Horizon Europe ICOS : International Cooperation on Semiconductors for European Economic Resilience

Francis Balestra (*CNRS/Grenoble INP-UGA/SiNANO Institute*)

SEMICON Europa

Munich, Nov. 18-21, 2025

INTRODUCTION

- ICOS Project started in January 2023 for three years, it is funded by the Horizon Europe research program.

Coordinator

Technical co-Coordinator

- An ambitious project in the framework of the European strategy for semiconductors

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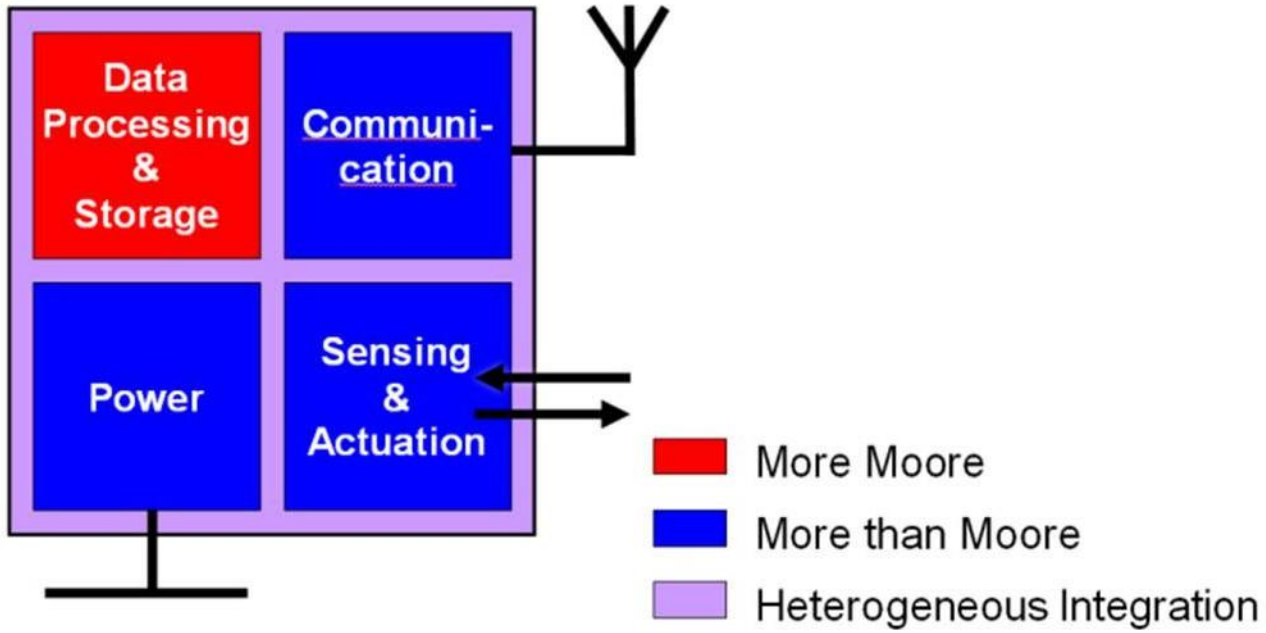
Main Scientific Topics

- Advanced computing & Advanced functionalities: sensing, RF & optical communications, optical devices, energy harvesting, power devices, …



Motivation for **International Cooperation in Semiconductors**

- **Semiconductors & Semiconductor-based photonics** are pivotal technologies for almost all existing industrial sectors, as demonstrated by the recent chips shortages

- **International cooperation** is key for:
  - **Knowledge** exchange
  - **Speeding up** technological innovation (e.g. ITRS/IRDS, IPSR-I, ECS-SRIA, NEREID): computing needs, energy efficiency, advanced functionalities, heterogeneous integration
  - **Reducing cost** by avoiding duplicated research
  - **Strengthening** complex **supply and value chains** (no region can cover the whole value chain)
  - Managing **risks** due to the turbulent geopolitical context
  - overcoming **skill shortage**
  - gaps in **standardisation**

And is encouraged by the new **strategies** of leading semiconductor countries (**Digital Partnerships**…)

Objectives of International Cooperation in Semiconductor

- **To implement and strengthen the DPs & TTC in close cooperation with the EC**
- To build **balanced semiconductor partnerships** with like-minded countries
- To set out cooperative framework on **initiatives of mutual interest**
- To identify and support the establishment of the **most promising scientific international collaborations**
- **To consolidate sovereignty through skills**

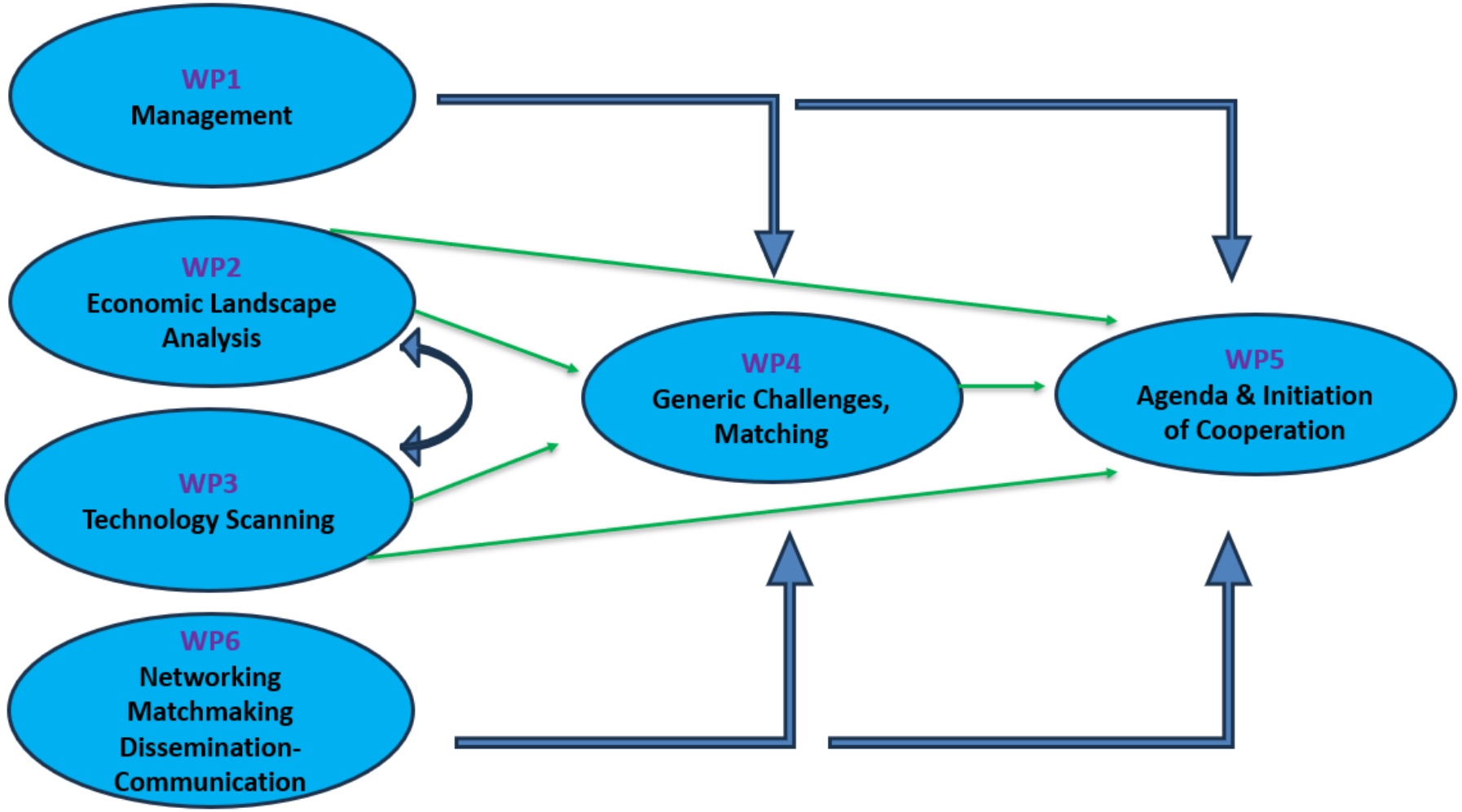
=>*Skill Roadmap* aligned with Research and Industrial Roadmaps, Strengthen *scientific and technological competences in Academia* through international cooperation, Develop *MS and PhD students skills*, Attract *international students*

