BABBAGE FORUM

16th SEPTEMBER 2025

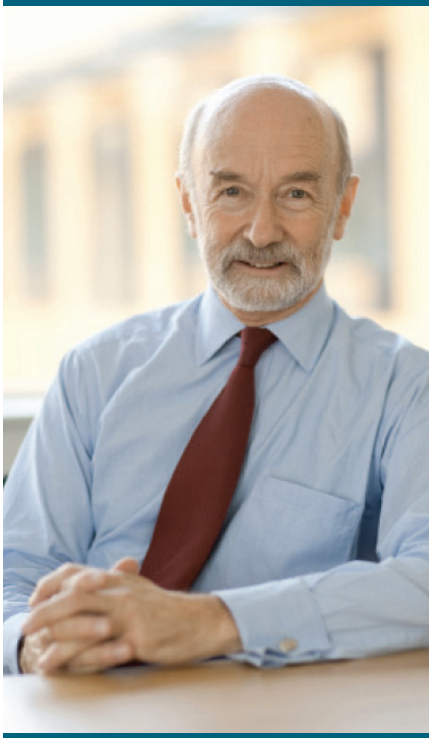
Global Industrial Innovation Policymaking

An International Meeting of Leading Policymakers

Cambridge, UK

Meeting Report

Foreword



Mike Gregory

The 2025 meeting was the third in the series of annual international industrial innovation policymaker gatherings. We were delighted to see many previous participants and to welcome many new senior policymakers Sixteen countries were represented.

The primary aim of these occasions is to provide opportunities for professional policymakers to share experiences and expertise related to current and future challenges. Our community seeks to operate below the political level but above the technocratic level.

The format is now well established. Keynotes provide a snapshot of the global context and developments in the main regions, US, China, Asia and Europe where Babbage meetings have been held during the year. The main body of the meeting is devoted to small-group round table discussion sessions enabling participants to engage in more depth. This year's main themes were:

Geopolitics, Security and Sovereignty.

Supply chains and global markets.

Industrial and technological capabilities.

This report captures the keynotes and the main points from the roundtable discussions. Key issues identified by all the groups included:

Institutions in a new world order

The nature and implications of security

Building resilient and sustainable supply chains

Industrial and technological sovereignty as a strategic imperative

Balancing competition with constructive global collaboration

We hope that these deliberations will help inform policy makers around the world as they wrestle with new and ever more complex challenges.

MG

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Final plenary: Key themes

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The Global Context
Keynote Speeches

Each year, the Babbage Forum invites a series of speakers to open the International Policymaker Meeting with a series of keynotes. These presentations provide delegates with an up-to-date international context for the later roundtable sessions and the examination of the chosen themes for 2025.

This year, Lord David Willetts opened proceedings with a brief overview of the current geopolitical situation, including possible scenarios moving onto 2026 and the potential influence on industrial innovation policymaking.

Recent global events have led to re-evaluations of industrial innovation policy and the development of national industrial strategies in many countries; and regional presentations explored the latest drivers, patterns and trends in Asia, China, Europe and USA.

Speakers in this session sought to address:

- Key regional drivers of industrial innovation policy
- Recent regional industrial innovation policy developments
- Emerging industrial innovation policy trends and their implications
- Key discussion points from 2025 Babbage regional meetings

Summaries of each keynote can be found in the following pages along with links to videos of the full presentations.

Keynote speech: Lord David Willetts

The Geopolitical Context

Lord Willetts explored the shifting relationship between politics, security, and technological development, situating his remarks within the broader context of geopolitical realignment and the evolving role of industrial strategy. He characterised the United States under the Trump administration as practising a form of "bellicose retreat" - a disengagement from global cooperation accompanied by heightened assertiveness. This posture, he argued, had significant implications for science, technology, and higher education, with potential long-term consequences for global research collaboration and the international innovation system.

Willetts cautioned that the erosion of America's traditional commitment to open science and university excellence would represent a global loss. However, he also suggested that this trend could create new opportunities for other countries, particularly the United Kingdom and Europe. As US leadership in certain sectors falters, markets for non-American Western products are expanding, signalling a potential rebalancing of industrial influence. He cited the challenges facing Elon Musk's electric vehicle sales as an example of shifting consumer and political dynamics.

Tracing the history of industrial policy, Willetts argued that America had always had an industrial policy hiding in plain sight as a security strategy. He stated that behind a Jeffersonian rhetoric of individualism there was a highly effective Hamiltonian practice driving advances in industry and supporting American business domestically.

Britain meanwhile had for many years pursued what he termed "naïve liberalism" - a belief in non - interventionism - while enjoying the protection and prosperity afforded by the US security umbrella. In effect, the UK's laissez - faire stance was sustained by America's industrial strategy.

Reflecting on Britain's policy evolution, Willetts noted that the UK has now rediscovered the importance of industrial strategy, a process catalysed by the coalition government and the work of its Business Secretary Vince Cable. He argued that contemporary British R&D and industrial policy have become increasingly shaped by security imperatives. Defence, energy, and advanced manufacturing are now viewed through the lens of national resilience and technological sovereignty. Over the past decade, security considerations have become pervasive across all domains of science and innovation policy.

To illustrate the shift in political attitudes, Willetts recalled the case of Sheffield Forgemasters, a specialist steel manufacturer with capabilities relevant to the nuclear sector. In 2010, the coalition government debated whether to extend financial support to the company. Ten years later, the same company was nationalised under a Conservative government and is now owned by the Ministry of Defence. This happened without controversy. Willetts cited this as evidence of how far the political consensus has moved towards an acceptance of active state participation in industrial policy.

Turning to the international dimension, Willetts discussed the growing tension between the US and China and its impact on global research collaboration. He warned that American security preoccupations increasingly shape the conditions under which other countries can cooperate with China. He described his own experience during discussions over the UK - U.S. technology pact, noting that Washington had begun insisting that partners avoid any engagement with China as a condition of collaboration. This dynamic, he predicted, would intensify - affecting access to grants, research partnerships, and international funding.

Willetts cited the UK's experience with Huawei as emblematic of this shift. Britain had established what it believed to be a secure and transparent partnership involving Huawei and Vodafone in the rollout of 5G technology. The arrangement included rigorous oversight of Huawei's equipment to address security concerns. Nonetheless, U.S. political pressure ultimately led to the collapse of the partnership. For Willetts, this episode demonstrated both Britain's vulnerability to external influence and the broader erosion of trust between allies over technology governance.

He predicted that similar pressures would be felt within the European Union, though the internal balance of opinion there might sustain more nuanced engagement with China. In Europe, he observed, there is strong resistance to an American veto over academic and industrial collaboration. This could produce a "non - American world order" in which European, Chinese, Indian and other entities cooperate more independently. Willetts identified this as a potential moment of opportunity for the EU, which has already demonstrated its capacity to shape global standards with its data protection regime, helped by blockages in Congress preventing the US from creating their own regime.

