of the Cold War era. For policymakers in the US, Europe, and Japan, it was a stark warning that "energy security = dependence on China".

The US has designated this dependence a national security threat and accelerated efforts to bring battery, solar, and wind supply chains back to North America through the Inflation Reduction Act (IRA). The IRA's subsidies total **$370 billion**, prompting Tesla, GM, Ford, Panasonic, LG, and others to build massive gigafactories in North America. The US has thus launched a national project of "manufacturing reshoring".

1. China's "Vertically Integrated Hegemony": a Supply-Chain State Controlling Resources & Technology

China's rise is not simply the expansion of manufacturing: it is the consolidation of a vertically integrated supply-chain hegemony that unifies resources, materials, manufacturing, and final products under a national strategy. In renewables, batteries, and rare metals – the foundations of decarbonization technologies – China has built a massive system that encompasses the entire industrial structure. Since the 2000s, China has placed rare earth mining under state control, strengthened refining technologies through national programs, and now dominates **90% of rare earth refining**, **95% of graphite refining**, and **60% of lithium refining** – establishing control over the "resource stage".

Furthermore, China has integrated the entire solar supply chain – from polysilicon to modules – and built enormous industrial clusters for battery materials, cells, EVs, and wind turbines. Mega-factories across Xinjiang, Inner Mongolia, and Sichuan, supported by cheap electricity and subsidies, effectively determine global renewable prices, making China the "price setter" of decarbonization technologies.

Leveraging this vertical integration, China has weaponized resources by imposing export controls on rare earths, gallium, and germanium – strategic materials essential for semiconductors, EVs, wind turbines, and military technologies. These measures immediately affected US, European, and Japanese industries. In 2025, China imposed export restrictions on the US, and in 2026 added Japanese firms to its monitoring list.

China controls **70% of rare earth ore production**, **over 90% of refining**, and **80% of magnet production**. The US depends on China for **72% of its rare earth imports**. IEA projections show magnet demand doubling by 2050, meaning China's dominance will only grow.

Thus, China has constructed a "vertically integrated hegemony"

that controls the beating heart of global decarbonization technologies.

2. US Countermeasures & the Beginning of a "Resource Cold War"

The US response to China's resource weaponization has not been limited to tariffs or subsidies: it is a two-tier national strategy to restructure supply chains themselves. Washington has maintained high tariffs on Chinese solar panels, batteries, and components, and blocked rerouted imports via Southeast Asia – turning the North American market into a "strategically protected space".

Symbolic is the decision to extend tariffs on Chinese goods (averaging 19-25%) for an additional year beyond their scheduled expiration in late 2025. This was a "counter-sanction" against China's tightening of export controls on rare earths, gallium, and germanium. Both countries are now striking at each other's vulnerabilities, entering a "resource cold war".

Yet both sides wish to avoid total supply-chain disruption. A complete US ban on Chinese components would hurt American industries, while China cannot afford to lose the US market. This mutual dependence produced a "quiet ceasefire" in early 2026, but it is merely a pause before the next confrontation.

Japan has also been affected. China's stricter export reviews for rare earth-related materials caused procurement delays for Japanese magnet and electronics manufacturers, reviving memories of the 2010 rare earth embargo. Japanese firms again felt the fragility of dependence on China.

In today's world, where decarbonization technologies form the core of national industrial bases, strategic materials – rare earths, battery materials, solar panels, semiconductor equipment – have become "silent weapons" that shape national security and hegemony. The US and China are now confronting each other with these weapons, turning supply chains into a new battlefield.

This "resource cold war" differs from the Cold War arms race: the battleground is not missiles or tanks, but rare earths, batteries, solar panels, and hydrogen. The conflict is quiet, deep, long-term, and structural – engulfing the entire global economy. The US seeks to bypass China's supply chains while rebuilding its own and those of its allies, accelerating global fragmentation and resource bloc formation.

II. Greenland: the New Battleground for Rare Earths Among Major Powers

Greenland, the world's largest island, has a population of only 56,000, with 80% of its vast territory covered by ice. Its area of 2.16 million square kilometers – six times that of Japan – and its central Arctic location have long made it a key site for military, meteorological, and navigational monitoring. In the late 2020s, as ice sheets receded due to global warming, Greenland emerged not as a remote polar frontier but as a central node in the world's resource map.

Photo: Geological Survey of Denmark and Greenland (GEUS)



Tanbreez Rare Earth Deposit, Greenland

The exposed Kvanefjeld and Ilímaussaq regions contain over **10 million tons of rare earths**, including high concentrations of heavy rare earths such as neodymium, dysprosium, and terbium – comparable to deposits in southern China. These resources have the potential to fundamentally reshape global rare earth supply structures.

The Tanbreez deposit on the western shore of Kangerluarsuk Fjord contains an estimated **400 million tons of ore**, including **7 million tons of TREO** (Total Rare Earth Oxides), rich in heavy rare earths (HREE) and with low uranium content – an exceptional strategic deposit.

Rare earths are indispensable for EV motors, wind turbines, semiconductor equipment, missile guidance systems, quantum communication, and AI server cooling systems. Greenland's minerals are thus the "lifeblood" of 21st-century industrial, military, and digital technologies.

Greenland's value also lies in its position along the Northern Sea Route (NSR). As Arctic ice thins, navigation becomes possible not only in summer but also in spring and autumn, shortening the distance between Asia and Europe by one-third compared to the Suez route. Greenland, located at the gateway of this route, has become a "keystone" where resource, navigational, and military value converge.

Foreign investment has surged, with Denmark, Canada, Australia, and China entering mining projects. FDI reached several billion dollars by the late 2020s. China's Shenghe Resources became a major shareholder in Kvanefjeld, signaling that Greenland is now recognized as a "strategic mine" shaping global supply chains.

III. A Quiet Arctic Cold War: US, EU, China, & Russia Intersect

The scramble for Greenland is not merely a resource competition: it is a multi-layered geopolitical game involving four major powers

with distinct strategic objectives.

US – For the US, Greenland is both a rare earth hub and a military outpost essential for Arctic dominance. Thule Air Base has strengthened surveillance and communications since 2024, monitoring the NSR and countering Russian and Chinese polar activities. The Pentagon has invested hundreds of millions of dollars in joint development with Lynas and US firms, deeply engaging in Kvanefjeld. President Donald Trump has again expressed interest in acquiring Greenland, viewing it as vital to US national security – a reflection of America's intent to secure Arctic hegemony.

European Union – For the EU, Greenland is a key supply source for reducing dependence on China and achieving strategic autonomy. The 2023 Critical Raw Materials Act aims to localize 40% of rare metal refining by 2030, placing Greenland at its core. European firms announced 1 billion euro in investments between 2024 and 2026.

China – China targeted Greenland early to maintain its dominance in rare earth refining. Shenghe Resources sought to expand its stake in Kvanefjeld, aiming to secure a second supply source that could undermine Western "de-risking". However, US and EU pressure has constrained Chinese expansion since 2024.

Russia – Russia's Arctic strategy centers on military and resource control. State firms are surveying seabed resources around Greenland, integrating the Arctic's estimated **90 billion barrels** of oil and gas into long-term plans. For Russia, Greenland is a missing piece in its Arctic dominance.