- To organize **matchmaking bilateral and multilateral events**
- To support the growth of the Semiconductor industry in growing markets through **focused research alliances** based on awareness of advanced research activities
- To strengthen **Europe's position** in global value chains in this area and to contribute to the **EU Chips Act, Green deal and Digital Agenda**

Objectives


Canada
USA
China
Republic of Korea
Japan
India
Taiwan
Singapore
Investigated countries

ICOS Concept

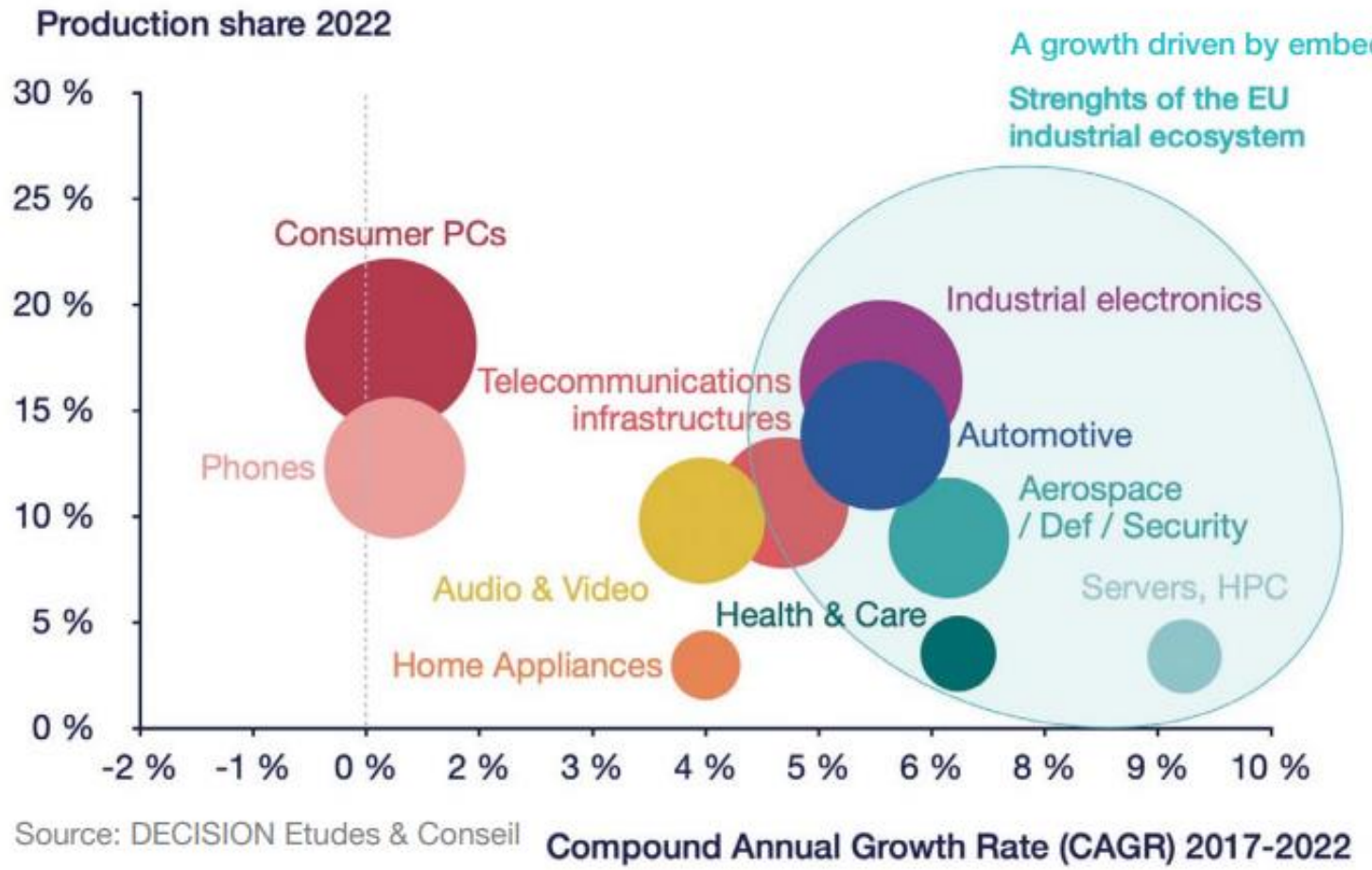


Complex supply & value chains

Global Semiconductor Landscape in 2024

Source: DECISION Etudes & Conseil

Compared growth of the electronics segments in the World



A growth driven by embedded industries

Strenghts of the EU industrial ecosystem

- **77%** of the production of electronics systems on EU soil is made of embedded systems.

SIEMENS, Continental, PHILIPS, ZF, BOSCH, Schneider Electric, Valeo, AIRBUS, FORVIA, THALES, EVIDEN