However, he expressed doubts that Europe could replicate this success in emerging fields such as artificial intelligence, citing a cultural aversion to risk and failure that inhibits rapid technological development. He drew an anecdote from his time as Chair of the UK Space Agency, recalling that the European Space Agency's record of near-perfect reliability in rocket launches reflected a broader preference for safety over experimentation. In his view, the avoidance of failure had hindered Europe's capacity for innovation.

Willetts also highlighted fiscal constraints as a growing limitation on industrial ambition. While global investors still hold an appetite for US dollar-denominated debt, many European nations - including the UK and France - face tightening fiscal conditions that restrict public investment capacity. This financial context, he argued, will shape how effectively Western economies can compete with China, whose capacity for large - scale, state - supported manufacturing is "extraordinarily impressive." China, he suggested, is moving from a phase of technological catch-up to one of global leadership, particularly in advanced manufacturing.

He concluded by observing that Britain and its allies are now navigating a difficult strategic position - caught between historic friendship with the US and the opportunities, but also the risks, of engagement with China.

The full presentation can be viewed here.

Asia: Dr Marco Kamiya
(UNIDO)

Dr Marco Kamiya began by drawing on the historian Fernand Braudel's three cycles of history and the concept of *longue durée* - the slow - moving, structural shifts that shape centuries of human history. He stated that we are now witnessing three such *longue durée* events : the advent of artificial intelligence (AI), the making of a new unilateral order, and geopolitical friction among the US, China, and Europe. He examined Southeast Asia's industrial policy against this backdrop.

China's Dominance and US Tariffs, and Transhipment Charges

Kamiya contextualised the challenges facing Southeast Asia through the lens of the "Flying Geese Model" - a concept developed by Japanese economist Kaname Akamatsu in 1962 to explain the sequential industrialisation of East Asian economies. Japan achieved rapid industrial development in just three decades from 1870 to 1910, transitioning from textiles to chemicals, then to steel, automobiles, and finally electronics. As labour costs rose, industries gradually moved to lower income countries.

This pattern unfolded across East Asia from the 1950s to the early 2000s, when China began to dominate entire industries. Kamiya posed the question of whether China is now leading the new "Flying Geese" model.

Regarding manufacturing, UNIDO, as the global custodian of industrial statistics, defines manufacturing value added (MVA) as the total output of the manufacturing sector minus the cost of intermediate inputs used in production. Comparing 2015 and 2023 as a proportion of GDP, MVA increased in Southeast Asia, but also in China, slightly increased in Malaysia and significantly increased in Vietnam. He noted two main reasons for this, the nature of manufacturing and related services, and transhipment which China uses in Vietnam and Mexico as a way to by-pass US tariffs.

However, the United States has threatened to impose 40% transshipment charges on goods it deems of Chinese origin, a policy that could severely disrupt Southeast Asian supply chains. Kamiya warned that while intra - ASEAN tariffs have been virtually eliminated (averaging below 0.2% since 2017), these new US measures threaten to undermine regional trade integration, potentially forcing some ASEAN members to negotiate bilateral concessions with Washington.

Southeast Asia's Industrial Policy Tools

Kamiya emphasised that Southeast Asia is a region with a long tradition of industrial policy, picking winners and selecting champions to nurture. He outlined three principal policy tools being reinforced across the region: commodity-based industrial policy, economic zones, and integrated production networks.

Commodity - Based Industrial Policy

Indonesia exemplifies the use of commodity-based industrial policy. Possessing the world's largest reserves of nickel - a critical material for steel, batteries, and electric vehicles. The country implemented a downstreaming policy in 2020, banning the export of unprocessed nickel. In 2023 China invested over $7 billion in nickel smelters and opened massive industrial parks. Indonesia now accounts for more than half of global refined nickel production.

The government aims to extend this downstreaming model across multiple sectors, including renewable energy, oil and gas, and mineral processing, targeting $600 billion in investment. While highly successful in attracting capital, the policy has yet to achieve significant technology transfer, leaving the absorption of foreign know-how a pressing challenge.

Economic Zones

The region has more than 1,600 economic zones, which have played a pivotal role in the region's social and economic growth. They are used to attract foreign investment and promote economic growth by offering incentives such as favourable regulation. Notable examples include Thailand's ten border special economic zones, the Philippines' free port zones, and Malaysia's new industrial parks focused on semiconductors. Thailand is also expanding its industrial parks to produce electronics.

These zones vary in function - some primarily attract FDI, while others support R&D.

Integrated Production Networks

Kamiya stated that participation in Integrated Production Networks is crucial in the developing strategy of Asian countries. Asian and surrounding East Asian countries entered an era of IPNs in the 1980s. They now depend on the contemporary space available for production integration and if transhipment charges are enforced it may trigger competition among Asian countries.

Vietnam, which is highly dependent on the US market will have to negotiate while Cambodia, aligned more closely with China, might resist US pressure. The Philippines may try to expand back office services with US companies.

Strategic Industrial Policies

Kamiya noted that China continues expanding its production networks. He cited Patrick McGee's book 'Apple in China,' which describes how Apple invested $275 billion in China over five years, an amount exceeding the US Marshall Plan in post - war Europe.

He presented further evidence of Chinese overseas expansion, noting that electric vehicle manufacturer BYD has production sites in Cambodia, Indonesia, Thailand, Uzbekistan, Turkey, and Hungary, while CATL, a major battery producer, is establishing facilities in Spain. China has also begun construction on Chancay Port in Peru, which will be a major hub for commodities and goods for Latin American countries.

Kamiya observed that while industrial policy in advanced economies has shifted towards national security and geopolitical concerns, in developing countries it remains primarily focused on job creation and poverty alleviation. China's overwhelming dominance of supply chains makes it difficult for developing countries to industrialise, although it is building production networks overseas. However, developing countries still rely heavily on the US market to support their industrial policies.

Concluding Remarks: Towards a New "Flying Geese" Model

Returning to Braudel's framework of historical cycles, Kamiya reiterated that we are now experiencing three longue durée cycles - artificial intelligence, a new multilateral order, and geopolitical friction among large economies. For Southeast Asia, the evolution of industrial policy will depend on how the US enforces tariffs and transshipment rules, and how Chinese investment abroad continues to evolve. Therefore, commodity based industrial policy, especially economic zones and production platforms will follow the logic of US and Chinese policy.

Kamiya concluded by saying that the task ahead is to provide a new "Flying Geese" model, not only for South East Asian countries but for the rest of the world. He believes China, the US and Europe can all contribute to this.

The full presentation can be viewed here.