Thus, the US seeks rare earths and military bases; the EU seeks strategic autonomy; China seeks supply-chain hegemony; and Russia seeks Arctic control. Arctic strategy documents published by each power signal that competition is evolving into "inevitable confrontation".

Conclusion: Greenland as the Keystone of the Global Technological Order

Greenland has become a keystone supporting the world's technological and geopolitical order. Modern technologies – EV motors, wind turbines, semiconductors, missile guidance, quantum communication, AI cooling systems – cannot exist without rare earths. With China controlling 87–90% of refining, Greenland's deposits have emerged as a crucial "second source", driving supply-chain diversification.

Greenland's strategic value also lies in the NSR, which may soon allow near year-round navigation. As the gateway to a route one-third shorter than the Suez path, Greenland stands at the center of a logistics revolution.

Major powers have published Arctic strategies: China's "Near-Arctic State" doctrine and "Ice Silk Road", Russia's Arctic Strategy 2035, America's updated Arctic strategies, and the EU's Arctic Policy and CRMA.

Today, US, EU, Chinese, and Russian vessels and research ships intersect across the Arctic, conducting resource surveys, maritime monitoring, and military exercises. The Arctic has become a stage for a "quiet cold war", with Greenland at its forefront – a new keystone shaping the stability of global technology systems and supply chains.

The global energy map is now being dramatically redrawn. Europe has completely abandoned Russian gas and built new supply networks with the US, Qatar, and Africa. The US, having consolidated its position as a major LNG exporter, is simultaneously promoting the reshoring of battery and solar manufacturing, thereby establishing a dual advantage in both energy hegemony and battery hegemony. Japan, South Korea, and ASEAN are emerging as central hubs of a new Asia-Pacific supply network by diversifying sources of rare metals and battery materials. Asian countries, facing growing instability in the Middle East, have expanded imports of Russian crude oil while continuing to grapple with the structural challenge of dependence on China for decarbonization technologies.

The world has now entered an era in which resource bloc formation and supply-chain multipolarization are advancing simultaneously. Russian energy is flowing toward the Eurasian sphere; Chinese batteries and rare metals toward the Asian sphere; and American LNG and battery industries toward the Atlantic sphere. The world is fragmenting into multiple resource zones, and a new resource geopolitics of the 21st century – surpassing even the US-Soviet oil blocs of the Cold War – is taking shape.

In the coming years, we will observe how the three major geopolitical focal points – US-China rivalry, the Arctic, and the Middle East – interact on this new stage and further shake the international order. Competition over energy and strategic resources such as rare earths is no longer a matter of national policy alone: it is becoming a force capable of restructuring the global order itself. International politics in the 21st century has begun to move once again around the axis of resources. **JS**

Dr. Guo Sizhi is specially appointed professor at Teikyo University Okinaga Research Institute, and consulting fellow at the Japan Economic Foundation (JEF). He specializes in the international economy, the energy economy, and the Chinese economy. His current research focuses on the transformation of the international political and economic order, new energy, and economic security toward carbon neutrality, and decarbonization technology innovation. He is the author of numerous books, including *A History of the Industrial Revolution: The Transition of the International Order as Seen Through Innovation* and *The Decarbonizing Industrial Revolution*.

Culture

Concept Shop Touhenboku: Transcending Wholesalers



Author Mukesh Williams

By Mukesh Williams

As a master craftsman, Jin Kobayashi redesigns past artifacts into new functional products. Therefore, Touhenboku is a concept store providing a new business model par excellence in Matsumoto. The model can be adapted by other stores with some changes, keeping in mind the aesthetics and demand of the city.

Reviews by readers have prompted *Japan SPOTLIGHT* to do another writeup on Touhenboku. This article is a follow up of "Concept Store Touhenboku" (*Japan SPOTLIGHT*, January/February 2026) that highlighted this distinctive retail enterprise in Matsumoto. This interview with Jin and Reiko Kobayashi, the proprietors of Touhenboku, builds on the store's values of tradition, functionality and aesthetics rooted in Matsumoto's long history. It explores the evolution, inspiration, and vision of Touhenboku. Touhenboku is visualized as a concept or select shop that recreates traditional Japanese crafts for contemporary day-to-day life use. The previous article used Touhenboku's evolving story to touch on Japanese aesthetics, the continuity of culture from the Edo Era to the present, and the ways a small business can sustain decades of perseverance before achieving lasting success.

In the article it was pointed out that Touhenboku is not just a conventional store but a concept store that brings together books, musical instruments, pottery, everyday objects, and traditional crafts into a handpicked environment where the proprietor's aesthetic sensibility decides what goes on display. Touhenboku does not believe in selling single items or functioning as a wholesaler of specific goods but works as a select shop keeping an eye on beauty, functionality and cultural depth. The shop creates a business model that redesigns basic materials like wood, paper, and stone into modern works of art that still remain beautiful and functional. It does not pursue novelty for the sake of novelty but to design products that support daily life while preserving craftsmanship. Kobayashi calls it a Japanese approach to crafting artifacts where design is not separate from culture but an expression of it. As such the artistic sensibility of the proprietor becomes the core value of the store. Items in the shop are chosen not by mass market appeal but how well they represent the shop's idea of incompleteness, subtlety, and gracious hospitality *(omotenashi)*.

Matsumoto, the shop's location, is central to the story. Matsumoto is a city where Edo essence survives alongside modern architecture. Ancient structures sit cheek by jowl with modern buildings and traditional practices coexist with contemporary ways. It is possible to see a cultural continuity consciously woven into Touhenboku's image. The shop does not just occupy a space on the Nakamachi Street but is culturally embedded in the spirit of Matsumoto. In the earlier article

Photo: Author



Touhenboku concept shop

Photo: Author



Mr. Jin and Ms. Reiko Kobayashi

Photo: Author



Table with partition screen

Photo: Author



Chair overlooking street

it was suggested that it is the quality of Matsumoto that gave rise to a business like Touhenboku where a thoughtful creativity can grow and be monetized.

It has taken 38 years for Touhenboku to achieve success based on endurance, resilience, and adaptation in a world of changing fashion. Touhenboku is an example of a long-term approach to building a stable enterprise that brings economic returns. Touhenboku can be used as a model beyond retail. It is a cultural experiment that shows how Japan's rich past can be recreated to bring economic benefit.

The Philosophy

Williams: Touhenboku evokes images of pottery fragments and natural beauty connected to discarded wood and roadside stones. What personal experience of "discarded treasure" inspired you to create this concept shop 38 years ago?

Kobayashi: Well, long ago, when I first encountered a pottery shard – when I first saw a broken fragment – it did not feel like a mere useless piece to me. Rather, it felt like a window connecting the past and the present. How should I put it? A chipped vessel, guided by the lines of imagination, emerges in the mind as a complete vessel once again.

Precisely because it was incomplete, I felt it had gained the wings of creativity and become something entirely new. In this way of thinking, when walking along roads or beaches, I began to find beauty even in ordinary rolling stones. If I found a stone beautiful, I wanted to be the kind of person who could pick it up without hesitation. A stone that simply exists there, asking for nothing. There is a purity, an innocence, in this simple state of being – completely detached from the standards and judgments of society.