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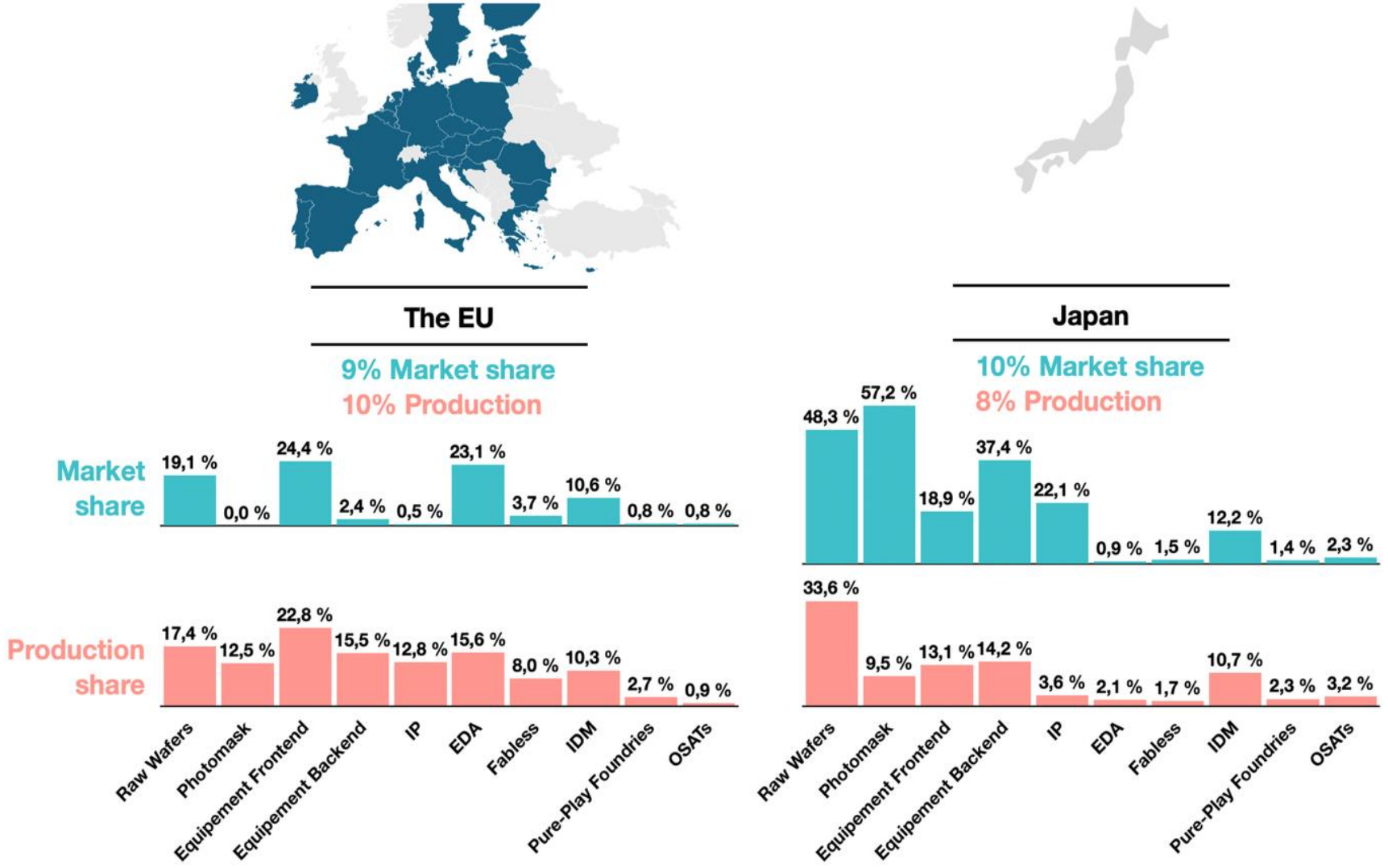
Market & Production shares in the value chain



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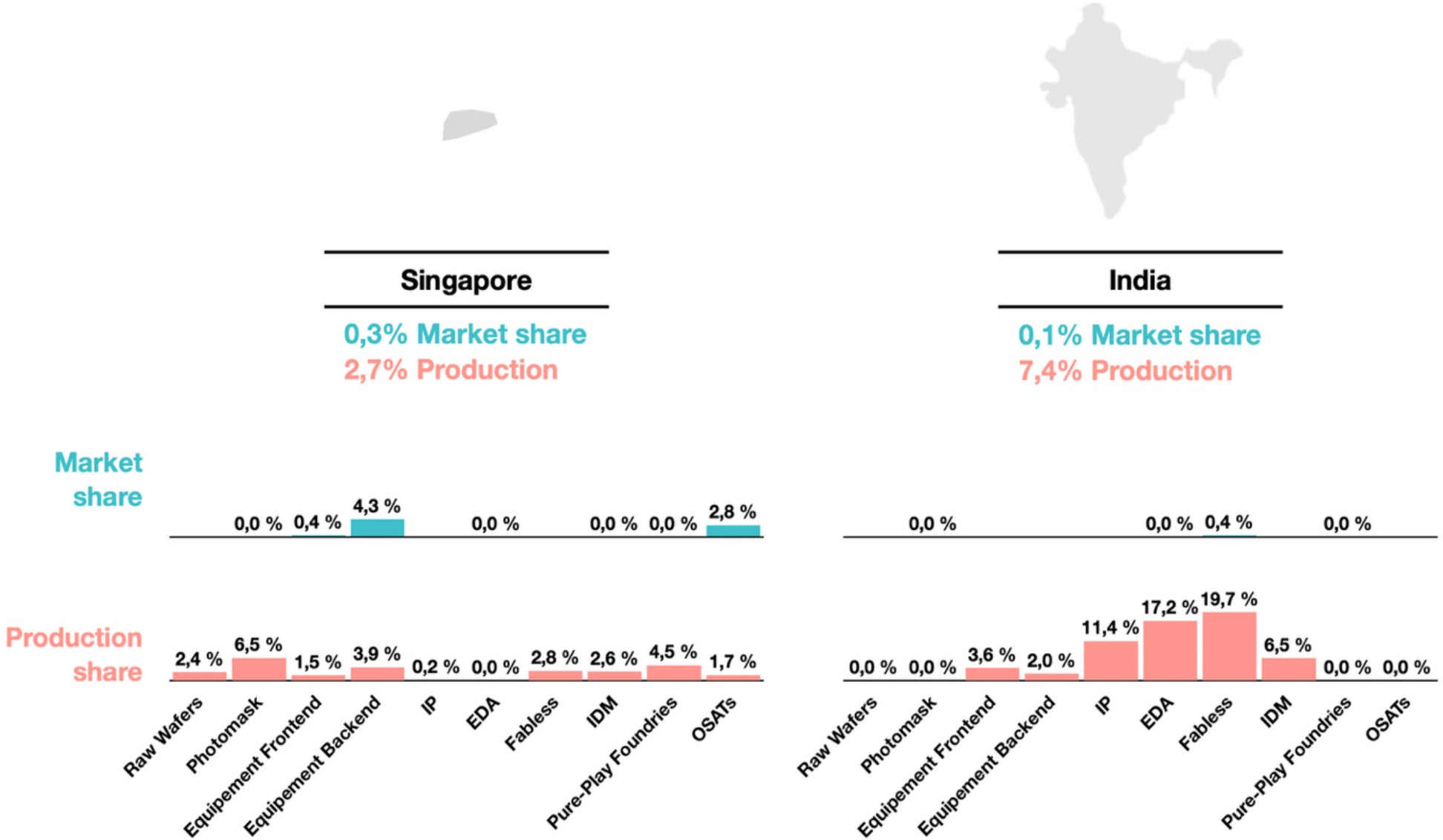