China: Professor Wu Xiaobo

National Institute of Innovation Management

The Dynamism of Industrial Innovation Policy

Professor Wu Xiaobo began by situating China's modern industrial trajectory in its long history of engagement with the West, noting that the country's industrialisation effectively began after the First Opium War in the 1840s. The defeats China suffered in the nineteenth and early twentieth centuries prompted a sustained process of learning and adaptation. After 1949, industrial infrastructure was developed with significant assistance from the former Soviet Union that came at a very high cost.

China's modern reform era began in the late 1970s when it began opening up. While aiming for a market economy the country followed its own particular systems with central government dominating development. Since the introduction of five-year plans in the 1950s, now in their fifteenth iteration, these plans have served as the backbone of China's developmental strategy.

Wu argued that the transformation of China's innovation system was profoundly influenced by the First Gulf War in 1991, which awakened Chinese policymakers to the strategic role of science and technology, particularly the internet. The Second Gulf War in 2003 reinforced China's realisation of the importance of IT.

The central government's commitment to long-term strategic reform culminated in the 2005 National Congress on Science and Technology, which established innovation as the primary driver of national development. Since then, China's R&D investment has expanded from around 1% of GDP to 2.8%. Wu described this as the manifestation of a strategic determination to be the best country in the world, achieved through constant reform and improvement.

The Inclusiveness of Industrial Innovation Policy

China's vast geographic and social disparities have presented significant challenges to balanced development. The government, Wu explained, has sought to mitigate inequality between the prosperous coastal regions and less-developed interior provinces through a combination of industrial policy and targeted regional investment.

He identified three emblematic products symbolising China's scientific and industrial achievements - electric vehicles, lithium - ion batteries, and photovoltaics - and noted that these successes had been the result of a highly dynamic industrial policy involving multiple stages and policies. While some observers criticise the frequency of policy adjustments, Wu argued that this dynamism reflects China's ability to embrace uncertainty - a key feature of its innovation model.

Wu emphasised the inclusiveness of China's approach with its industrial policy incorporating both large state-owned enterprises and small and medium - sized private firms, supported by institutional reforms that integrate economic, political, and social dimensions. He stated that opening up had been the biggest lesson learned from the former Soviet Union and that it had been key to China's success. China's hybrid model which combines market systems with systematic planning has also been key to the country's success.

The Coherence of Industrial Innovation Policy

China's long - term vision has been to be a global leader. R&D expenditure has increased dramatically while China's manufacturing competitiveness has expanded globally.

Wu highlighted the landmark Made in China 2025 plan as a major strategic milestone. Fifteen years ago the initiative identified ten priority sectors and now leads the world in three of those - advanced railway systems, new energy vehicles, and energy equipment. Six others met their targets, only agricultural equipment failed to do so. For 2035 six areas are being targeted including biotechnology and AI. Work began five years ago.

Wu observed that around 50 - 60% of R&D investment now comes from industry rather than government, reflecting the growing role of market - oriented innovation. Universities and laboratories have also become increasingly important recipients of R&D funding.

He stressed that, even amid growing tensions with the US, China remains committed to openness and international collaboration.

Current Areas of Focus

Wu identified a number of priority areas shaping China's current innovation agenda. Firstly, the US/China relationship. China is having to contend with a technology blockade, manufacturing reshoring and a tariff war but it has counter measures in place including domestic substitution. In particular it is developing its domestic capabilities in high end science and technology equipment.

Industrial upgrading is another focus, one that Wu believes will be a hard task due to most Chinese manufacturing being traditional. However, rare earth control is perhaps the most important focus - China has introduced export controls on medium and heavy rare earth elements, a strategic measure designed to leverage its dominance in critical materials.

Artificial intelligence has become a national strategic priority. China's State Council launched the AI Plus campaign and Wu noted that the entire country from top to bottom is involved with downstreaming happening very quickly. Wu believes China's advantage lies in it having the biggest manufacturers and the biggest data banks although he acknowledged that the US has the advantage when it comes to upstreaming.

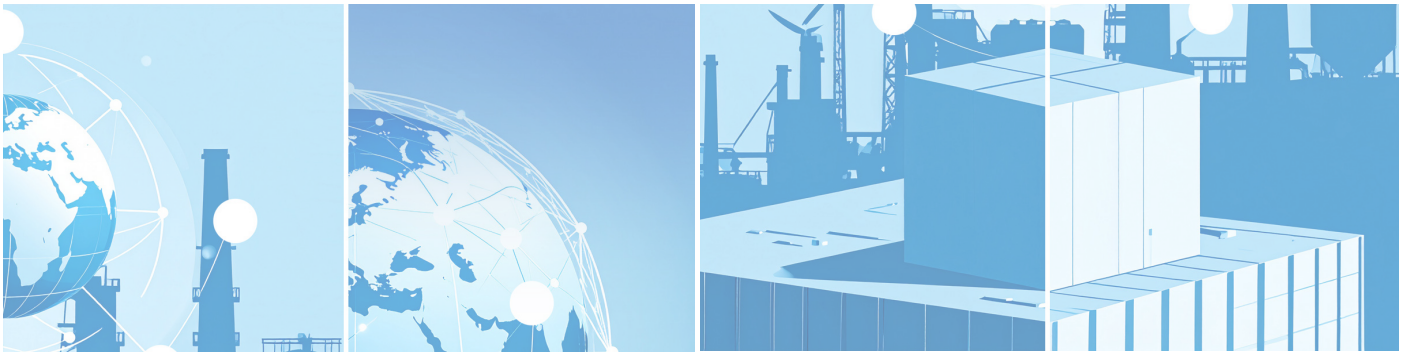
Another key task is enhancing the effectiveness of national innovation systems in semiconductors, new energy, and biomedicine. Many leading universities are establishing specialised colleges in AI, life sciences, and new materials. Wu noted that of 35 "bottleneck technologies" identified as constraining progress in 2018, China has achieved breakthroughs in approximately 85%.

New Orientation

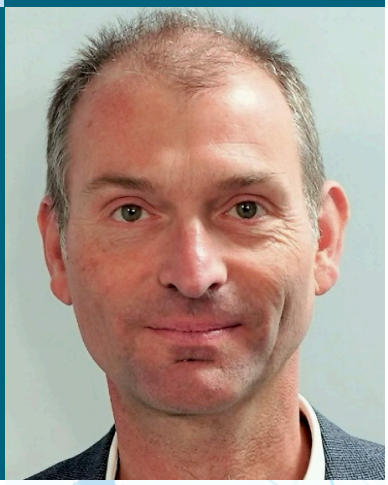
Professor Wu concluded by describing China's emerging orientation as one of embracing uncertainty and growing via trial and error. The guiding framework remains socialism with Chinese characteristics, combining market mechanisms with state coordination in pursuit of common prosperity and a harmonious relationship between humanity and nature. He summarised the key tenets of China's industrial innovation model as follows:

- A long-term strategic determination that embraces uncertainty.
- Dynamism coupled with consistency; directions and boundaries are fixed.
- A unified national architecture with region - specific adaptation.
- An open yet secure approach to global engagement.

