IfM MANAGEMENT TECHNOLOGY POLICY

BABBAGE FORUM

UK-Japan workshop on industrial and innovation policy

Summary Report

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British Embassy Tokyo

経済産業省
Ministry of Economy, Trade and Industry

Contents

This event was co-organised by:

- British Embassy, Tokyo
- Japan Ministry of Economy, Trade and Industry
- Institute for Manufacturing, University of Cambridge
- Babbage Policy Forum, University of Cambridge
- Cambridge Industrial Innovation Policy, University of Cambridge

Rapporteurs: Elizabeth Tofaris, Rhiannon Lloyd-Jones and Helen Caldwell

Note: Opinions were expressed by participants in a personal capacity and, therefore, do not necessarily represent the views of their affiliated institutions.

“Japan has been a trailblazer in innovation, and we aim to stay globally competitive by leveraging our scientific knowledge and expertise. Our focus is on enhancing our national power and capabilities through STI policy and industrial development. I am, therefore, honoured to be here today with experts at the forefront of industrial policy.”

Dr Takahiro Ueyama, Council for Science, Technology and Innovation, Cabinet Office, Government of Japan

“This forum was a powerful and very timely opportunity to develop joint thinking on how we can combine the complementary technological and industrial strengths of Japan and the UK to create something better for both of us.”

Dr Dave Smith, National Technology Adviser, UK Government

“This gathering showcased an inspiring exchange of ideas on how science, technology, and industrial policy can come together to shape the future of global innovation. From exploring sectoral strategies and bridging the gaps between research and application to leveraging alternative data for policy development, the discussions highlighted the valuable insights we can gain by learning from each other’s experiences and approaches.”

Professor Sir Mike Gregory, Chair of the Babbage Policy Forum, University of Cambridge

“As both Japan and the UK look to the future to shape strategic priorities, this is a pivotal time to come together. Japan and the UK are natural partners in addressing some of the complex challenges our world is facing, and how to tackle innovation is at the heart of how we do this. This conversation is well timed to help both countries to build better innovation systems.”

Julia Longbottom, British Ambassador to Japan

BACKGROUND AND WORKSHOP AIMS

The world is in a race to seize the industrial opportunities of the future. Innovations in areas such as advanced computing, materials and manufacturing, communication technologies, artificial intelligence (AI), biotechnology, plant genetics, semiconductors, and quantum computing are creating new possibilities across industrial value chains.

In the evolving geopolitical landscape, rebuilding industrial capabilities has become a matter of both economic policy and national security. Japan and the UK are facing similar challenges but from different starting points. Japan has a highly successful manufacturing industry but now faces considerable challenges from new competitors. The UK, once a leader in manufacturing, has now recognised the need to revitalise this sector of its economy.

Both countries enjoy strong education and research infrastructures but seek to be more effective in the translation of new science into innovations and wealth-creating companies and industries. This requires closer integration between Science, Technology and Innovation (STI) policies and industrial strategy. What new conceptual approaches are required to this end? How can the evidence base be enhanced? How can collaboration between those with responsibilities for technology, innovation and industrial policy be strengthened?

This report summarises a workshop aimed at strengthening connections between industrial leaders, government officials, and academics engaged in manufacturing in the UK and Japan.

In particular, the workshop aims were to:

- Compare and learn about emerging international industrial policy approaches and practices
- Share practical solutions to challenges faced in developing and implementing effective industrial innovation policies
- Identify opportunities for ongoing dialogue and collaboration.

KEY THEMES & OBSERVATIONS

The workshop brought together key stakeholders from the UK and Japan to share their thinking about the key drivers influencing the future of manufacturing and industrial competitiveness and the implications for policies to support manufacturing-based solutions to societal challenges.

Clear themes of common interest emerged as a basis for future engagement, and there was a notable alignment of UK and Japanese perceptions. Discussions reflect a strong focus on leveraging STI to address both countries' industrial challenges, fostering collaboration, and prioritising strategic technologies to enhance national security and economic competitiveness.