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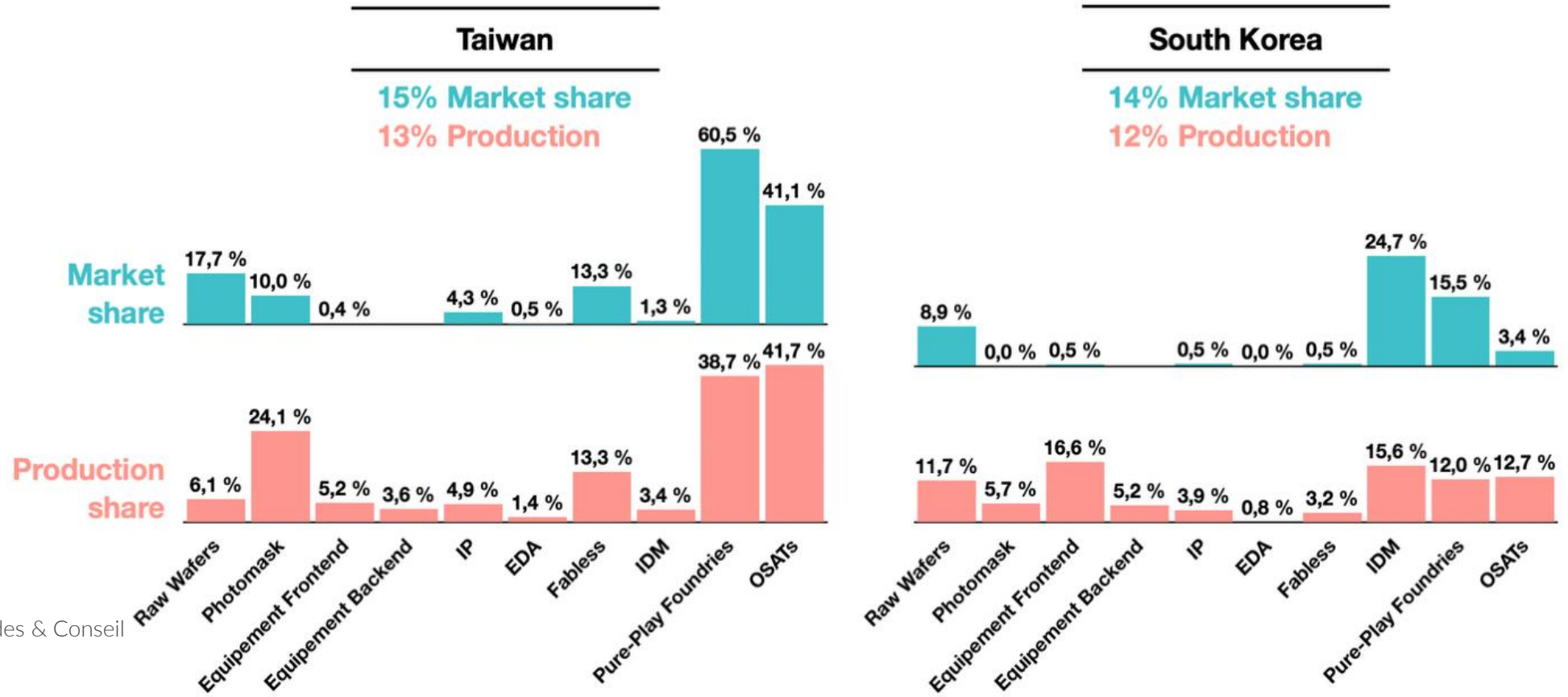