The full presentation can be viewed here.



Europe: Dr Erik Canton
European Commission



The Broad International Scene

Dr Canton began by setting the broad international scene. Public R&D investment in Europe stands at 0.72% of GDP, a respectable level but lower than that of the United Kingdom (0.80%) and far below South Korea (0.89%). He noted that the position of Europe has decreased over a ten year period.

The situation is more concerning for private R&D investment, where Europe lags behind all major competitors. Private sector R&D amounts to 1.46% of GDP, compared to 2.70% in Japan, 2.83% in the United States, and 3.85% in South Korea.

It is a similar story with the venture capital needed to scale new innovations, particularly at later funding stages, where Europe's ecosystem remains underdeveloped relative to the United States. When it comes to "unicorns" - startups valued above $1 billion - the EU only has 90 compared to the U.S.'s 724 and China's 287. These figures appeared in the Draghi Report and were also used in the European Commission's flagship report Science, Research and Innovation Performance Report 2024.

R&I Challenges in Europe

Canton identified two landmark 2024 reports as having shaped the current policy scene. Firstly the Letta Report (April 2024) which focuses on the "Fifth Freedom" - a regime to make it easier for firms to do business in other parts of Europe and strengthen the single market; and the Draghi Report (September 2024) which focuses on competitiveness and how to strengthen Europe's position vis a vis other parts of the world.

Stagnant R&D spending, low labour productivity growth compared to the United States, and regulatory fragmentation that hinders cross - border cooperation and the scaling of innovations are all identified as concerns.

The European Commission has transformed the report's messages into a strategic document, The Competitiveness Compass (January 2025), which identifies four core challenges:

- Fragmentation of the R&I ecosystem: The R&I landscape is fragmented by national boundaries and regulatory differences.
- Inefficient allocation and dispersion of R&I funding: funding is spread thinly and often duplicates efforts.
- Weak transition from research to market: The EU struggles to turn research outputs into scalable, market - ready innovations.
- Skill mismatches: mismatch between the skills produced by the education system and those needed for high - growth sectors.

EU R&I Policy: Shift to Complexity

Past policies focused on broad, wide sector support with an emphasis on output indicators (patents or publication counts). While designed for quick assessment and public communication this approach gives limited guidance for strategic or transformative interventions.

The new approach advocated by Draghi is policy focused on targeted, challenge driven support. It places a growing emphasis on quality based and context sensitive indicators as well as complexity informed insights that enable a more impactful policy making process.

In future this could help build a forward-looking perspective, creating environments that support transition into new domains or help solve societal challenges as well as policies that can evolve in response to new challenges and opportunities.

Case 1: R&I Fragmentation

While acknowledging that there is co-operation, Canton noted that this often remains within countries and when co-operation exists internationally, it is often limited to cross - border regions. However, the “burden of knowledge” concept emphasises the difficulty of innovating alone. Especially when it comes to complex technology there is a need to pool the knowledge that is rarely found in one place alone.

In contrast, US innovation networks are less constrained by distance resulting in deeper networks.

Case 2: Technological Sovereignty (1)

Canton noted that openness could create tensions when it comes to security issues and stressed the need for sensitivity when dealing with this trade-off. Global value chains are already being reshaped due to a focus on reducing reliance on imports while boosting national innovation. The growing securisation and weaponisation of science and technology policies has intensified debates on how to safeguard access to critical technologies.

Notably the EU Framework Programme for Research and Innovation, which traditionally had a strong distinction between civil and defence use, now has a stronger interest in dual use applications. The framework programme is opening up for this dual use application.

Technological Sovereignty (2)

While strategic investment in digital technologies such as the Internet of Things and AI could offer significant competitive advantages, the EU faces significant technological gaps compared to the US and China. However, Canton noted that the EU is stronger in green technologies, and these are capabilities that could be leveraged for further specialisation.

Case 3: Supply Chain Dependencies and Technological Adoption

Preliminary findings on supply chain dependencies reveal that the EU faces substantial dependence on external suppliers for essential but relatively less complex inputs such as raw materials and basic components. Canton said this was likely the result of various factors including lack of natural resources and a large and diversified industrial base revolving around more technologically advanced segments of production.

Technological Adoption

When it comes to technological adoption Canton identified a number of key issues:

- Adoption of new technologies by firms, governments and households is crucial for valorisation of R&A efforts and for boosting productivity.
- Unequal adoption across firms can exacerbate income inequalities and slow tech diffusion can hamper reaching other objectives e.g. green transition.
- It can be very costly as it requires complementary investments. If a company wants to work with AI it doesn't just have to buy the software, it needs to overhaul its whole business model. There can also be resistance to the use of new technology.
- Though AI is a general-purpose technology that is useful across the board, it can have a displacement affect leading firms to reduce their labour force.

Flash Eurobarometer 559

Canton also highlighted the worrying statistics revealed in Flash Eurobarometer 559, a survey conducted in Europe, the US and other countries relating to firms' adoption of AI. While in Europe larger firms (500 plus) more frequently adopt AI than smaller firms the percentage is still modest (30%) compared to the US where almost 80% of larger firms use it. Even small firms in the US are adopting AI more often than large firms in the EU.

Conclusion

Canton concluded by emphasising that the EU's position in the global R&I landscape is being challenged. The Letta and Draghi reports have significantly influenced the EU's current policy thinking on strengthening R&I and the region's competitiveness.

It is recognised that multifaceted challenges call for adaptive, forward-looking approaches that can capture the dynamic, interconnected nature of R&I systems.

A particular challenge is to foster R&I, which can be highly geographically concentrated, while ensuring that the benefits are evenly spread. Inclusiveness is important in order to prevent increasing resistance to new technologies.

With swift and across the board technology adoption being equally essential in order to boost productivity and competitiveness, Canton highlighted regulatory sandboxes, a form of policy experimentation where the role of regulation for adoption of technologies is investigated, as one tool being used to address this.

The full presentation can be viewed here.

US: Professor Elisabeth Reynolds
MIT

Industrial strategy in the 21st century

Reynolds began by noting that the US is in a new place for industrial strategy which is now accepted across the board in a way it wouldn't have been even five years ago. The integration of national security and economic security is a key factor of this "semiconductor strategy. " Commercial markets are equally important - 1/3 inflation in 2021 was driven by a shortage of semiconductors in the auto industry.

Issues and approaches to 21st Century industrial strategy

· **Foster competition:** Firms should be encouraged to invest in innovation and growth to increase productivity and create globally competitive industries.

