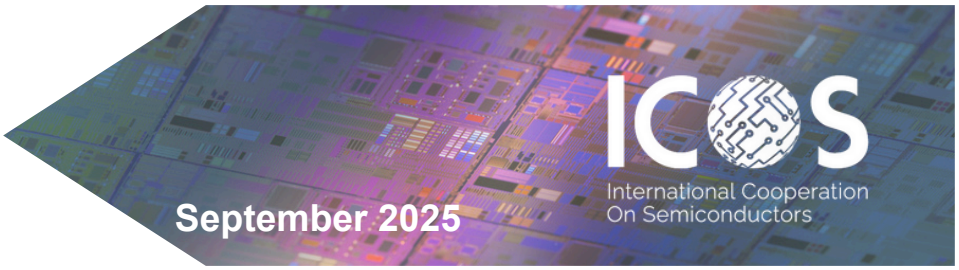
ICOS NEWSLETTER



IN THIS ISSUE:

AENEAS's perspective on the impact of International Cooperation on the EU Industrial Community

Why is International Cooperation in Semiconductors important for the European industrial community?

Caroline Bedran: European industrial players are multinational and acting in semiconductors markets which are inherently global. In addition, the next scientific and technological challenges are so complex that they require collaboration, as no single country or region possesses all capabilities. It all shows that international cooperation on semiconductors is not an option, but a strategic need for the European Union. This remains true even if export control, investment screening and more recently tariffs may affect supply chain strategies for our industry. Actually, one might argue that the turbulent geopolitical context increases the importance of international collaboration, as a strategic tool to counterbalance some of its negative effects and to manage the risks deriving from this turmoil.

To bolster Europe's competitiveness and resilience, the EU Chips Act acknowledges these needs and that is why the Commission builds on ICOS work to select partners and topics and build its cooperation agenda.

These findings will in particular inspire the R&D&I initiatives to be carried out within the Chips JU, that will be discussed again during EFECS 2025.

Caroline Bedran, Director General of AENEAS

What are the emerging or strategic technological domains in which cooperation is essential to guarantee Europe's competitiveness?

CB: The ICOS project has shed lights on structural dynamics, delivering evidence-based insights into how, with whom, and on what, international collaboration can strengthen Europe.

Joint research projects are at the forefront, as their pre-competitive nature facilitates knowledge exchange and collaborative innovation. Joint calls have already been launched with Korea and Japan, supporting the development of heterogeneous integration and neuromorphic computing technologies for future semiconductor components and systems. Others will follow.

ICOS has laid the foundations for collaborations with other regions, by organizing in recent months its first EU-India Joint Researchers Workshop, as well as the very first Forum between the European Union and Singapore in the field of Semiconductors.

ICOS has received funding (2023 – 2025) from the European Union's Horizon Europe research and innovation programme under GA No 101092562.

Eventually, Europe's competitiveness will depend on its ability to link its strengths in technology and applications with complementary capabilities abroad, ensuring balanced and mutually beneficial partnerships. With ICOS as a guide and Chips JU as an enabler, Europe can position itself as a strong and trusted partner shaping the future of semiconductors worldwide.

Which future markets or activity sectors are the most important for Europe, where International Cooperation will be most critical?

CB: The work of ICOS demonstrates that International Cooperation is essential across all application areas listed in the ECS Strategic Research and Innovation Agenda (SRIA), which is updated annually by industry.

These future growth markets are increasingly global by nature, making international cooperation indispensable. The most relevant ones for Europe include:

- **Mobility**, where semiconductors for electrification, autonomous driving, and connectivity require worldwide interoperability and standards.
- **Energy**, including power electronics for renewable integration, smart grids, and energy storage, which rely on cross-border technology deployment.
- **Digital Industry**, where advanced manufacturing, automation, robotics benefit from shared architectures, supply chain resilience, common technology platforms.
- **Health & Wellbeing**, where Europe can leverage strong research assets while accessing international expertise in bioelectronics, robotics, diagnostics, and digital health solutions.
- **Agrifood and Natural Resources**, where precision farming, environmental monitoring, and sustainable production systems are strengthened through global cooperation in sensors and data-driven technologies.
- **Digital Society**, where 6G, IoT, and secure connectivity demand joint work on architectures, standards, and regulatory frameworks.

What can we expect from ICOS between now and the end of the project?

CB: Recommendations on standardisation have just been delivered and updated technology scanning and foresight will be issued in the next months.

Of course, policy recommendations on international cooperation in semiconductors will be a major milestone. Looking further, we see opportunities for a follow-up project to complement the ICOS findings with an analysis of risks to EU's economic security in the semiconductor sector, whether from over-capacity in mainstream chip production, from export controls, or from non-market policies and practices. Such a project would also be needed to update the recommendations according to technological and geopolitical evolutions and investigate collaboration activities with additional countries.