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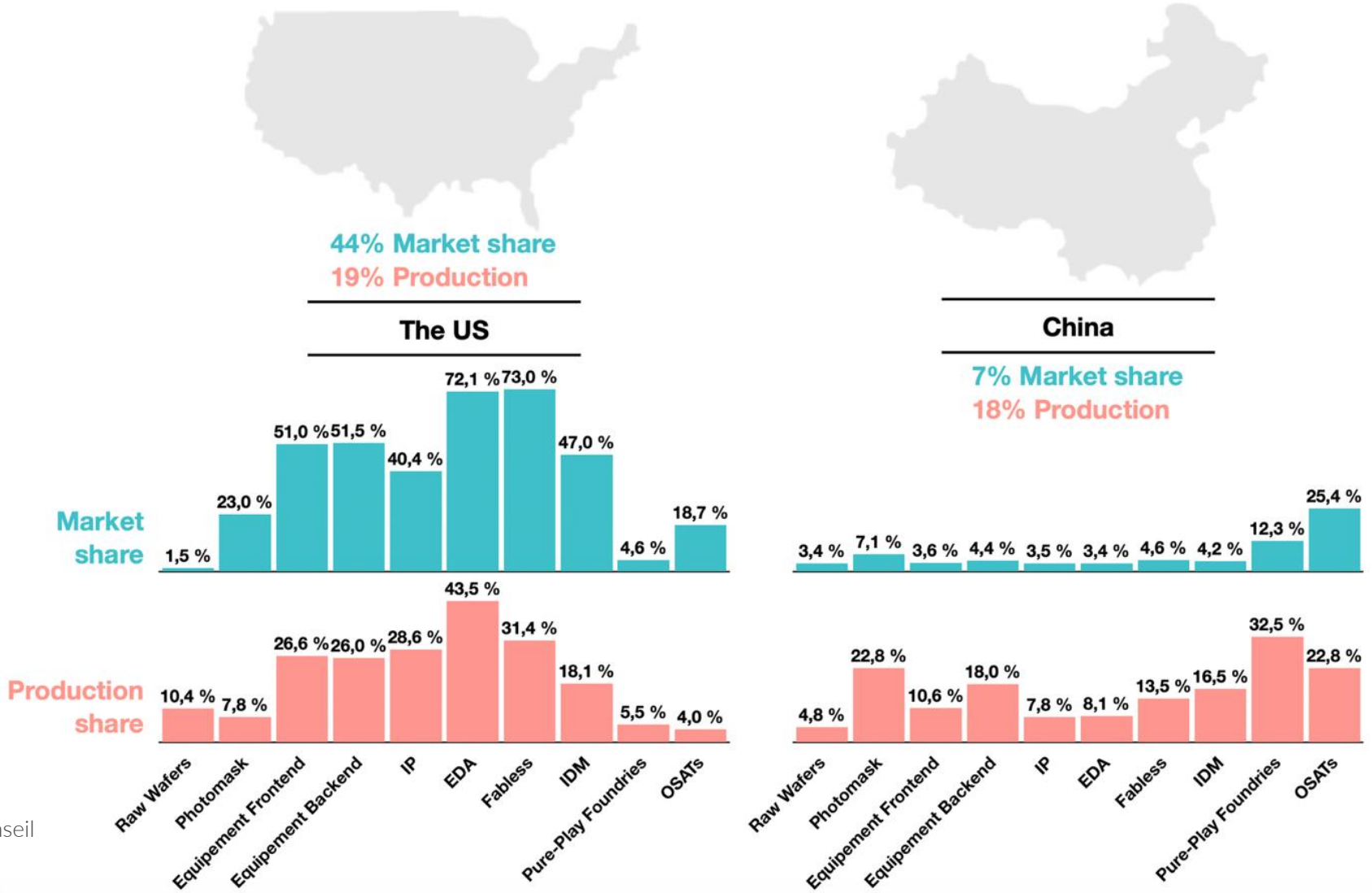
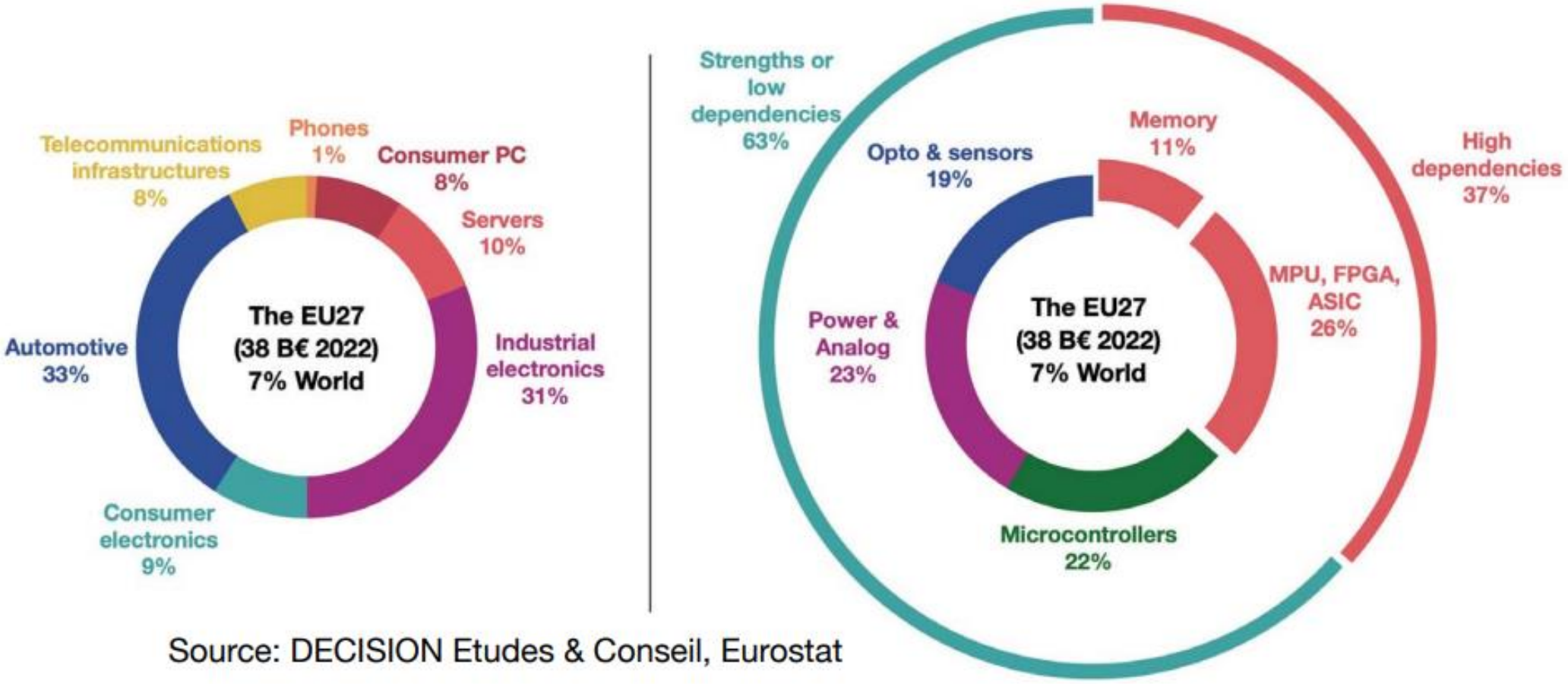