· **Guardrails and conditionalities:** The US is trying to be neutral and not pick winners among technologies or companies. Can guardrails be created that prevent the U.S. leaning into the worst aspects of industrial policy? When it comes to conditionalities, if companies are receiving government subsidies there should be some benefit back to the public.

· **Flexibility and iteration:** A country can't wait 10 years for outcomes of its industrial policy to show success. It needs to be engaged in a process that allows for iteration back and forth between the public and private sector, allowing for problem solving over time as both sides work towards shared goals.

· **Foster shared priorities:** Policies should be designed that create public benefits and positive spillovers that are broadly shared e.g. through education, job creation and community economic development.

Industrial strategy: risks and primary concerns

These were identified as: picking winners; rent seeking and political capture; corruption and political interference; reducing market competition; public authorities without expertise involved in making complex investment decisions; diversion of funds to unproductive uses.

Reynolds noted that there are elements of these we can see in today's industrial policy and that if the US heads down this path too far it will start to see a negative impact on its economy.

Biden's industrial strategy

Biden's strategic priorities were identified as resilience, reindustrialisation, quality jobs and place - based strategies.

The global pandemic, climate change and geopolitical threats led to a focus on supply chain resilience and an awareness of the need to build domestic capacity in key industries such as semiconductors, critical minerals and defence. Reindustrialisation happened in a number of ways including grants to semiconductor companies and tax credits to clean energy. There were also Made in America provisions, particularly in the clean - energy space.

Quality jobs were addressed via the possibility of recognising unions or project labour agreements and incentives such as tax credits for apprenticeships. Regional cluster strategies aimed to build expertise and excellence beyond the coastal centres renowned for innovation.

The primary goal in all these strategies was to "crowd in" private sector investment.

Reynolds highlighted the Bipartisan CHIPS and Science Act as the most "industrial policy" under Biden. It provided grants to companies without too many strings attached and guardrails with a portfolio approach - multiple companies had access. Tax credits were open to any company. The Inflation reduction act (IRA) focusing primarily on tax credits was also fairly successful achieving $100 billion of private sector investment, a leverage of $4 - 5 x in areas that had already been invested or in which construction was already underway.

Trump's industrial policy

Reynolds noted that while resilience and reindustrialisation are as important under Trump as Biden, the tools used under the Trump administration are very different and might be seen as a deal based bilateral approach to industrial strategy.

- Tariffs are a very blunt tool, not very strategic, and they're used on friends and foes alike.
- Equity stakes, the idea that the government takes active shares in critical companies (Intel, MP Mining), was something that the Biden administration considered but was taken off the table. Trump has been prepared to take a step that Biden might have been criticised for.
- Foreign direct investment is part and parcel of tariff negotiations. It exploits leverage over trade partners to receive concessions and investment agreements.
- The America First approach with regards to the WTO, UN and NATO is protectionist and inward looking.
- The use of centralized executive power on industrial strategy, some of which has been deemed illegal.

Continuity and Divergence

Similarities with the Biden administration were identified as:

- Industry focus - critical minerals; semiconductors; clean energy (there's a pull back on solar and wind but still investments going on); rebuilding the US defence industrial base (for the first time the government had a budget that exceeds $1trillion).Reynolds emphasised that when we talk about US industrial strategy moving forward, it will be doing so under the umbrella of defence.

- A rejection of the idea that the WTO has served the country well. There are concerns over unfair trade practices, some driven by China.

- Responding to Chinese technological competition with tariffs and export control policies. This is a continuation of a policy that has been growing over many years.

Key differences were identified as:

- No consistent economic rationale behind discrete policies.

- Tariffs are seen as a tool for negotiation. For Trump the market is a platform for negotiation. There is no long-term strategy.

- Trump is picking winners: there is no competitive process and he is taking significant equity stakes.

- Indirect self - dealing: many of the portfolio companies of JD Vance and the Secretary of Energy's previous venture firms now have contracts with the defence department or department of energy.

- The promotion, particularly in AI, of a set of companies without much competitive process.

- Most importantly, much of what is going on in terms of attacks on government R&D centres as well as higher education is ultimately about undermining the US science and technology engine. Reynolds sees this as a loss not only for the US but for the world.

Immediate economic impacts

Reynolds observed that Trump's policies have led to a decline in manufacturing due to tariffs having a negative impact on costs for intermediate goods. There are also signs of stagflation as material prices are increasing while order volume declines. However, Reynolds noted that industry is most concerned with uncertainty rather than tariffs as such.

There has also been a gradual but steady decline in new construction for manufacturing business and a labour market flatline particularly in goods producing sectors.

If the aim of Trump's policies was to bring manufacturing back to the US and address the trade balance, it has actually had the opposite effect. Global trade has increased by c. $3 billion in the first half of 2025 while the overall US trade deficit has increased by c. $160 billion compared to a year ago. It's estimated that tariffs will have a negative impact on US growth reducing GDP b 0.5% in the long run.

Broader implications for the US and globally

Trump's policies risk creating a long-term negative impact on US leadership in technological innovation if the R&D engine is compromised. There is also risk of greater US isolation and alienation from allies and partners in terms of research and partnerships.

Due to cuts, there is limited state capacity to implement everything the Trump administration wants to get done.

Reynolds concluded by commenting on the unpredictability of the Trump regime noting that "everything is on the table all the time." Trump could be seen as pursuing a conservative agenda (cutting taxes and regulations), a form of state capitalism (state more de-registe), or even democratic socialism (taking equity stakes).

Please add at end: The full presentation can be viewed here.

Roundtable Sessions

Particpants engaged in three seperate roundtable discussions:

Theme 1 – Geopolitics, security and sovereignty

Theme 2 – Supply chains and global markets

Theme 3 – Industrial and technological capabilities

Contributions were invited in response to the following industrial innovation policy questions:

• What current and future challenges/opportunities are your country focusing on?

• What measures exemplify how your nation is addressing those challenges/ opportunities?

The Chairs and Rapporteurs captured and refined the contributions of each group during the course of the three roundtable sessions and presented back to the meeting the key insights and findings from those discussions. What follows is a summary of the full sets of notes made on the day as well as the final presentations.

Theme 1: Geopolitics, Security and Sovereignty

Trust

Current and Future Challenges and Opportunities

Delegates agreed that an erosion of trust has become a defining feature of the current geopolitical landscape. This deterioration is evident in relations between major powers, particularly between the United States, Russia, and their global counterparts. Uncertainty has grown regarding the reliability of alliances, the stability of long - term commitments, and the rules underpinning global order.

Several participants observed that, while the United States retains significant short-term leverage through its economic and technological dominance, this position may not translate into sustainable trust in the long run. Many countries now view dependency on the US as a potential strategic risk, particularly in the context of shifting political priorities and unilateral policy actions. The perception that trust, once lost, is difficult to restore was a recurring theme throughout the discussion.