Williams: You started this unconventional shop transcending wholesalers about four decades ago. What challenges were before

Photo: Author



Rice bowl

you in blending books, musical instruments, pottery, and crafts?

Kobayashi: It was not something radically unconventional. What we sold was pottery – primarily pottery. However, at that time, I do not think there were any pottery shops where music was playing, shelves were filled with books, and even musical instruments were displayed, though all of those belonged to me personally. Perhaps it was the atmosphere created by that very space itself that gave Touhenboku its distinctive character.

Williams: How did necessity shape your unique vision?

Kobayashi: I'm not sure if this answers the question, but I believe that everything in this present moment – truth itself – exists only within a few meters around us (as I mentioned before). I believe countless realizations can be found within that small sphere.

Curating Experiences

Williams: Many customers from Japan, Europe, America, and South Asia experience the "quiet flow of time" when they visit the store. What prompts you to select everyday items, like a wooden butter knife or washi lamp, to immerse visitors in the flow of history, lifestyle, and art?

Kobayashi: They are ordinary objects that can be found anywhere, in any country. People who are drawn to everyday tools, and who notice things such as a butter knife, are I think people who pay close attention to the world around them and possess an artistic sensibility.

Williams: Touhenboku reimagines traditional Japanese crafts with modern functionality. Can you share a recent example of a product that surprised you by bridging Edo-era sensibilities with today's needs?

Kobayashi: One of the vessels I recently created is a lacquerware bowl called a *Kittate-wan*. In terms of form, I emphasized straighter lines in its shape, so that it could function as a bowl suitable for both Japanese and Western cuisine.

Essence & Endurance of Matsumoto

Williams: Matsumoto combines Edo architecture with cutting-edge buildings, ancient customs, and contemporary lifestyle. How has the neighborhood influenced Touhenboku's evolution?

Kobayashi: The townscape, Matsumoto Castle, the distant Northern Alps, the rivers flowing through the city, the spring water – these are all, for me, a kind of emotional stabilizer (laughs).

Williams: The *Japan SPOTLIGHT* article called Touhenboku a symbol of Japanese business renewal amid uncertain times. What adaptations have kept the store thriving through economic shifts, like post-1987 changes or recent global events?

Kobayashi: Items such as the Crescent Moon Cutting Board and the Sesame Grinding Bowl have existed for more than 30 years. The objects that customers have continued to support for five, 10, or 15 years are all everyday tools used in daily life. The increase in inbound tourism over the past year is not unique to my shop, but what feels different now is that overseas visitors casually purchase things like mortar bowls, butter knives, spoons, and our original *Evening Moon* plates. I think the way overseas visitors perceive Japan has changed considerably as well.

Global Reach & Future

Williams: As international visitors enter "the past" via Matsumoto's streets, what cultural exchanges or overseas feedback have shaped your inventory?

Kobayashi: Rather, through people purchasing items like the *Evening Moon* plates and butter knives, I have come to feel reassured that the philosophy behind my shop can also resonate with people from overseas.

Williams: Looking ahead, what new "fragments" (products, collaborations, or ideas) do you envision for Touhenboku's next phase?

Kobayashi: At the moment, although it is not exactly a tool – though perhaps in a broader sense it could be considered one – the cat carrying a sea bream, a beckoning cat, has become popular both among Japanese customers and overseas visitors. I would like to continue thinking about objects through which people can experience a sense of Japan in this way. They are not necessarily new creations, but I would like to continue carefully preserving and developing the shop's original pieces that are currently loved and supported.

We have actually been making cat-themed objects for a long time,

in ceramics and *papier-mâché*. The beckoning cat is also my original design, and about five or six years ago I began making ceramic beckoning cats carrying sea bream on their backs. Even now they are lined up across the shop window, and they are extremely popular. It feels as though they have already traveled all around the world.

You know, there are the common beckoning cats that raise either the right paw or the left paw – you see them at places like Gotokuji Temple as well. In contrast, ours carry a sea bream on their backs. Half-jokingly, I sometimes say they come with a "powerful sea-bream booster", and that they will "strongly support and bring good fortune to everyone". While saying such things, I line up seven or eight of them across the shop window, and the effect is quite remarkable. Matsumoto is currently experiencing a huge influx of international visitors, and people constantly stop outside to take photos. At the very least, I imagine photographs of them have already spread across the world. Love for cats really is universal. Beckoning cats, after all, are uniquely Japanese, and besides practical tools, we also create folk-art style objects like these. Through such folk crafts, I hope people can experience Japan in another sense as well, and I would like to continue doing so in the future.

Photo: Author



Paper lantern

Photo: Author



Corridor with lamp

Photo: Author



Top floor display

Williams: How can you convert everyday items into something extraordinary?

Kobayashi: As I may have mentioned before, the first things we should reconsider are ordinary daily-use items, everyday objects. Objects that are completely ordinary and taken for granted. I think we should begin by looking carefully, little by little, at the things people truly use in their everyday lives. First of all, with respect – because some of these objects have continued to exist for hundreds of years. And while respecting such traditions, I ask myself whether there might still be ways to improve them or forms better suited to contemporary life. And after considering their function, I hope they can embody a kind of functional beauty as much as possible.

Williams: The items we currently carry are ceramics and kitchenware. Do you have anything else?

Kobayashi: Of course – we also carry glassware, textiles, and wooden products. So it is not only pottery; broadly speaking, most of the things we carry are related to food and dining.

Perception of Japanese & Foreign Customers About Touhenboku Goods

Japanese customers see the aesthetics of the display and moderate pricing, while foreign customers see flexibility to requests and unique Japanese products on display. From a Japanese perspective, the products displayed in Touhenboku are well-thought, unique, and reasonably priced. A unique quality implies that the products are attached to utilities such as kitchenware and tableware. The selected items have both aesthetics and utility combined, much appreciated by Japanese customers. The goods being reasonably priced means the store doesn't forget about consideration for the customers. In many shops in Tokyo, we see hiked-up prices. Touhenboku's way of dealing with customers is distinctive. They have not forgotten that people are living beings spending money for a specific purpose. There are some sellers who will sell once and make maximum profit. But in Touhenboku this is not the case. This value is seen by Japanese customers in every aspect of their business. In other words, they see an interconnectedness of business and buyers. Touhenboku treats the customers and business as an organic entity. It asks questions such as: What kind of kitchenware will light up their lives? What kind of goods will add value to familiar things? What things in their uniqueness attract customers?

Foreigners, on the other hand, see Touhenboku as a store from where they want to buy something uniquely Japanese but cannot find in other places; for example, they want to buy a beckoning cat, or *maneki neko*. Foreign tourists find it difficult to deal with products in Japan that are standardized, that is, where no change is allowed.

Photo: Author



Mr. Kobayashi and author

When a German or Swiss tourist comes and wants to ship a couple of lampshades with washi paper to their country, Touhenboku accommodates this request. Though this is extra work for the shop, they are flexible to accommodate new requests. Foreigners also see the way goods are displayed using wood and ceramics. This arrangement provides a clean appearance to the shop, complementing the overall clean ambience of Matsumoto town. It is a statement Touhenboku makes about how wood is arranged, and the way light plays on it.