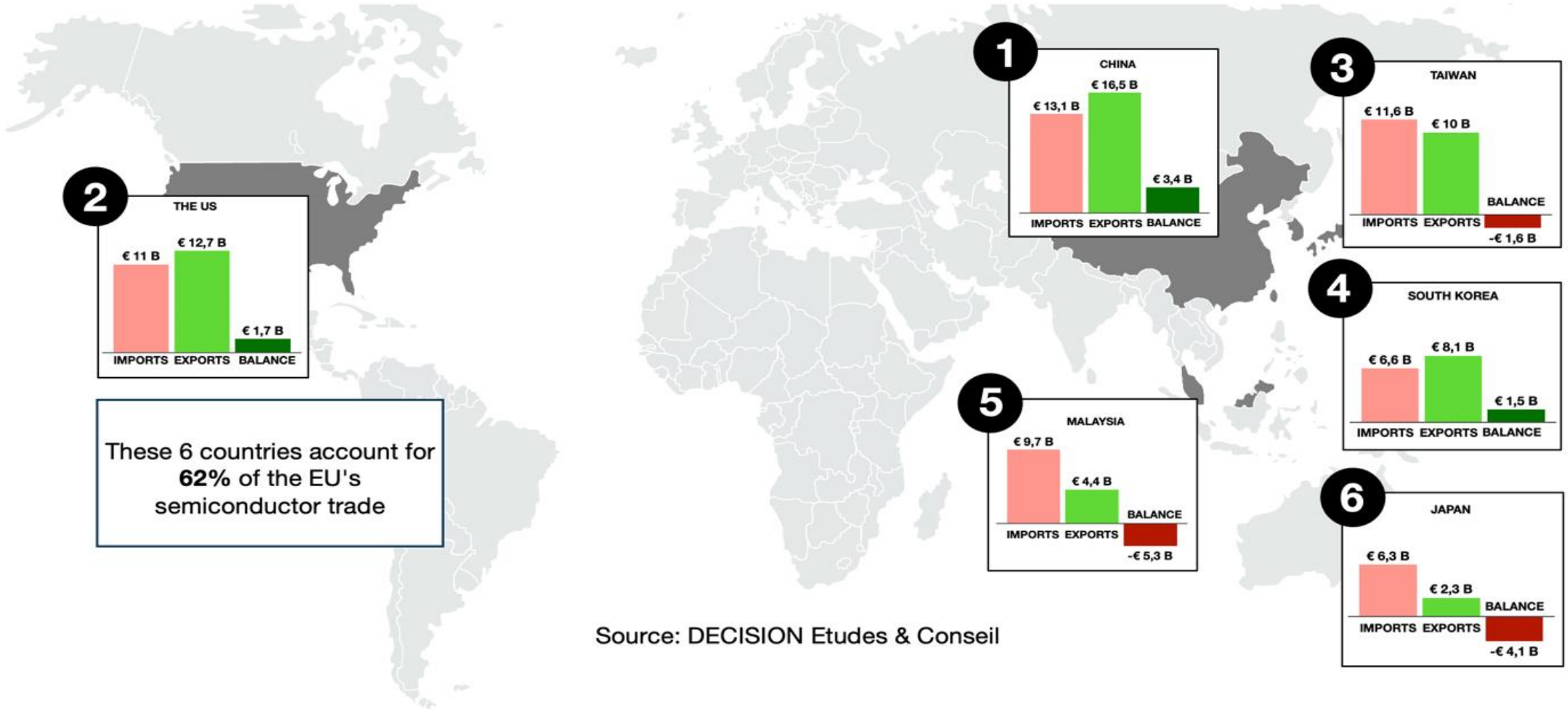
Source: DECISION Etudes & Conseil

Description of the semiconductor demand in the EU by application and products



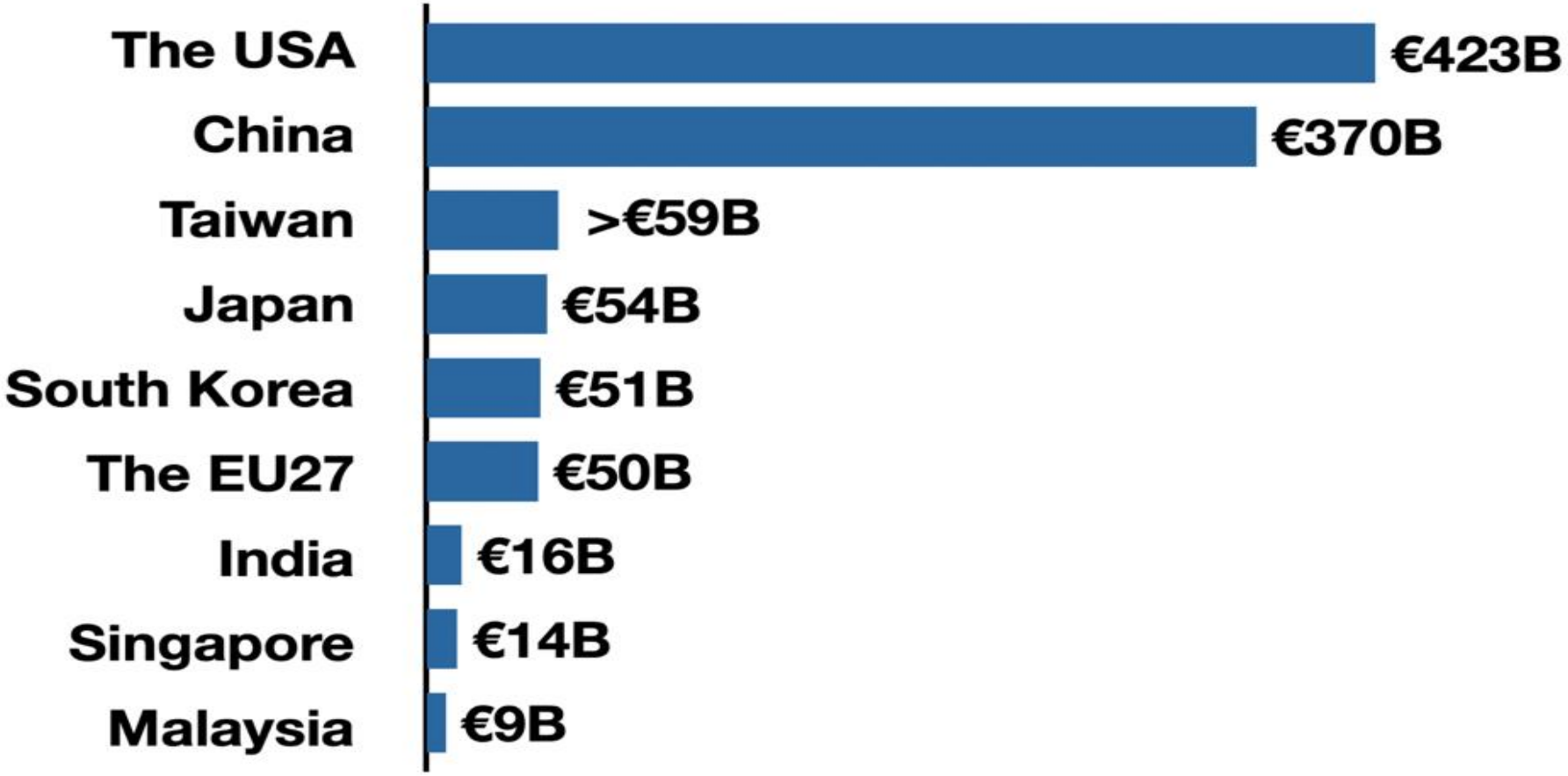
Source: DECISION Etudes & Conseil, Eurostat