A summary of key themes and observations emerging from the workshop presentations and follow-up discussions is presented below. Opinions were expressed by participants in a personal capacity and, therefore, do not necessarily represent the views of their affiliated institutions.

THEME ONE | INTERFACES BETWEEN STI AND INDUSTRIAL POLICY

As countries compete to establish leadership in the industries of tomorrow, the interface between STI policy and industrial policy has become a critical area of focus for governments and industries. In this session, delegates discussed the necessity of utilising STI as a key driver of economic growth, recognising its increasingly significant role in national security as a crucial factor in determining national power.

Four key themes emerged:

The UK and Japan are natural partners for industrial collaboration and policy learning

The UK and Japan have notable similarities that position them as natural partners in shaping the future of industrial innovation. Both countries possess competitive industries supported by world-class scientific and research institutions. Additionally, they face common challenges related to technology emergence, supply chain resilience, and policy alignment. For example, the rapid advancement of digital and energy technologies presents an opportunity for both countries to engage in bilateral dialogue, fostering frameworks to accelerate adoption while effectively managing risks. The UK and Japan, with their strong historical economic ties and firm collaborations within global supply chains across various industries, are natural partners for exchanging lessons and insights on policy approaches and practices.

Science, Technology and Innovation (STI) policy is becoming increasingly central to national security

Internationally, STI is no longer confined to labs and research centres; it is now deeply embedded in daily life, driving business innovation, boosting economic growth, and reshaping society through advancements like AI and other digital technologies. In this context, STI policy should prioritise the advancement of science and its impact on improving daily life, enhancing business competitiveness, and bolstering national resilience. By reinforcing industrial strengths and promoting innovation through an economic security framework, STI can help fortify national resilience and ensure long-term leadership in a competitive global landscape.

As global competition intensifies, STI has become a strategic asset for national security. Policymakers must adopt a comprehensive approach that promotes cutting-edge research while accounting for the criticality of technologies, such as AI, quantum computing, and advanced materials, to both economic growth and security. Strategic investments in these areas are crucial for protecting against external threats and fortifying the economic foundations of national power.

To achieve this, it was agreed that strong collaboration between governments, businesses, and academic institutions is essential. STI must serve as a driving force for societal progress and the protection of national interests. This includes developing robust frameworks to safeguard intellectual property and manage technology transfer, aligning STI policy with economic security goals through targeted investments and new funding mechanisms, and recognising universities' role in strengthening national security while ensuring alignment between academic research and industrial innovation. Standards and regulations are critical to ensuring this alignment.

A focus on products and industrial capabilities can help turn investment in scientific research into industrial competitiveness

The UK and Japan face significant challenges in bridging the gap between scientific advancements and their practical applications in industry. While both nations are recognised for their world-class research, more effective mechanisms are needed to integrate these innovations into industrial policy. Investment in scientific research is crucial for enhancing industrial competitiveness. The focus should go beyond traditional metrics, such as publications and patents, and recognise the importance of translating innovations into products and industrial capabilities that drive long-term growth.

There is a need for clear pathways to link national investments in R&D with various industries. Since governments cannot invest in all fields, it is crucial to identify which critical technologies are essential for strengthening industrial competitiveness. Strategic investment in areas such as materials science, biotechnology, and digital innovation can foster the development of cutting-edge products. Focusing on products encourages policymakers to consider the necessary infrastructure, supply chains, and skilled workforce essential for sustainable industrial leadership.

This has important implications for industrial strategy. Governments must align research funding with long-term industrial strategy priorities, fostering strong links between research institutions, private companies, and policymakers. Innovation hubs and public-private partnerships are examples of critical platforms to pilot and scale emerging technologies, facilitating smoother transitions from research breakthroughs to industrial applications. Collaborative research initiatives focusing on supply chain optimisation, risk management, and sustainability can also significantly contribute to this goal.