Foreign tourists prefer uniquely Japanese goods because they see them as souvenirs that are both practical and culturally distinct. Japanese products are often valued for high quality, careful design, and items that reflect everyday Japanese life or traditions, such as floating butter knives, toast stands, wooden spoons, wooden partitions, or writing tables. The floating butter knife is designed with two balanced blades, so the blade never touches the table, reflecting both hygiene and minimalist elegance. The toast stand elevates slices to preserve crispness by allowing air circulation, a response to texture and convenience. The hand-carved wooden spoons are made asymmetrical to reveal the maker's touch and enhance hand grip. The wooden partition balances openness and privacy, creating a Japanese spatial design. And a traditional Japanese writing table (low writing desk) encourages a working rhythm aligned with the *tatami* lifestyle. Foreign tourists want items that are aesthetically appealing and well-crafted that they cannot easily buy at home. A characteristic Japanese design is so unique that it increases appeal. Foreign customers associate Japanese goods with quality and durability. A limited edition, and that to a region-specific item, is more special and collectible. At a concept shop, foreign tourists see goods that are locally made but extraordinary, such as a memorable design and a curated experience that cannot be duplicated. Goods that are special, limited, and connected to a specific area are sold at Touhenboku. The visit by a foreign customer feels like a discovery rather than just an ordinary purchase.

Japanese to English translation assistance by Dr. Ui Teramoto.

JS

Prof. Mukesh Williams (ret.) is a poet and media writer who taught literature and cultural history in Japan and India. Formerly a faculty member at Keio and Soka universities, he is now Distinguished Professor at Shoolini University and advisor on academic exchange and global culture.

INDONESIA, The Beautiful Archipelago



Author Biren Nanda

By Biren Nanda

The book *INDONESIA The Beautiful Archipelago* (Birch Books, 2026) by Ambassador Aftab Seth is an in-depth examination of Indonesia's post-independence history from the perspective of an Indian diplomat. Ambassador Seth comes across as an astute observer and his commentary gives a unique perspective on political, social and cultural developments in Indonesia. The underlying theme of the book is the melding together of a multi-ethnic and multi-religious society during the eight decades since Indonesia's independence. The author points out that Indonesia is a Muslim majority country but it is not an Islamic State. Indonesia's national motto *"Bhineka Tungal Eka"* – "even though they appear separate, they are one and the same" or "unity and diversity" – gives the essence of how the country manages diversity while giving equal status to all religions. Indonesia did not distance itself from religions by adopting a secular constitution, but rather by actively managing diversity through a Ministry of Religious Affairs.

Ambassador Seth observes that the ideology of *Panchsila* was the foundation of the Indonesian State: (1) belief in one supreme God, (2) just and civilized ideology, (3) unity of Indonesia, (4) democracy guided by wisdom of deliberation, and (5) social justice. Indeed, Suharto, Indonesia's second president, deliberately used syncretic culture as a counter-balance to Islamic orthodoxy.

The author avers that there are certain unique characteristics that have helped Indonesia maintain communal harmony. Islam came to Indonesia through preachers and traders – including those from Gujarat. There is no legacy of conflict. The Indic legacy was overlayed by the gradual spread of Islam across the archipelago resulting in the emergence of a syncretic Islam embracing important elements from the pre-Islamic culture.

Ambassador Seth points out that a significant section of Indonesian Muslims are members of two nationwide Islamic organizations – Nahdlatul Ulama (90 million) and the Muhammadiyah (70 million). The NU runs a network of *pesantren* or religious schools in the countryside which are gradually being absorbed into the formal school system. The Muhammadiyah emphasizes Islamic education and has established schools and colleges across the country. Members of the Muhammadiyah are to be found in urban areas and they are better represented in government and state institutions. The NU, which has more members, is concentrated in the countryside. The NU embraces some pre-Islamic customs and beliefs. The Muhammadiyah, on the other hand, would like to purge Indonesian Islam of pre-Islamic practices and beliefs and restore it to a level of religious purity.

As pointed out by the author, when the Islamic revolution occurred in Iran the Indonesian government sought to keep at arms-length from these developments and kept a close eye on activities of Iranian diplomats in Indonesia. Saudi Arabia played an active role in Islamic education by arranging teachers and the funding of Islamic institutions in Indonesia. One aspect of interest was the deep admiration in some circles in Indonesia towards Pakistan which had established an Islamic State in 1947, whereas Indonesia had been unable to accomplish this to date.

Ambassador Seth walks the reader through Indonesia's post-independence era – the coup that dethroned Sukarno, the anti-communist purges of 1965-1966, and the New Order regime that lasted till 1998. He fondly recalls his meetings with Abdurrahman Wahid, the first democratically elected president of Indonesia. Wahid was a great friend of India and had great respect for India's handling of religious diversity.

While the first half of the book is about Islam and political governance in Indonesia, the second half touches on a range of topics – the Vietnamese invasion of Kampuchea, the Chinese invasion of Vietnam, and the Indonesian provinces of Aceh and West Sumatra. Aceh is significant as it is the nearest to the Andamans. West Sumatra, for long a center for education under the Dutch colonial rule, gave Indonesia many leaders during the independence movement – notable was Vice President Hatta, personally known by many Indian leaders in India's freedom movement.

The book concludes with a chapter on Tagore and his advocacy of an Asian cultural renaissance. Tagore visited Indonesia in 1927 and was hoping to see glimpses of India's past in Indonesian fine arts and performing arts. Instead, what he found was a rich indigenous cultural legacy of Indonesian art and culture. He made a call for a Swadeshi education. Pursuant to his efforts, some Indonesian artists studied at Shantiniketan, including the famous Affandi who studied under Nandlal Bose. The last chapter is about the author's advocacy of and contributions towards the establishment of an Indian Cultural Center in Bali.

This book is an engaging history-cum-memoir that reflects the deep knowledge and empathy with which the author approaches his subject. The book focuses mainly on the period 1983 to 1985 when the author was posted as deputy chief of mission in Jakarta. A few notable exceptions from a later period are the events 1997-1998 (the collapse of the New Order State), the election of Wahid as president in 1999, and the election of Probowo Subianto in 2024. The book is elegantly designed and includes some beautiful photographs of places referred to in the text. JS

Biren Nanda is a former ambassador to Indonesia and later to Australia. Before these assignments, he was consul general of India in Shanghai and deputy chief of the Indian Embassy in Tokyo.

From Policy to Classroom: J-FLEC & the Distance Japan Still Has to Cover



Author Arihant Lodha

By Arihant Lodha

Japan has made one of the clearest policy bets of any advanced economy: that a nation of savers can be taught to become investors, and that the teaching should begin in school. The architecture of that bet is now largely in place. Financial education sits inside the national curriculum. A dedicated public body, the Japan Financial Literacy and Education Corporation (J-FLEC), exists to deliver it. The expanded NISA has given households a powerful tax-free reason to act. What remains uncertain is whether the policy has reached the place it was always meant to reach, which is the classroom. From inside one, the honest answer is: partly, and unevenly.