Delegates also highlighted persistent disagreements within alliances regarding defence sovereignty and dependencies on the US. European representatives noted that the continent continues to grapple with its reliance on American defence infrastructure and intelligence. The tension between autonomy and alignment remains a central challenge as countries attempt to reconcile collective security arrangements with national sovereignty.

National Measures and Approaches

In response to declining trust, nations are adopting strategies to reduce vulnerabilities and rebuild confidence through diversified partnerships. European countries are investing in initiatives aimed at strengthening defence capabilities within their own borders and at the EU level. Efforts to develop independent strategic capacities, particularly in areas such as cybersecurity, intelligence, and technological resilience, are being prioritised.

Several participants noted that countries are also seeking to reinforce trust through greater transparency in international cooperation. Initiatives that promote open communication, joint exercises, and standardised practices are seen as mechanisms to prevent misinterpretation and escalation. For smaller states, engagement in multilateral platforms remains essential to ensure stability and predictability in a fragmented world order.

General Observations

- Erosion of trust is reshaping alliances and altering perceptions of dependency.
- Restoring confidence requires transparency, diversification, and clear communication.
- The tension between autonomy and alignment will remain a defining issue in Western defence policy.
- Building new forms of trust may depend more on practical cooperation than on rhetoric.

Increased Multipolar World

Current and Future Challenges and Opportunities

Delegates described a clear shift away from traditional multilateralism toward a multipolar global order. They identified four emerging centres of influence — the United States, China, Europe, and the Global South - each shaping distinct models of political and economic governance. This evolution has intensified competition, with countries increasingly required to navigate complex alignments rather than participate in a unified system.

Participants noted that geopolitical alignment is now intertwined with technological ecosystems, particularly in artificial intelligence and digital infrastructure. Choices about which AI models or technology standards to adopt are becoming implicitly political, often reflecting broader alliances with the US or China. Such technological dependencies are increasingly recognised as determinants of sovereignty.

Delegates also examined China's central role in global value chains. While China's dominance in sectors such as critical minerals, semiconductors, and manufacturing was acknowledged, participants emphasised that these developments stem primarily from domestic developmental goals rather than overt geopolitical ambitions. Nevertheless, this concentration of capability has strategic implications for other economies that remain reliant on Chinese production networks.

National Measures and Approaches

Countries are responding to multipolarity by pursuing strategic diversification and enhanced regional cooperation. European states, for example, are deepening intra - regional ties to maintain autonomy while continuing engagement with both the US and China. Efforts are underway to strengthen technological sovereignty through investments in indigenous digital infrastructure, semiconductor production, and critical materials supply.

Other nations are prioritising flexible diplomacy, balancing participation in multiple forums and trade frameworks to safeguard their strategic interests. The Global South is emerging as an increasingly cohesive actor, leveraging its collective influence to negotiate better terms in trade, investment, and technology partnerships.

General Observations
• The global order is transitioning from multilateralism to multipolarity.
• Technology and AI ecosystems are shaping geopolitical alignment.
• Strategic diversification is essential for maintaining autonomy.
• China's economic dominance reflects domestic priorities but produces global dependencies.

Defence Spending

Current and Future Challenges and Opportunities

Delegates observed that defence spending has increased sharply across numerous nations. This escalation reflects a widespread perception that security risks - both traditional and non - traditional - are intensifying. Governments are redirecting substantial fiscal resources toward military modernisation, intelligence, and technological innovation.

However, participants cautioned that this reallocation often occurs at the expense of other priorities, particularly climate action and welfare expenditure. In a fiscally constrained environment, trade - offs between short - term security and long - term sustainability are becoming more pronounced. Several delegates emphasised that genuine security extends beyond military preparedness to include climate resilience, public health, migration management, and technological sovereignty.

The growing interest in dual-use technologies - those that serve both civilian and defence applications - was also highlighted. Participants recognised that innovation in fields such as artificial intelligence, quantum computing, and materials science can strengthen national defence while simultaneously driving broader economic competitiveness.

National Measures and Approaches

Many countries are expanding defence budgets and reforming procurement systems to accelerate innovation. European states are coordinating investment in joint capabilities, such as air defence and surveillance systems, under collective frameworks. These initiatives aim to reduce duplication, increase interoperability, and enhance strategic autonomy within NATO and EU structures.

At the same time, nations are exploring integrated policy frameworks that combine defence, technology, and environmental objectives. Investments in dual-use technologies are being prioritised to ensure that advances in defence contribute to wider industrial and scientific progress.

General Observations

- Defence budgets are rising amid heightened perceptions of insecurity.
- Fiscal trade-offs with climate and social spending are intensifying.
- Broader definitions of security now encompass technology, health, and sustainability.
- Dual-use innovation is increasingly a feature of modern defence strategy.

Towards Constructive Collaboration

Current and Future Opportunities

Despite the focus on fragmentation and rivalry, delegates expressed cautious optimism that cooperation remains possible in specific domains. Areas such as health security, technology development, and environmental innovation were identified as potential platforms for constructive engagement, even among strategic competitors.

Participants noted that private sector collaboration and research partnerships can play a stabilising role in periods of geopolitical tension. Shared interests in innovation, supply chain stability, and global well - being may provide the foundations for renewed trust.

General Observations

- Collaboration in science, health, and technology offers avenues for renewed trust.
- Constructive engagement may emerge from practical cooperation rather than political alignment.
- Public–private partnerships are crucial to sustaining dialogue amid geopolitical uncertainty.

Theme 2: Supply Chains and Global Markets

Redesigning Supply Chains for Resilience

Current and Future Challenges and Opportunities

Delegates highlighted that the redesign of supply chains has become a central challenge for all economies. Recent crises - including the pandemic, geopolitical tensions, and trade disruptions - exposed vulnerabilities in global supply networks, especially for critical goods such as semiconductors, minerals, and medicines. These disruptions revealed that reliance on extended, efficiency - driven value chains created structural risks that could no longer be managed by market mechanisms alone.

Participants agreed that resilience must now be treated as a strategic objective alongside efficiency. This involves reducing dependencies on single suppliers or regions and strengthening domestic or regional production capacity where appropriate. Delegates emphasised that this shift applies not only to critical sectors but also to basic goods, as disruptions in seemingly low-value chains can have cascading economic effects.

Some participants noted that the redesign of supply chains requires balancing the benefits of globalisation with the need for strategic autonomy. China's dominance of certain value chains, particularly in critical raw materials and components, was discussed. Delegates observed that this dominance often reflects China's domestic development agenda rather than purely geopolitical intent, but it nonetheless creates vulnerabilities for other economies.