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2. Fact Sheets to have a broad vision of the Semiconductor ecosystems

Semiconductors are fundamental to nearly all modern technologies, serving as critical driver of digital innovation, industrial automation, and energy transition.

International monitoring is essential to understand the global semiconductor innovation landscape and supply chain dynamics.

Recognising the multifaceted nature of the challenges we face in the semiconductor value chain, international collaboration is emerging as a crucial enabler for success.
By fostering partnerships and cooperation on a global scale, countries can leverage collective strengths, mitigate resource constraints, share technological expertise, and pool financial resources.
Through international collaboration, countries can navigate complex geopolitical dynamics, ensure sustainable practices across the semiconductor value chain, and accelerate innovation to drive the transition towards a resilient future. In an increasingly interconnected world, collaboration serves as a cornerstone for unlocking the full potential of the semiconductor industry, paving the way for shared prosperity across borders.

> *"Through international collaboration, countries can navigate complex geopolitical dynamics, [...] and accelerate innovation to drive the transition towards a resilient future"*

EPoSS Association Annual Forum 2025, Monika Curto Fuentes - © VDI VDE

Having identified the relevance of international observation, ICOS has prepared an overview of semiconductor R&D&I, funding and international benchmarking of seven countries to identify opportunities for further cooperation.
The review provides key information on the national semiconductor ecosystems in China, South Korea, Japan, India, Singapore, Taiwan, and the USA.

It gives insights into the key domestic stakeholders, national chips strategy documents, main policy objectives, current research priorities, as well as details on funding instruments, the semiconductor market and production share and the recent developments in the relations with the EU. Both the national stakeholders and all the sources are linked to the adequate websites for further research.

The factsheets are intended to be living documents that will be regularly updated, so please do not hesitate to contact us directly if you have further relevant information or comments (monika.curtofuentes@vdivde-it.de).

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3. 2025 International Semiconductor Researchers Forum in the Republic of Korea

Building on the success of the first Forum held in Brussels on March 2024 which laid the groundwork for stronger ties between the European Union and the Republic of Korea in the semiconductor researcher domain, ICOS project along with the European Union, the Chips JU, the Ministry of Science and ICT, the National Research Foundation of Korea and the Korea-EU Semiconductor R&D Cooperation Center (KE-SRCC) decided to get reunited again to witness the progress in the cooperation plan on June 16th, 2025 in Jeju Island, ROK.

Supported with the **ROK-EU Digital Partnership** signed in 2022 and the launch of the joint call between ROK and EU in the framework of the Chips Joint Undertaking, experts, policymakers and representatives of major Research Institutes and Universities from both Europe and South Korea worked together during the whole year on the topics identified at the first Forum and proposed during the joint call.

2025 International Semiconductor Researchers Forum in Jeju, South Korea - © KE-SRCC

ICOS was honored to welcome the presence of Chang Yune Lee (MSIT), Rainer Wessely (EU Del. to RoK), Sang Wan Ryu (NRF), Juyoung Kim (EU Del. to RoK), Jari Kinaret (Chips JU) and Seo Gyun Kim (KE SRCC). They all recognized the **crucial role of the semiconductor industry in driving digital transformation** and its presence in both current and emerging technologies that are shaping our societies.

The Forum aimed at reviewing the progress of ongoing collaboration initiatives, exploring potential new areas for collaborations and highlighting opportunities for aligning funding mechanisms between the EU and ROK.

The topics covered during the forum include **Ferroelectric materials and memory, 2D devices, silicon photonics, neuromorphic computing, AI and Power Devices**. Beside research materials, it was presented current projects and initiatives like the European Pilot Lines and the Horizon Programme to find ressources and opportunities.

Following the commitments made during the First Forum, both sides agreed that the cooperation is already well underway and has the potential to deliver impactful projects.

The event showcased the four projects selected through the Joint Calls and provided insights into their current progress and future milestones.

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4. Successful First EU-Singapore Semiconductor Researchers Forum

Singapore combines world-class research capabilities, robust industrial assets, and a strong commitment to advancing cutting-edge technologies. In 2022, the **European Union and Singapore signed a Digital Partnership Agreement**, reflecting their joint determination to deepen cooperation and accelerate the digital transition on both sides.

In this context, a dedicated Forum was organized by ICOS in Brussels on July 8th and 9th 2025 to explore how both regions can join forces to shape the semiconductor chips of the future.
Representing the European Commission, Pierre Chastanet (DG CONNECT) and Katherine Power (DG RTD) outlined Europe's key priorities: consolidating research and development efforts across the continent, fostering innovation ecosystems, and reducing strategic dependencies to ensure **technological sovereignty**.