The Three-Year Mark

The useful anchor here is not J-FLEC, which is barely more than a year old, but the curriculum reform that preceded it. Since April 2022, Japan's Ministry of Education has embedded financial education into the national curriculum from elementary through high school. Younger pupils learn the basics of money and the difference between needs and wants. Older students are expected to engage with financial products and long-term planning, and high school home economics now formally covers asset formation and investment for the first time.[1]

That was a genuine shift. For decades, money was something Japanese schools largely left alone, on the implicit assumption that thrift was virtue enough. The reform reflected a hard demographic logic. With an aging population and a strained pension system, the state can no longer afford for households to leave their savings idle. Yet roughly 54% of Japan's enormous pool of household financial assets still sits in cash and deposits, a figure that has barely moved despite years of official encouragement.[2]

So the three-year question is fair to ask: with the mandate now well into its second cohort of graduates, what has actually changed at desk level? The data offers a sobering baseline. In the most recent national Financial Literacy Survey, only about 36% of Japanese adults answered the standard set of core financial-knowledge questions correctly,[3] a rate that continues to trail the United States.[4] More striking, when J-FLEC was set up, the supporting analysis noted that only around 7% of people felt they had ever received any financial education at all.[5] A curriculum line is not the same as a learned skill.

J-FLEC: the Institutional Layer

J-FLEC is the structural answer to that gap. Established in April 2024 and fully operational from August of that year, it was created to consolidate efforts that had previously been scattered across the Financial Services Agency, the Bank of Japan (BOJ), and industry associations. The BOJ contributed funding and folded in the work of the Central Council for Financial Services Information, which it had long housed.[6] Former Prime Minister Fumio Kishida attended the launch ceremony in Tokyo,[7] a level of political attention that tells you how the project is regarded in policy circles.

Its mission, in J-FLEC's own framing, is to promote financial and economic education through public-private collaboration. In practice that means three things: producing teaching materials, training teachers, and dispatching certified instructors to schools and workplaces free of charge.[8] The certification system is the genuinely distinctive feature. By vetting the advisors it sends out, J-FLEC is trying to guarantee neutrality, so that a classroom session on investing is not a sales pitch for a particular product. For a country where mistrust of financial selling runs deep, that design choice is shrewd.

The limitation is one of reach and time. A single national body, however well designed, cannot personally instruct every high school in a country of this size within its first year. The free-instructor model is excellent for the schools that request it and invisible to those that do not. And because J-FLEC is so new, there is little public outcome data yet on how many classrooms it has actually touched or whether literacy among reached students has measurably improved. The institution exists. The evidence that it is closing the gap is still being built.

What the Classroom Actually Looks Like

The most persistent obstacle is not policy or institution but the people expected to teach. Financial education in Japanese high schools is delivered largely through home economics and civics, by teachers who were not trained as finance specialists and in many cases never expected to discuss compound interest or risk diversification. This is not a new complaint. Professor Naoyuki Yoshino, among the most prominent voices on Japanese financial education, has long observed that many teachers are simply not well trained in the subject.[9] An earlier nationwide teacher survey found that a large share felt the time allotted was insufficient, and around 40% judged the content itself inadequate.[10]

The reform did not resolve this. It arguably sharpened it, by adding investment content to subjects taught by non-specialists without

proportionally expanding training or hours. A home economics teacher can convey budgeting with confidence. Explaining why a diversified portfolio behaves differently from a single stock, or what an index fund is, asks something the original teacher training never provided. J-FLEC's instructor dispatch is meant to plug exactly this hole, and where it operates it does. But it functions as a supplement summoned on request, not as a default that reaches every student as a matter of course.

The result, observed from a Tokyo classroom, is unevenness. Some students encounter a knowledgeable outside instructor and a teacher who has leaned into the new material. Others receive a single rushed lesson treated as a box to be ticked before returning to subjects that carry weight in university entrance exams. The mandate guarantees exposure. It does not yet guarantee competence, and the difference between the two is the whole point.

The NISA Paradox

While the schools have been catching up, household behavior has raced ahead, and the gap between the two is now visible in the national conversation. The expanded NISA, launched in January 2024 with indefinite tax exemption and a far larger lifetime allowance,[11] produced an immediate surge. Monthly new sign-ups in 2024 averaged around 530,000, roughly three times the prior year's pace. Accounts held by people under 40 climbed past 7 million.[12] Among Japanese in their 20s, the share holding mutual funds or stocks has reached roughly 36%, up from about 13% in 2016.[12] A generation with no memory of the bubble's collapse is investing in a way its parents did not.

The trouble is that enthusiasm has outrun literacy. A new term, *NISA bimbo*, loosely "NISA poor", has entered circulation to describe young people who cut everyday spending to an unhealthy degree in order to keep investing.[13] According to consumer-finance survey data, the average monthly amount invested by people in their 20s has risen sharply while their discretionary spending has fallen.[14] The phenomenon was serious enough to be raised in the Diet in March 2026, where the finance minister acknowledged the concern and stressed the importance of proper, objective financial education and life-planning guidance.[13]

That exchange is the cleanest illustration of the policy sequencing problem. Japan opened the investment door wide and incentivized walking through it before it had reliably taught people how to size a position, weigh risk, or distinguish saving for a goal from sacrificing a life to a contribution schedule. Behavior is a lagging proxy for understanding, and the lag is now showing up as a social cost rather than a private one.

Closing the Distance

None of this is an argument against the project. The direction is correct, and Japan deserves credit for treating financial literacy as economic infrastructure rather than a personal hobby. The point is narrower: a mandate and an institution are necessary, but they are inputs, not outcomes. Three years in, Japan has built the supply side of financial education impressively and has measured the demand side far too little.

Three steps would help. First, treat teacher capability as the binding constraint it is, and resource training on the scale of the curriculum's ambition rather than leaving it to summer seminars and goodwill. Second, make J-FLEC's instructor support a default that schools opt out of, not one they must know to request, so that reach does not track only the most motivated schools. Third, and most importantly, measure. Without regular, student-level data on what young people actually learn, the country cannot tell whether it is producing literacy or merely attendance.

There is also a role here that policy cannot fill on its own, which is peer-led and student-built. Running a cross-border finance initiative as a high school student has taught me that young people engage with this material most readily when it comes from people close to their own experience and when it is framed as something they can do rather than something done to them. Institutions set the floor. The ceiling tends to be raised by students who decide the subject belongs to them. Japan has, commendably, built the floor. The next three years are about whether anyone is standing on it.

References

1. *The Japan Times*, "Japan is looking to strengthen financial education, but are schools ready?" May 17, 2022.
2. Deloitte, "Building Prosperity: Japan's ambition to become a leading asset management center" (2025-2026).
3. Central Council for Financial Services Information, Financial Literacy Survey 2022 Results. www.shiruporuto.jp
4. "The importance of financial literacy: Evidence from Japan", *Journal of Financial Literacy and Wellbeing*, Cambridge Core (2023).
5. World Economic Forum, "Public and private financial education initiatives in Japan" (2025). www.weforum.org
6. Bank of Japan, capital subscription release, March 1, 2024. www.boj.or.jp
7. Prime Minister's Office of Japan, "Launching Ceremony of the Japan Financial Literacy and Education Corporation (J-FLEC)", Aug. 2, 2024. www.japan.kantei.go.jp
8. J-FLEC, "Overview of the J-FLEC". www.j-flec.go.jp
9. N. Yoshino, "Financial Education in Japan", FSA materials. www.fsa.go.jp
10. "Financial teaching by parents and financial education at school", *Family Science Review* (citing Financial Education Promotion Study Group, 2014).
11. Nikko Asset Management, "Bold and fundamental changes to Japan's NISA", 2023.
12. QUICK Asset Management Research Center / Nikkei, "Survey on Individual Asset Formation" (2025-2026).
13. *News On Japan*, "Young People Fall Into 'NISA Poverty'", March 17, 2026.
14. *Seoul Economic Daily*, "Japan's 'NISA Poor' Youth Cut Spending to Fund Tax-Free Investments", May 30, 2026.