Main trading partners of the EU in semiconductors in 2024

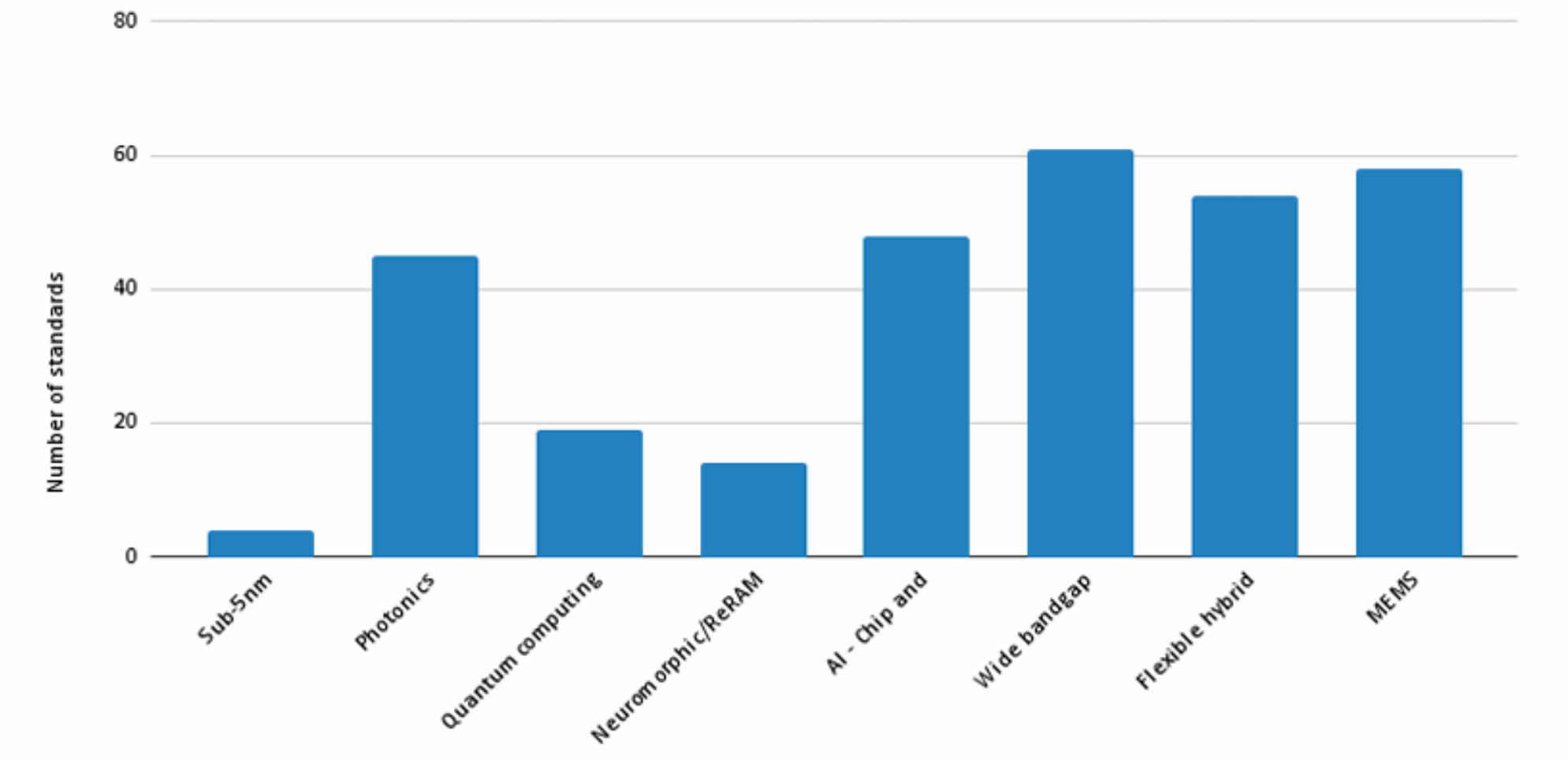


Source: DECISION Etudes & Conseil

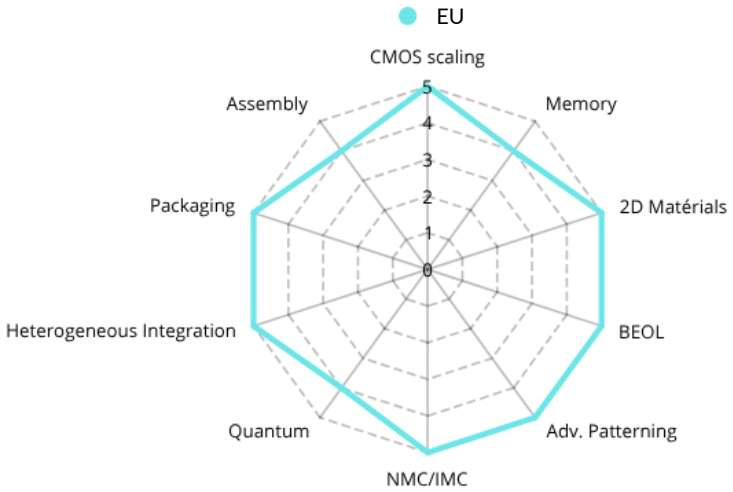
Confirmed Semiconductor Investments

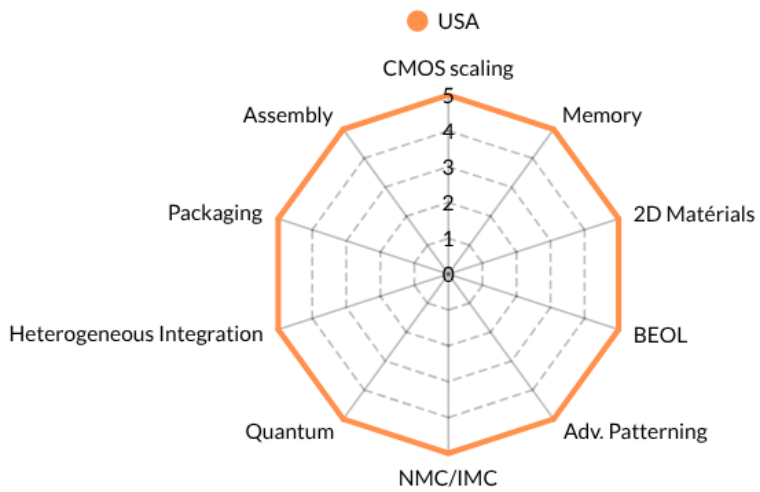


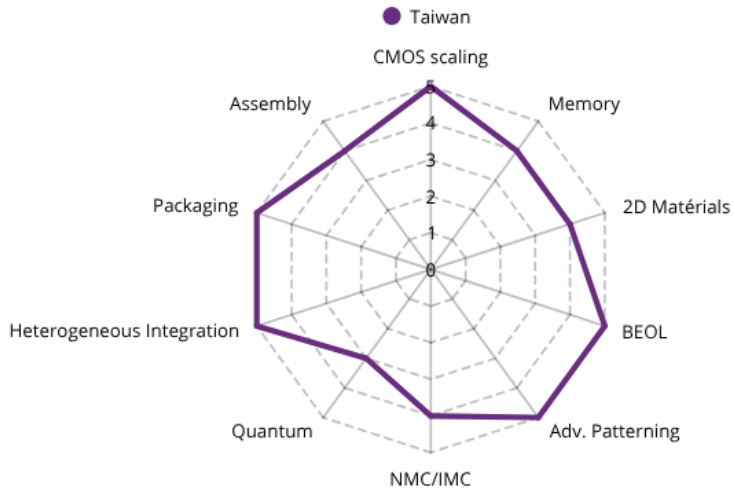
Number of standards vs Category modules or Components

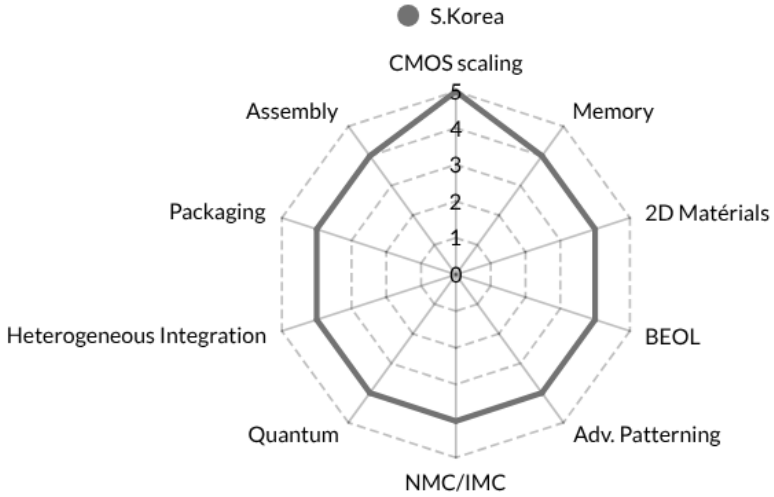


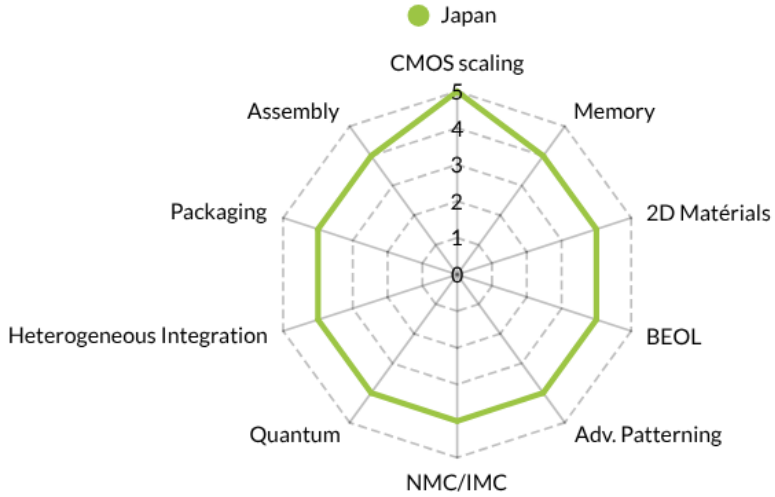
Strength matrix involving RTOs and Academia for Advanced Computing