National Measures and Approaches

Delegates described several measures being taken to build resilience. These include mapping critical dependencies and increasing transparency across supply chains, diversifying sources of supply, and supporting domestic production of essential goods. European initiatives to identify and mitigate risks related to raw materials and pharmaceuticals were cited as key examples.

Some countries are encouraging the development of regional partnerships to ensure continuity of supply and reduce strategic exposure. Others are promoting the use of digital tools to improve supply chain visibility and crisis response. Investment in infrastructure and logistics capacity was also seen as essential to strengthen resilience, as was cooperation between governments and industry in assessing risks and planning contingencies.

General Observations

- Resilience has become as important as efficiency in supply chain design.
- Dependence on geographically concentrated suppliers poses long - term strategic risks.
- Transparency, diversification, and regional cooperation are core mitigation tools.
- Supply chain redesign extends beyond critical goods to include essential everyday products.

Policy Uncertainty and Strategic Industrial Planning

Current and Future Challenges and Opportunities

Delegates identified policy unpredictability as a significant factor undermining industrial confidence and investment planning. Uncertainty arises from shifting tariff regimes, inconsistent energy and climate policies, and divergent national priorities between major economies. The United States' tariff policies and Europe's ongoing debate between green transition goals and short-term energy security were cited as examples of conflicting signals to industry.

Participants noted that governments sometimes announce ambitious objectives - such as the EU's 2035 ban on internal combustion engines - without ensuring that supporting infrastructure, supply capacity, and investment frameworks are in place. This results in misalignment between regulatory ambition and industrial readiness.

Another recurring issue was the insufficiency of funding for critical industrial projects. Several delegates expressed concern that the EU's financial instruments are inadequate to match the scale of strategic investment required, particularly when compared to the resources deployed by the United States and China. Moreover, industrial policy often remains reactive, responding to crises rather than guiding long-term transformation.

National Measures and Approaches

Delegates described national and regional efforts to improve strategic coherence. European programmes to identify priority sectors and align national investment plans with shared objectives were cited as positive steps. Some governments are exploring frameworks that link climate policy, energy strategy, and industrial competitiveness, aiming to provide greater predictability for business.

Several participants noted that coordination between ministries of economy, environment, and industry is essential to avoid contradictory policy signals. Enhanced cooperation between the public and private sectors was also recommended to ensure that long-term industrial objectives are realistic, financially supported, and clearly communicated.

General Observations

- Policy coherence and stability are essential for industrial planning.
- Strategic goals must be matched by investment capacity and infrastructure readiness.
- Funding mechanisms for critical projects remain insufficient in many regions. Coordination between public authorities and industry strengthens policy credibility.

Reindustrialisation and the Recovery of Know-How

Current and Future Challenges and Opportunities

Delegates observed that reindustrialisation is a complex and long-term process. Many countries face the challenge of rebuilding production capacity after decades of offshoring and deindustrialisation. The loss of tacit know-how - the practical expertise required to operate and optimise production systems - has created a significant barrier to reindustrialisation.

Participants noted that while reshoring or near-shoring of production can strengthen resilience, it also requires rebuilding ecosystems of suppliers, skills, and innovation that have been dispersed or lost. The ability to fine-tune and scale complex manufacturing systems has diminished, especially in sectors such as electronics and pharmaceuticals.

Delegates agreed that reindustrialisation cannot rely solely on financial incentives. It requires sustained investment in skills, education, and applied research, as well as a stronger connection between universities, technical institutes, and industry. They also recognised that the reindustrialisation process must integrate new technologies, such as digitalisation and automation, to remain globally competitive.

National Measures and Approaches

Delegates cited national initiatives aimed at supporting reindustrialisation through workforce training, innovation programmes, and regional development. European policies promoting industrial clusters and partnerships between research organisations and businesses were highlighted as mechanisms to restore local expertise and build competitive advantage.

Some countries are prioritising sectors where they retain comparative strength or where new technologies provide opportunities for leapfrogging. Efforts to recover or adapt production capacity in critical goods - including basic medicines, renewable energy technologies, and advanced materials - were also mentioned.

General Observations

- Reindustrialisation requires rebuilding lost capabilities as well as creating new ones.
- Skills development and applied research are central to restoring know - how.
- Clusters and regional partnerships help reconstruct industrial ecosystems.
- Technological innovation must underpin competitiveness in the reindustrialisation process.

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Theme 3: Industrial and Technological Capabilities

Reconciling National and Economic Security

Current and Future Challenges and Opportunities

Delegates agreed that industrial and technological capabilities are central to both national and economic security. Countries are reassessing the balance between open markets and the need to protect key sectors and technologies. The discussion emphasised that the security of supply, particularly in energy, semiconductors, and critical raw materials, has become a strategic imperative.

Many observed that the global fragmentation of production networks exposes economies to vulnerabilities that cannot be addressed by market forces alone. National resilience now depends on securing domestic production capacity and reducing exposure to external shocks. Delegates recognised that governments face difficult trade-offs between the benefits of openness and the need for control over strategic assets.

National Measures and Approaches

European delegates referred to emerging initiatives to strengthen economic security through industrial capability, including the European Economic Security Strategy and programmes focused on semiconductors, batteries, and critical minerals. Some countries are consolidating defence, industrial, and research priorities within single strategic frameworks to prevent duplication.

Delegates noted the importance of coordination between economic and security institutions to maintain balance between protection and competitiveness. Several emphasised the need to invest in workforce capabilities to support technological resilience and to rebuild production capacity lost through deindustrialisation.

General Observations

- Industrial capacity is now regarded as an essential component of sovereignty and security.
- Balancing openness with strategic protection remains a central policy dilemma.
- Coordination across government helps align security and economic objectives.
- Resilience depends on skills, supply chain transparency, and sustained investment.

How Do You Transition?

Current and Future Challenges and Opportunities

Delegates acknowledged that the transition from industrial strategy to implementation remains a major challenge. While many nations have articulated comprehensive strategies, delivery is often slowed by institutional fragmentation, complex governance, and limited administrative capacity.

Participants noted that long-term objectives frequently collide with short-term fiscal or political cycles, leading to inconsistency. Others observed that there is a tendency to react to crises rather than to pursue a coherent industrial transformation. Knowledge transfer between research institutions and firms was also identified as a persistent weakness, particularly for small and medium-sized enterprises (SMEs).

National Measures and Approaches

Denmark's InnoBooster programme was cited as an example of targeted support for SMEs and entrepreneurs seeking to commercialise innovation. Other countries described pilot initiatives designed to integrate industrial policy with skills development, workforce upskilling, and digital adoption. Some referred to coordinated mechanisms for monitoring progress, designed to ensure that industrial strategies translate into measurable outcomes rather than remaining aspirational documents.

Delegates agreed that industrial transformation requires adaptive implementation - policies must evolve through feedback, evaluation, and collaboration between government and industry.