JS

Arihant Lodha is a Grade 10 student at St. Mary's International School in Tokyo and the founder of the International Finance Challenge (IFC), a free global finance competition for high school students active across 12 countries. He is also a research assistant and co-author with Prof. Leonid Pugachev at the University of Missouri-St. Louis, where he contributed to building a federal banking enforcement dataset across the OCC, FDIC, Federal Reserve, and OTS.

Slowdown in Inbound Demand



Author Nobuo Iizuka

By Nobuo Iizuka

Number of Foreign Visitors to Japan Declining

Signs are showing of a slowdown in the consumption activities of foreign tourists to Japan (inbound demand), which has underpinned Japan's service exports in recent years. The cumulative total number of foreign visitors to Japan, which the Japan National Tourism Organization (JNTO) releases every month, was down for the period January to August by 2.7% year-on-year. It had recovered sharply since bottoming out in 2021 during the coronavirus pandemic, and by 2024 it had exceeded the pre-pandemic 2019 level, increasing to over 40 million visitors in 2025. The total number of overnight stays of foreign visitors as reported in the "Survey on Overnight Stay Travel" (Japan Tourism Agency) also shows a continuing year-on-year decline since March 2026.

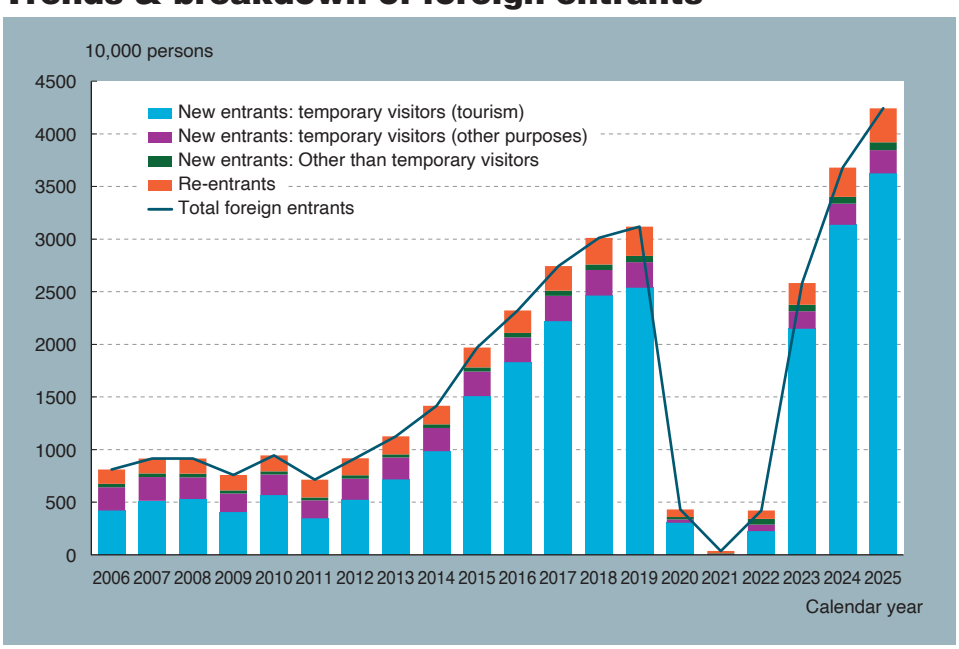
On the other hand, as written in the July/August 2023 issue of this series, the number of foreign visitors to Japan also includes foreign nationals entering the country for reasons other than tourism. Therefore, in this month's article, I will examine the trend in recent years by using the "Immigration Control Statistics" (Ministry of Justice) which is the basic survey of the number of foreign visitors to Japan.

"Temporary Visits" for Tourism Are 85% of Foreign Visitors

The number of foreign nationals entering Japan as reported in the "Immigration Control Statistics" was 42.43 million in 2025. Compared to 2006, this is an approximately fivefold increase. *Chart 1* shows the breakdown, with those planning to stay in Japan for 90 days or less (temporary visits) for the purpose of tourism accounting for 85% of the total, at 36.24 million. Although it was zero in 2021 during the coronavirus pandemic, by 2024 it had exceeded the pre-pandemic 2019 level. Since the percentage was about half of all foreign nationals entering Japan in 2006, it can be shown that temporary visits for the purpose of tourism have been the driving force behind the recent increase in the number of foreign visitors.

CHART 1

Trends & breakdown of foreign entrants



Source: "Immigration Control Statistics", Ministry of Justice

China Not the Driving Force Behind Recovery from Pandemic

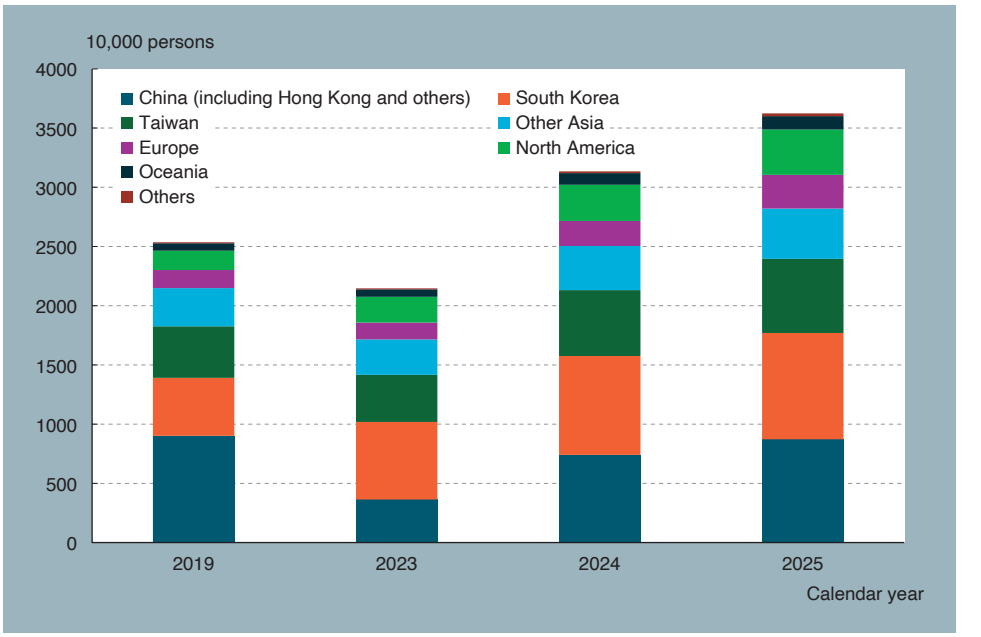
A breakdown of new entries to Japan for temporary visits for the purpose of tourism is available by country and region. Approximately 60% (6.73 million people) of the increase (10.87 million) between 2019 and 2025 was attributed to a

rise in tourists from Asia *(Chart 2)*. Whilst Asia has traditionally accounted for over 80% of foreign tourists visiting Japan, tourists from India and the ASEAN region have also increased, in addition to those from South Korea (4.07 million) and Taiwan (1.90 million) which have historically accounted for a large share. Furthermore, the number of tourists from China in 2025 was still 520,000 less than in 2019. Although the number had been on the rise following the slump during the coronavirus pandemic, even in 2025 it still did not reach the 2019 level.