Competing in critical technologies requires step changes to technology funding, entrepreneurship support, and university incentives

Invested efforts in critical technologies such as artificial intelligence, quantum computing, advanced manufacturing, and renewable energy can enhance both nations' competitive edge and address significant global challenges such as climate change, security threats, and economic sustainability. But to address the challenge of "invented here, produced elsewhere," it is crucial to prioritise funding and align policy objectives with research and STI initiatives.

The U.S. experience shows that substantial investments in venture capital, including pension funds and university endowments, can drive innovation and produce impressive returns. Such financial commitment enhances universities' global competitiveness and transforms their operational cultures. This shift has led to increased participation in the global investment market, fundamentally changing incentives for faculty members and fostering a market-oriented approach within academia. Establishing a nurturing ecosystem for entrepreneurship is crucial; this can be achieved by improving access to funding, mentorship, and tailored resources that specifically address the needs of emerging companies. Supporting small and medium-sized enterprises (SMEs) and start-ups is also vital, as they will play a key role in developing the supply chains of future industries.

Japan has already taken steps to drive systemic change, securing and investing a total of 10 trillion yen globally for university endowments. This aims to provide 300 billion yen per year to top-ranked universities once sufficient assets have been secured through this investment. The current total assets amount to 11 trillion yen. The goal is to identify top universities that can receive substantial funding over the next 25 years, incentivising them to adapt their governance and management practices. This includes enhancing internationalisation and encouraging partnerships with the private sector. As universities in Japan embrace this transformation, there is a growing focus on the social impact of research. Emphasis has been placed on the potential of innovative potential into tangible economic benefits by fostering a mindset that values collaboration with industry and prioritising practical applications.

THEME TWO | EMERGING APPROACHES IN SECTORAL AND TECHNOLOGICAL POLICIES

As technological advancement accelerates, the need for robust frameworks to support industrial innovation has never been more critical. In this session, delegates explored the challenges and opportunities at the intersection of innovation and regulation for stakeholders in various sectors.

Three key themes emerged:

The innovation-regulation gap is hindering technology deployment

A persistent and critical challenge in advancing industrial innovation is the gap between rapidly evolving technological advancements and the slower pace of regulatory reform. This misalignment, often rooted in organisational inertia, prevents the seamless introduction of new technologies into real-life applications and markets. Regulatory frameworks tend to lag behind innovations, creating uncertainty and limiting the scalability of promising solutions.

In an attempt to address these challenges, Japan has introduced regulatory sandboxes – controlled environments where innovations can be tested with limited regulatory oversight. These sandboxes enable regulatory bodies to balance the flexibility needed to foster innovation with the clarity required to maintain safety, efficiency, and fairness standards. This approach ensures the rationality of certain regulations while encouraging iterative improvement in regulatory frameworks.

Agile governance is critical for accelerating innovation

Participants agreed that governance structures must become more responsive and adaptive as industries evolve. Agile governance offers a solution to the rigidity of traditional policy frameworks by encouraging swift adaptation to emerging technologies. Demonstration projects and pilot schemes are prime examples of how policymakers can experiment with new governance models and assess their impact in real-world conditions. Agile governance not only accelerates the implementation of new technologies but also mitigates risks associated with untested innovations. By fostering a culture of responsiveness, policymakers can better align regulations with the needs of innovators, industry, and society.

Prioritising tech integration is essential for successful industrial adoption

Recent efforts to support industrial digitalisation in the UK highlight the challenge of integration in technology adoption. At first, the policy was organised around two key areas: research and adoption, with the majority of funding allocated to research rather than adoption. Policy initiatives for technology adoption often overlook the importance and complexity of system integration despite being critical for aligning new technologies with the country's industrial sectors. Effective technology adoption requires targeted programs for system integration, retrofitting, and upgrading, yet these areas frequently lack sufficient funding. Establishing integration as a key performance indicator (KPI) would allow for measurable progress, guiding funding priorities to ensure that integration efforts are adequately supported and effectively mapped to national industrial goals.

THEME THREE | ALTERNATIVE SOURCES OF DATA FOR INDUSTRIAL INNOVATION POLICY

Data-driven decision-making is crucial for aligning STI investments with industrial competitiveness. However, improving methods for data extrapolation and interpretation remains a challenge. During this session, delegates discussed the importance of acquiring relevant data to address unanswered questions. The session also examined the significance of data accuracy and advanced data analysis applications.