2025 International Semiconductor Researchers Forum in Jeju, South Korea - © SiNANO Institute

From Singapore's perspective, Aaron Thean, Deputy President and Provost of the National University of Singapore (NUS), and Tan Chee Seng, Senior Director A*STAR, highlighted the central role of electronics as the country's largest manufacturing sector and a key driver of economic growth.
Singapore has long invested in infrastructure, talent development, and international collaborations to strengthen its semiconductor ecosystem, and both speakers underlined that global cooperation is indispensable to sustain competitiveness and innovation capacity in the years to come.

The forum aimed at gathering experts and policy makers from both sides and give them the space to exchange on **Advanced Functionalities, Heterogeneous Integration and Advanced Packaging** to identify opportunities of collaborations. As an outcome of the forum, several promising areas for cooperation were identified, spanning different levels and domains: **Power electronics, RF/mmW GaN, Heterogenous integration, Sensors & actuators, Advanced photonics, and Energy efficient compute**.

Demonstrating the tangible success of the discussions, concrete next steps were agreed upon, including the participation of ICOS members in the **upcoming INPACE EU-Indo-Pacific Digital Partnership Conference 2025** organized by the Horizon Europe INPACE project at the National University of Singapore end of October 2025 to further explore research opportunities of cooperations.
All presentation materials are currently available on the ICOS website for further reference.

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5. Latest Results on the Semiconductor Value Chains

The deliverable “Monitoring Semiconductor value chain: Implications for International Cooperation” explores the semiconductor value chain evolution from three decades of globalization and deep regional specialization into a system increasingly shaped by geopolitical rivalries. The United States and China have become the two central poles of this transformation.

The U.S. is reinforcing its control over critical segments through export controls, investment restrictions, large-scale subsidies under the CHIPS Act, and the reshoring of production to reduce reliance on Chinese manufacturing. In parallel, China is accelerating its pursuit of technological self-sufficiency by mobilizing massive state investments, developing domestic suppliers across all segments, recruiting foreign expertise, and leveraging its dominance in critical raw materials while forging selective partnerships with countries in the Global South. This confrontation is driving the regionalization of value chains and pushing companies to adopt “local-for-local” production models.

Global investment patterns reflect these dynamics. The U.S. and China are leading massive expansions across the value chain, while Taiwan, South Korea, and India consolidate their positions, and Japan pursues recovery through projects like Rapidus. In contrast, the EU has announced substantial projects under the EU Chips Act, but many have been delayed or cancelled, highlighting Europe’s dependence on foreign-led initiatives, particularly from U.S. firms, and the fragility of its investment base.

At the same time, Europe maintains balanced trade relations with both U.S.- and China-centric ecosystems, seeking to preserve its strategic autonomy.

The full report “Monitoring Semiconductor value chain: Implications for International Cooperation - ICOS Semiconductors” is available here.

6. Interactive Workshop in Warsaw: Main Takeaways of ICOS Community

On May 12, 2025, ICOS organised an interactive workshop at Warsaw’s Centre for Advanced Materials and Technology (CEZAMAT), exploring risks and chances of the European semiconductor value chain. Co-hosted by VDI/VDE-IT and Queen’s University, Belfast, the event gathered over 50 international experts from research, industry, academia, and policy to map out Europe’s strengths and challenges in this strategic sector.

Using a metaphorical “boat exercise”, participants identified the following as Europe’s “strong winds”: R&D excellence, industrial capabilities, and strong international network. “Anchors” holding back smooth progress included bureaucratic hurdles, fragmented regulation, and skill shortages. The shortage of STEM graduates, especially at Masters level, and the need to attract more women into microelectronics across Europe emerged as particularly urgent issues.