Germany (219,000) contributed the most to the increase in tourists from Europe (1.30 million), followed by the United Kingdom, France and other countries. Nearly 80% of the increase in tourists from North America (2.20 million) were from the United States. It can be said that diversification in countries of origin for tourists is gradually progressing.

CHART 2

Foreign temporary visitors for tourism by country/ region



Source: "Immigration Control Statistics", Ministry of Justice

Cumulative Total of Temporary Visitors in Jan.-July Unchanged

The number of foreign nationals entering Japan for the purpose of tourism is released only in the annual report of the "Immigration Control Statistics". Since tourism accounts for over 90% of "temporary visits", trends in this category are thought to be heavily impacted by tourism demand.

The cumulative total for the period January to July 2026 is almost the same compared to the same period the previous year. There is no evidence of a fall as seen in the decline in the total number of foreign visitors to Japan. However, the number of visitors from Asia, which had been the driving force until 2025, contributed negatively by 1.4%. Visitors from China fell by over 50% and the increase in visitors from South Korea and Taiwan was not enough to offset this decline. The increase in visitors from Europe and North America was also not strong enough. Prime Minister Sanae Takaichi's remarks regarding a contingency in Taiwan led to the Chinese government's call for Chinese people to refrain from traveling to Japan and this had an impact, among other factors.

NOTE: This article was based on available information as of Sept. 30, 2026

Article translated from the original Japanese by Mio Kawashima.

JS

Nobuo Iizuka is a professor of the Department of Economics at Kanagawa University. He worked for the *Nihon Keizai Shimbun (Nikkei)* and the Japan Center for Economic Research for more than 20 years, and is one of the most highly-regarded commentators on Japanese business and the economy.

Calendar year, Quarter and Month	Real GDP		Nominal GDP		IIP rate of increase over previous year/term (month) (%)	CPI (All terms, less fresh food) rate of increase over previous year/the same term (month) of the previous year (%)
	Amount (trillion yen)	Rate of increase over previous year/term (%)	Amount (trillion yen)	Rate of increase over previous year/term (%)		
2018	580.9	0.8	569.2	0.7	0.6	0.9
2019	579.1	-0.3	571.8	0.5	-2.6	0.6
2020	554.3	-4.3	554.1	-3.1	-10.4	-0.2
2021	574.2	3.6	573.7	3.5	5.4	-0.2
2022	581.3	1.2	584.5	1.9	-0.1	2.3
2023	586.5	0.9	616.7	5.5	-1.3	3.1
2024	586.9	0.1	636.9	3.3	-2.6	2.5
2025	593.7	1.2	666.4	4.6	-0.3	3.1
2025/3rd Qtr.	592.4	-0.4	668.9	0.3	-1.1	2.9
4thQtr.	594.0	0.3	675.0	0.9	0.3	2.7
2026/1st Qtr.	596.8	0.5	680.1	0.8	2.5	1.7
2nd Qtr.	599.0	0.4	689.2	1.3	0.2	1.5
2026/Jan.	—	—	—	—	4.3	1.9
Feb.	—	—	—	—	-2.0	1.5
March	—	—	—	—	-0.4	1.7
April	—	—	—	—	0.5	1.4
May	—	—	—	—	0.1	1.4
June	—	—	—	—	1.9	1.6
July	—	—	—	—	-0.2	1.8
Aug.	—	—	—	—	-2.4	1.7
Sources	"SNA (National Accounts of Japan)", Cabinet Office				"Indices of Industrial Production", Ministry of Economy, Trade and Industry	"Consumer Price Index", Statistics Bureau, Ministry of Internal Affairs and Communications

Calendar year, Quarter and Month	Foreign Trade Statistics									
	Exports amount (trillion yen)	Exports rate of increase over previous year/ the same term (month) of the previous year (%)	Imports amount (trillion yen)	Imports rate of increase over previous year/ the same term (month) of the previous year (%)	Exports amount to US (trillion yen)	Exports to US rate of increase over previous year/ the same term (month) of the previous year (%)	Imports amount from US (trillion yen)	Imports from US rate of increase over previous year/ the same term (month) of the previous year (%)	Exports amount to EU (trillion yen)	Exports to EU rate of increase over previous year/ the same term (month) of the previous year (%)
2018	81.5	4.1	82.7	9.7	15.5	2.4	9.0	11.4	7.7	7.8
2019	76.9	-5.6	78.6	-5.0	15.3	-1.4	8.6	-4.2	7.4	-3.0
2020	68.4	-11.1	68.0	-13.5	12.6	-17.3	7.5	-13.7	6.3	-15.1
2021	83.1	21.5	84.9	24.8	14.8	17.6	8.9	19.6	7.7	21.4
2022	98.2	18.2	118.5	39.6	18.3	23.1	11.8	31.9	9.4	22.0
2023	100.9	2.7	110.4	-6.8	20.3	11.0	11.6	-1.7	10.4	10.9
2024	107.1	6.2	112.7	2.1	21.3	5.1	12.7	9.8	10.0	-3.9
2025	110.4	3.1	113.3	0.5	20.4	-4.3	12.9	1.8	10.1	1.3
2025/3rd Qtr.	27.2	0.3	27.9	-3.1	4.7	-12.8	3.3	5.7	2.5	2.1
4thQtr.	29.9	4.9	29.7	2.6	5.4	-2.5	3.4	12.6	2.8	9.8
2026/1st Qtr.	29.7	10.5	30.2	5.8	5.2	-3.1	3.4	9.9	2.8	19.1
2nd Qtr.	30.9	17.0	31.5	15.9	5.6	11.5	4.2	34.4	2.9	20.6
2026/Jan.	9.2	16.8	10.4	-2.6	1.5	-5.1	1.1	3.2	0.8	29.6
Feb.	9.6	4.0	9.5	10.3	1.8	-8.0	1.1	8.5	0.9	14.0
March	11.0	11.5	10.4	11.0	1.9	3.4	1.2	18.1	1.0	16.1
April	10.5	14.8	10.2	9.9	1.9	9.5	1.2	24.3	1.1	27.0
May	9.5	16.8	9.9	12.5	1.7	12.3	1.3	26.1	0.9	14.0
June	10.9	19.3	11.3	25.4	1.9	12.9	1.6	52.6	1.0	20.2
July	11.5	23.2	12.2	27.9	2.1	22.0	1.8	58.1	1.0	19.1
Aug.	10.0	19.3	11.2	28.0	1.7	24.9	1.7	55.2	0.9	11.0
Sources	"Trade Statistics of Japan", Ministry of Finance									