Three key themes emerged:

There are limitations with national statistics and traditional data sources

National statistics and traditional data sources have important limitations to inform industrial strategies. Alternative data sources, such as patents, international trade data, and administrative records, can supplement national statistics and improve data quality. Emerging evidence gaps, both descriptive (how to define sectors) and prescriptive (how to act on sector descriptors), were discussed. Mistakes in mixing different data sets were flagged as a common issue, and efforts to enhance data interpretation using AI and machine learning are ongoing. Data from both private and public sectors must be integrated to inform policy discussions.

The session emphasised the complexity of the industrial system and the need for agile and evidence-based policymaking. While data collection and analysis are improving, it is acknowledged that only part of the picture can be understood due to the fast-changing nature of the system. A more nuanced approach, including qualitative insights from industry and technology experts, particularly for emerging and critical technologies, is required.

Global analysis and horizon scanning will be key for future competitiveness

The need for a global perspective was emphasised, recognising that global trends and disruptions increasingly shape industrial innovation. To remain competitive and resilient, countries and industries must look beyond national borders and understand the dynamics of global supply chains, emerging technologies, and market shifts.

One key approach discussed was the integration of horizon-scanning functions within emerging foresight units. These units are tasked with identifying and analysing future trends, technological breakthroughs, and potential disruptions across the globe. By systematically anticipating developments in digital transformation, sustainability, and advanced manufacturing processes, policymakers and industry leaders can make more informed decisions, ensuring that innovation policies are reactive and proactive.

This forward-looking capability is critical in enabling industries to adopt cutting-edge innovations early and align regulatory frameworks, investment strategies, and skills development with the global economy's future needs. As such, fostering international collaboration and knowledge-sharing between countries can enhance this horizon-scanning function, helping to anticipate and leverage the innovations and trends that will define the future of industrial competitiveness.

International collaboration

According to some estimations, international collaborations are three times more effective than domestic initiatives, particularly in areas like joint research and innovation. Citations serve as the primary source of data for recording partnerships. This ratio emphasises the significance of diverse expertise, broader funding opportunities, and extensive networks that international partnerships can offer.

CONCLUSION

The discussions at the UK-Japan workshop revealed the complexities both nations face and highlighted the necessity for aligned strategies and policies to strengthen their competitive industrial sectors. Several key themes emerged regarding the common challenges in translating scientific advancements into market-ready products. A significant emphasis was placed on the critical role of data in this process. Participants discussed the need for flexible policy frameworks that can adapt to future uncertainties, emphasising how data can inform these designs. It was recognised that both nations have much to learn from each other, reinforcing the importance of ongoing dialogue and the sharing of ideas among stakeholders.

Looking ahead, there is optimism for future collaborations, and we invite all to continue engaging with the Babbage Forum. This will ensure the continuation of essential conversations, the sharing of insights, and the fostering of learning.

Find out more: **www.ciip.group.cam.ac.uk/what-we-do/network/**

APPENDICES

AGENDA

10:30 Opening remarks
Julia Longbottom, British Ambassador to Japan

10:40 Introduction: Formulating the right policy questions

- Professor Sir Mike Gregory, Chair of the Babbage Policy Forum, University of Cambridge
- Dr Takahiro Ueyama, Council for Science, Technology and Innovation, Cabinet Office, Government of Japan
- Dr Dave Smith, National Technology Adviser, UK Government

11:00 SESSION ONE | INTERFACES BETWEEN STI AND INDUSTRIAL POLICY
Chaired by Sir Mike Gregory, in conversation with

- Dr Takahiro Ueyama, Council for Science, Technology and Innovation, Cabinet Office, Government of Japan
- Dr Dave Smith, National Technology Adviser, UK Government
- Director General Jingo Kikukawa, Innovation and Environment Bureau, Ministry of Economy, Trade and Industry, Government of Japan