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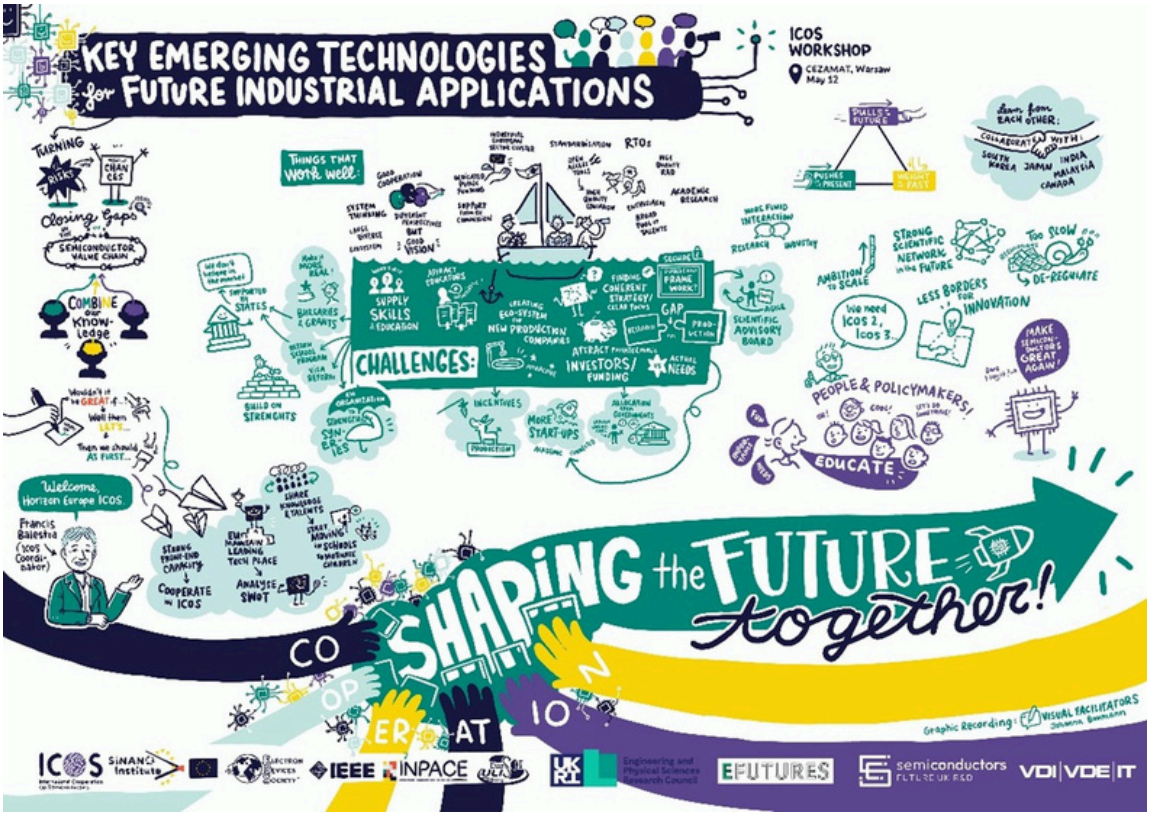
Collective calls were also made for more unified regulatory approach at the European level, alongside demands for simplified administrative procedures, longer-term funding strategies, and a dedicated European strategic body to coordinate semiconductor policy independently of shifting political agendas.

Later in the workshop, the group addressed Europe's weak start-up culture and limited early-stage investment, proposing measures such as tax and regulatory relief, improved grant access, and targeted visa schemes to attract global talent. Using an impact/effort matrix, participants prioritised several "low-hanging fruits": an agile EU Scientific Advisory Board, the launch of a "Best European Invention" competition to boost visibility, the establishment of long-term project funding mechanisms and a streamlined support structure for start-ups in key areas.

The workshop concluded with discussions complemented by a Futures' Triangle exercise. This provided a space for individual opinions regarding potential progress of semiconductor value chain in Europe, by identifying socio-cultural, technological, economic, environmental, political and values-based aspects that represent the weight of the past, the push of today's present and the pull of any semiconductor future.
A SWOT analysis prepared out of these outcomes shows that Europe's solid foundation in semiconductor research could be undermined unless institutional barriers are urgently tackled. By investing strategically, improving coordination, and fostering innovation, the ICOS initiative aims to strengthen Europe's future position as a resilient and globally competitive semiconductor hub.



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7. Next steps, come & meet us at

The ICOS project is reaching its final stage, and it is now time to focus on delivering results.

Don't miss our latest presentations with:

- 2 Keynote Talks at SEMICON and EFECS
- 1 EFECS Side event Workshop
- and the **final open event** of the ICOS Project as a side event of the ECS Brokerage Event, that will take place on February 3rd, 2025 in Brussels.

KEY DATES

SEMICON Europa 2025 - Keynote
18-21 October 2025 - Munich, Germany
Registration open

EFECS 2025 - Workshop Key Results of ICOS for European Economic Resilience
4 December 2025 - St. Julian, Malta
Pre-registration open for EFECS

Final ICOS event - ECS Brokerage Event
3 february 2025- Brussel, Belgium
Registration will open soon

Partners

Academics

Grenoble INP UGA, Universiteit Gent, IU.NET, Warsaw University of Technology, TU Delft – Delft University of Technology

RTOs

imec, VTT, Fraunhofer, Tyndall National Institute, cea leti

Industrials

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Associations & Consulting companies

SiNANO Institute, Aeneas, VDI|VDE|IT, DECISION ETUDES & CONSEIL

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