Calendar year, Quarter and Month	Cash salary amount rate of increase over previous year/the same term (month) of the previous year (%)	Active job openings-to-applicants ratio (time(s))	Unemployment rate (%)	M2 rate of increase over previous year/ the same term (month) of the previous year (%)	Balance of payments		Yen/$ rate (averaged during the term)
					Trade balance (trillion yen)	Current balance (trillion yen)	
2018	1.4	1.61	2.4	2.9	1.1	19.5	110.4
2019	-0.4	1.60	2.4	2.4	0.2	19.3	109.0
2020	-1.2	1.18	2.8	6.5	2.8	16.0	106.8
2021	0.3	1.13	2.8	6.4	1.8	21.5	109.8
2022	2.0	1.28	2.6	3.3	-15.5	11.4	131.4
2023	1.2	1.31	2.6	2.5	-6.6	22.5	140.5
2024	2.8	1.25	2.5	1.7	-2.7	29.3	151.5
2025	2.3	1.22	2.5	1.2	-0.6	32.2	149.6
2025/3rd Qtr.	2.4	1.21	2.5	1.3	0.2	10.7	147.5
4thQtr.	2.2	1.19	2.6	1.7	0.7	7.3	154.1
2026/1st Qtr.	3.0	1.19	2.7	1.8	0.5	9.6	156.9
2nd Qtr.	3.7	1.18	2.5	2.3	0.2	8.1	159.4
2026/Jan.	2.5	1.18	2.7	1.6	-0.6	0.9	156.8
Feb.	3.4	1.19	2.6	1.7	0.3	3.9	155.2
March	3.1	1.18	2.7	2.0	0.8	4.8	158.6
April	3.6	1.18	2.5	2.3	0.3	3.9	159.3
May	3.3	1.17	2.5	2.5	-0.0	4.1	158.3
June	4.0	1.18	2.5	2.2	-0.1	0.1	160.7
July	4.3	1.18	2.4	2.1	-0.4	3.0	162.5
Aug.	3.8	1.18	2.5	2.0	-0.7	4.1	158.8
Sources	"Monthly Labour Survey", Ministry of Health, Labour and Welfare	"Employment Referrals for General Workers", Ministry of Health, Labour and Welfare	"Labour Force Survey", Statistics Bureau, Ministry of Internal Affairs and Communications	"Money Stock", Bank of Japan	"Balance of Payments", Ministry of Finance		Bank of Japan

Calendar year, Quarter and Month	Foreign Trade Statistics									
	Imports amount from EU (trillion yen)	Imports from EU rate of increase over previous year/ the same term (month) of the previous year (%)	Exports amount to Asia (excluding China) (trillion yen)	Exports to Asia (excluding China) rate of increase over previous year/ the same term (month) of the previous year (%)	Imports amount from Asia (excluding China) (trillion yen)	Imports from Asia (excluding China) rate of increase over previous year/ the same term (month) of the previous year (%)	Exports amount to China (trillion yen)	Exports to China rate of increase over previous year/ the same term (month) of the previous year (%)	Imports amount from China (trillion yen)	Imports from China rate of increase over previous year/ the same term (month) of the previous year (%)
2018	8.8	10.6	28.8	2.9	20.0	7.8	15.9	6.8	19.2	4.0
2019	8.8	0.3	26.6	-7.6	19.0	-5.3	14.7	-7.6	18.5	-3.9
2020	7.8	-12.1	24.1	-9.4	17.2	-9.4	15.1	2.7	17.5	-5.1
2021	9.5	21.8	30.2	25.0	20.7	20.6	18.0	19.2	20.4	16.4
2022	11.4	21.1	36.4	20.6	28.6	37.8	19.0	5.7	24.8	21.9
2023	11.4	-0.2	34.7	-4.6	27.6	-3.4	17.8	-6.5	24.4	-1.7
2024	12.0	4.7	38.0	9.4	28.6	3.7	18.9	6.2	25.3	3.6
2025	12.8	6.6	41.1	8.2	29.1	1.6	18.8	-0.4	26.7	5.5
2025/3rd Qtr.	3.2	-1.3	10.3	4.9	7.2	-3.3	4.7	0.5	6.5	2.5
4thQtr.	3.3	6.0	11.0	8.6	7.6	3.3	5.1	1.8	7.3	5.6
2026/1st Qtr.	3.3	6.1	11.5	15.4	8.0	7.6	4.9	11.5	7.3	12.6
2nd Qtr.	3.3	3.3	11.8	20.5	8.8	30.2	5.3	17.0	7.6	18.8
2026/Jan.	1.0	-1.1	3.7	23.3	2.7	-1.2	1.5	32.0	2.6	0.6
Feb.	1.1	3.1	3.7	8.9	2.4	7.0	1.4	-11.0	2.3	35.5
March	1.2	16.7	4.2	15.0	2.9	17.9	2.0	17.7	2.3	8.9
April	1.0	3.9	4.0	16.3	2.9	30.1	1.8	15.5	2.6	15.0
May	1.1	4.7	3.6	20.2	2.7	29.6	1.7	17.9	2.4	13.7
June	1.1	1.7	4.2	24.9	3.2	30.8	1.8	17.6	2.6	27.9
July	1.1	-2.3	4.3	23.8	3.3	37.7	2.0	25.8	2.8	26.2
Aug.	1.1	20.4	3.9	21.7	3.1	34.5	1.8	20.5	2.4	22.5
Sources	"Trade Statistics of Japan", Ministry of Finance									



Read and Discover

https://www.jef.or.jp/jspotlight/latestissue/

November/December 2026

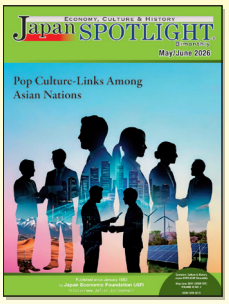
New Technologies & Industrial Policy to Foster Global Prosperity



September/October 2026
METI's White Paper on International Economy & Trade 2026



July/August 2026
In Pursuit of Restoring a Rules-Based International Trading System Through CPTPP-EU Collaboration



May/June 2026
Pop Culture-Links Among Asian Nations



March/April 2026
Good Global Governance in Japan's Pursuit of Enhanced Partnership with the Global South



January/February 2026
Enhancing Japan's Growth Potential with the Service Sector as the Driving Force

Visit *Japan SPOTLIGHT* website!

https://www.jef.or.jp/journal/

Japan SPOTLIGHT has been making great efforts to provide our readers with valuable information and knowledge ever since 1982. To fulfill our mission to provide such information to more people eager to learn about the global political economy, our journal became free to access on our website from the January/February 2017 issue in January 2017. We hope many of you will visit our website and enjoy reading our bimonthly English E-Journal *Japan SPOTLIGHT*, published on the 10th of every odd month.



Japan Economic Foundation (JEF)

Editorial Section

5th Floor, GINZA OMI Bldg., 3-7-3 Ginza, Chuo-ku, Tokyo, 104-0061 Japan
Tel: +81-3-6263-2518 Fax: +81-3-6263-2513 email: japanspotlight@jef.or.jp