General Observations

- Implementation capacity and administrative coordination are decisive for success.
- Policy consistency over time is essential to effective transitions.
- Support for SMEs and innovation diffusion accelerates industrial transition.
- Monitoring and evaluation ensure that strategy remains outcome-driven.

Strategy Development – One Size Does Not Fit All

Current and Future Challenges and Opportunities

Delegates observed that no single model of industrial strategy can be applied universally. The appropriate approach depends on economic structure, scale, and institutional capacity. Smaller and medium-sized economies emphasised the importance of focusing on comparative strengths and technological niches rather than attempting to replicate large-scale industrial systems.

Several participants noted that industrial ecosystems are now regional as much as national. Effective strategies therefore require alignment between local clusters, universities, and supply chains to achieve critical mass.

National Measures and Approaches

Examples included Norway's focus on maritime battery technology and green shipping, Denmark's continued investment in offshore wind and clean - tech systems, and the Netherlands' concentration on photonics and advanced manufacturing. Delegates also pointed to regional partnerships that connect research institutions with industry to generate innovation at scale.

General Observations

- Strategies must reflect each country's size, capacity, and resource base.
- Regional ecosystems play an increasingly decisive role in competitiveness.
- Focusing on niches can secure global leadership in specialised sectors.
- Coordination between government, research, and business ensures coherence.

How Do We Prioritise?

Current and Future Challenges and Opportunities

Delegates discussed how governments should determine priorities within limited fiscal and administrative capacity. Many agreed that broad objectives - such as the green and digital transitions - must eventually translate into choices about technologies, sectors, and instruments. However, there was caution about excessive intervention or attempts to 'pick winners'.

Some participants argued that governments should focus on setting broad missions and enabling conditions, such as skills and infrastructure, while leaving markets to identify the most efficient technologies. Others countered that the market alone cannot deliver long-term strategic objectives, particularly where social or environmental externalities are high.

National Measures and Approaches

Delegates referred to European coordination mechanisms such as the Important Projects of Common European Interest (IPCEI), which allow member states to focus investment on shared priorities like hydrogen, semiconductors, and health, but questioned whether they are going to be effective. Some national examples included mission - oriented frameworks that link public R&D, infrastructure, and industry in pursuit of agreed goals.

General Observations

- Prioritisation requires balancing direction with flexibility.
- Excessive central control risks inefficiency and politicisation.
- Mission-based frameworks can enable coordination across stakeholders.
- Evidence and transparency sustain legitimacy in priority setting.

Collaboration and Partnership

Current and Future Challenges and Opportunities

Delegates agreed that collaboration and partnership are critical to achieving scale and sustaining innovation. The complexity of modern production networks means that no nation can develop all technologies independently. Cooperation across borders, sectors, and disciplines is essential for competitiveness and resilience.

Participants also discussed the importance of public–private partnerships and trans - European projects. At the same time, they noted that collaboration must balance openness with the need to protect strategic knowledge and assets.

National Measures and Approaches

ASEAN's free trade arrangements and the Belt and Road Initiative were mentioned as examples of international cooperation designed to share risk and capital costs in infrastructure and industrial development. Several countries highlighted initiatives that link universities, research centres, and firms to align investment with national objectives.

General Observations

- Collaboration is essential for scaling innovation and sharing risk.
- Transnational projects enhance resilience and collective capacity.
- Partnerships must balance openness with strategic protection.
- Regional and international cooperation underpin long - term competitiveness.

Plenary: Key Themes

Security

- Security was recognised as a dominant issue, but it was questioned whether we should be content to let the military complex drive the trajectory of our countries.
- It was observed that economic security should be considered as a distinct but related dimension of national security. It was noted that the military alone cannot fully address economic security, which requires a broader societal framework encompassing workforce adaptation and advanced manufacturing.
- It was suggested that when it comes to security there are two models, that of the UK and the US. The US places economic security inside national security while in the UK economic security stands alone. Most European countries do not follow either model. As economic security concerns the business community there will be a need for them to also focus on national security.
- Surprise was expressed at the lack of discussion on what could be learned from the Ukrainian defence industry and their approach to developing capabilities under pressure. It was suggested that countries could leverage their own industrial policies and knowledge to support the Ukrainian defence industry more directly. That could then be leveraged to build the defence capabilities of allied nations.

Economic Security/Collaboration

- While the importance of security was acknowledged, several participants emphasised the need to balance this with broader efforts to improve global living conditions. The cost of living crisis and creating quality jobs were two areas of focus suggested.
- It was acknowledged that there are major differences between the US, Europe and Japan and medium and small - scale economies. How do we work with these Capsule markets to help them scale up their challenges?
- In the UK context there is a lot of thinking around market dynamism. Post covid the amount of exit and entry defers has decreased dramatically and the UK is thinking of moving from an anti-trust to pro-innovation policy.

Global Development, Industrialisation, and Regional Perspectives

- It was suggested that the Chinese and Vietnamese path to development may no longer be available to other nations. Indonesia using its rare earths and minerals as a means to development was given as an example of a possible new path to industrialisation, one where countries develop capabilities in processing their own rare and desirable commodities, rather than having this carried out elsewhere, and then acquire new leverage in the international community. What that would mean for the rest of the world would then have to be pondered.

- It was noted that the new Dean of the Asian Development Bank Institute in Tokyo was, for the first time, an Indonesian, a former minister of finance. His view was that historical examples from Japan, the US or Europe were not applicable for developing countries in the south. Instead they needed to learn more from the recent experience of Eastern Europe and Central Asia as this was closer to the issues that are being faced in the south.

- As organisations in Southeast Asia do not always have the ability to provide answers to governments seeking advice, it was suggested that there were opportunities for more advanced nations such as Europe and the US to provide soft diplomacy by answering these questions.

- Norway was pointed to as a rare example of a country that uses its oil to provide social benefits for the whole country.

Future challenges and opportunities

- While challenges in the near future are obvious, imagining what lies beyond them is difficult and may therefore be constraining us. It was suggested that identifying the commodities that will cause concern in 5-10 years and organizing markets around those might be a way to make progress.

- The need to identify institutions capable of achieving global good was also recognised as a key task, even if it is difficult to imagine what form they may take. It was suggested that they won't be strictly technological or economic so will need complementary capabilities.

- In a spirit of optimism regarding international collaboration it was pointed out that there are already international organisations, often low profile, such as The International Standards Organisation (ISO) and International Telecommunications Union (ITU) where countries, even those in a state of conflict, come together to set standards which are agreed upon and complied with. It was suggested that rather than creating new entities perhaps we should see what we can obtain from organisations like the ISO and ITU.

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Institute for Manufacturing
17 Charles Babbage Road, Cambridge UK, CB3 0FS
+44 (0)1223 766141
ciip.group.cam.ac.uk