11:45 Roundtable discussion

12:15 Lunch

13:15 SESSION TWO | EMERGING APPROACHES IN SECTORAL AND TECHNOLOGICAL POLICIES
Chaired by Margaret Tongue, Minister Counsellor for Economic Diplomacy in conversation with:

- Professor Tim Minshall, Dr John C Taylor Professor of Innovation, University of Cambridge
- Dr Carlos Lopez-Gomez, Head, Policy Links Unit, Cambridge Industrial Innovation Policy, University of Cambridge
- Director General Hirohiko Nakahara, Cabinet Secretariat, Government of Japan
- Director Kanae Kurata, International Science and Technology Affairs Division, Ministry of Education, Culture, Sports, Science and Technology, Government of Japan
- Principal Fellow Takao Kuramochi, Centre for Research and Development Strategy, Japan Science and Technology Agency, Government of Japan

14:00 Roundtable discussion

14:30 Break

14:45 SESSION THREE | ALTERNATIVE SOURCES OF DATA FOR INDUSTRIAL INNOVATION POLICY
Chaired by Professor Tim Minshall, Dr John C Taylor Professor of Innovation, University of Cambridge in conversation with:

- Kenji Ueki, Director General, Technology Strategy Centre, New Energy and Industrial Technology Development Organisation
- Dr Sadao Nagaoka, Programme Director, Research Institute of Economy, Trade and Industry
- Naoaki Kashiwabara, Secretariat of Science, Technology and Innovation, Cabinet Office, Government of Japan
- Jacob Waldock, Head of Assessments, Technology Insights, Futures and Foresight, Government Office for Science

15:30 Roundtable discussion

16:00 Concluding remarks and next steps
Professor Sir Mike Gregory, Chair of the Babbage Policy Forum, University of Cambridge

16:30 Networking reception

ATTENDEE LIST

UK Speakers

Professor Sir Mike Gregory, Chair of the Babbage Policy Forum, University of Cambridge
Professor Tim Minshall, Dr John C Taylor Professor of Innovation, University of Cambridge
Dr Carlos López-Gómez, Head, Policy Links Unit, Cambridge Industrial Innovation Policy, University of Cambridge
Dr Dave Smith, National Technology Adviser, UK Government
Margaret Tongue, Minister Counsellor for Economic Diplomacy
Jacob Waldock, Head of Assessments, Technology Insights, Futures and Foresight, Government Office for Science

Japanese Speakers

Naoaki Kashiwabara, Secretariat of Science, Technology and Innovation, Cabinet Office, Government of Japan
Director General Jingo Kikukawa, Innovation and Environment Bureau, Ministry of Economy, Trade and Industry, Government of Japan
Principal Fellow Takao Kuramochi, Centre for Research and Development Strategy, Japan Science and Technology Agency, Government of Japan
Director Kanae Kurata, International Science and Technology Affairs Division, Ministry of Education, Culture, Sports, Science and Technology, Government of Japan
Dr Sadao Nagaoka, Programme Director, Research Institute of Economy, Trade and Industry
Director General Hirohiko Nakahara, Cabinet Secretariat, Government of Japan
Kenji Ueki, Director General, Technology Strategy Centre, New Energy and Industrial Technology Development Organisation
Dr Takahiro Ueyama, Chief Executive Member, Council for Science, Technology and Innovation, Cabinet Office, Government of Japan

Participants

Tateo Arimoto, Senior Advisor to the President of the Japan Science and Technology Agency
Susie Kitchens, International Policy Fellow, Babbage International Forum; Imperial College London
Chihiro Nakagawa, Senior Policy Advisor, Secretariat of Science, Technology and Innovation, Cabinet Office
Masataka Saburi, Director of International Coordination, Research Institute of Economy, Trade and Industry (RIETI). Adviser to the Minister, Ministry of Economy, Trade and Industry
Yukihiro Sato, Deputy Director, Ministry of Economy, Trade and Industry (METI) Japan
Yoichi Sekiguchi, Director of Research, Trade and Industry (RIETI)
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