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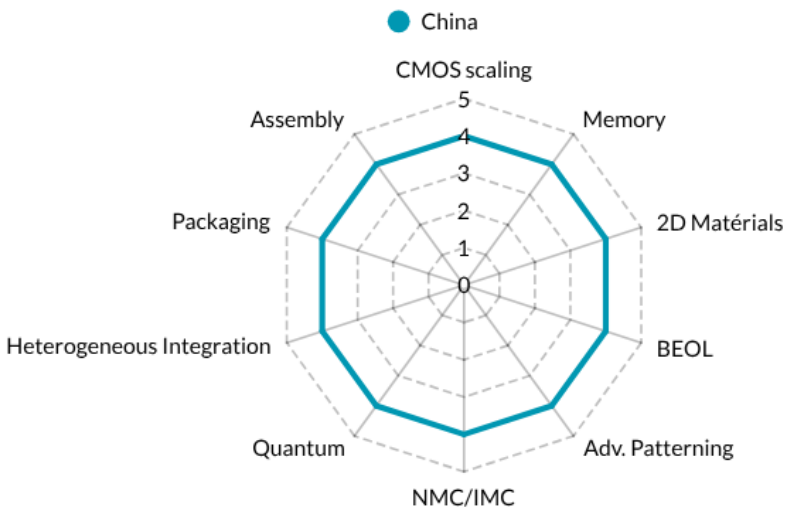

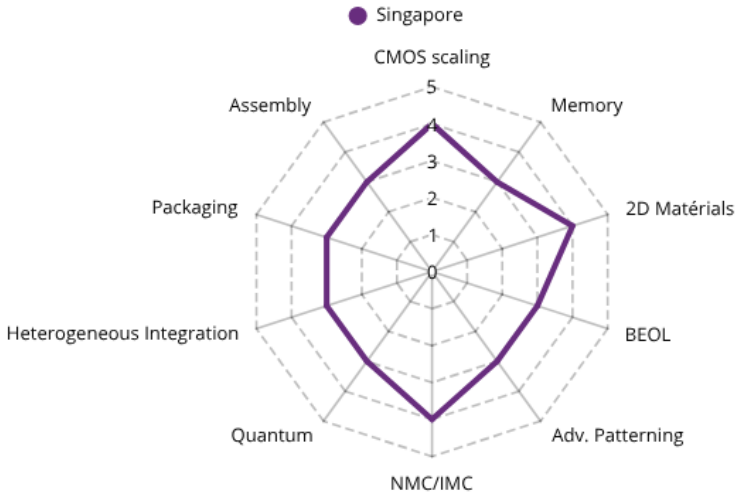

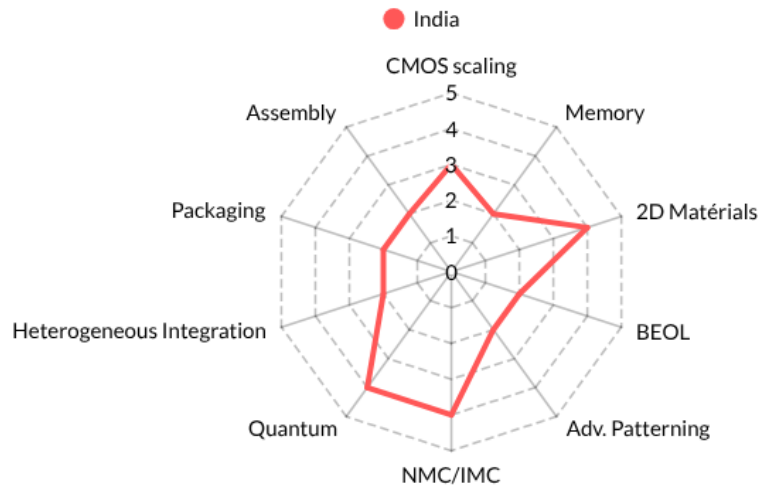

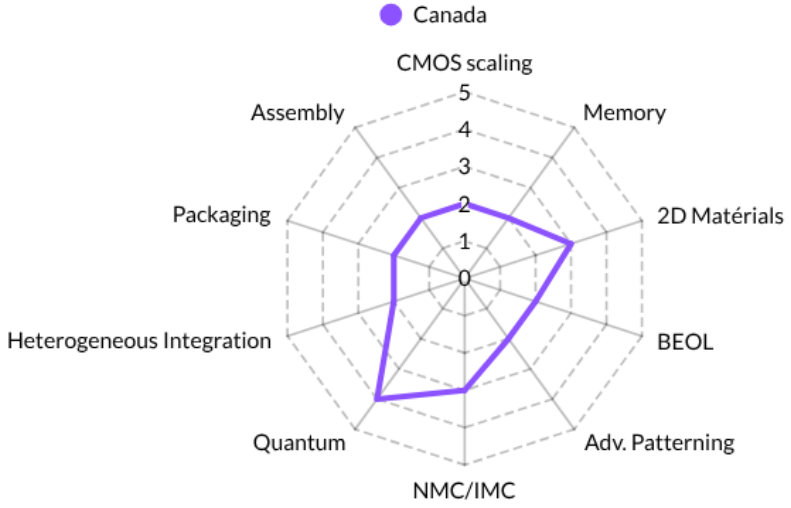

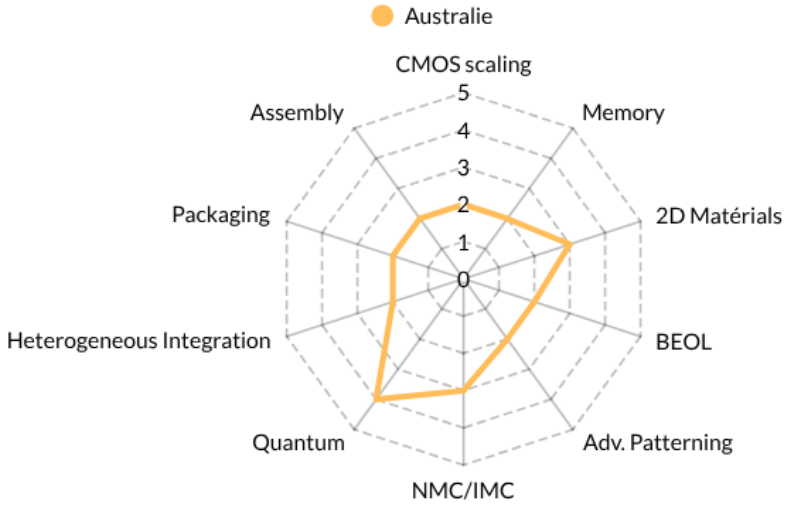

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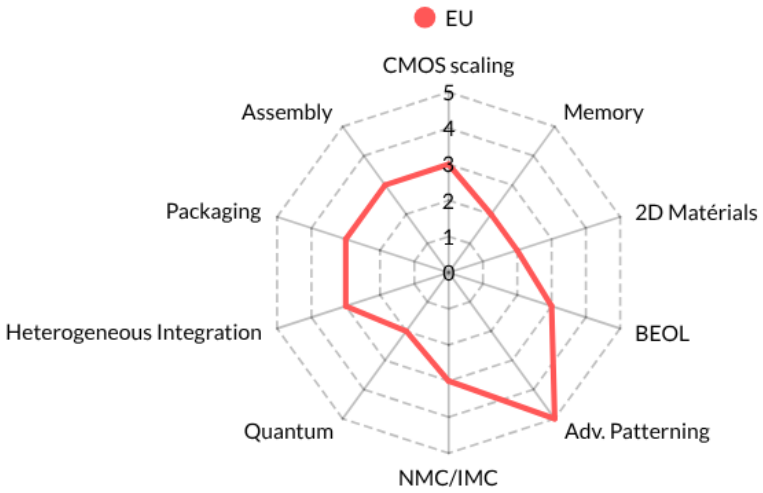
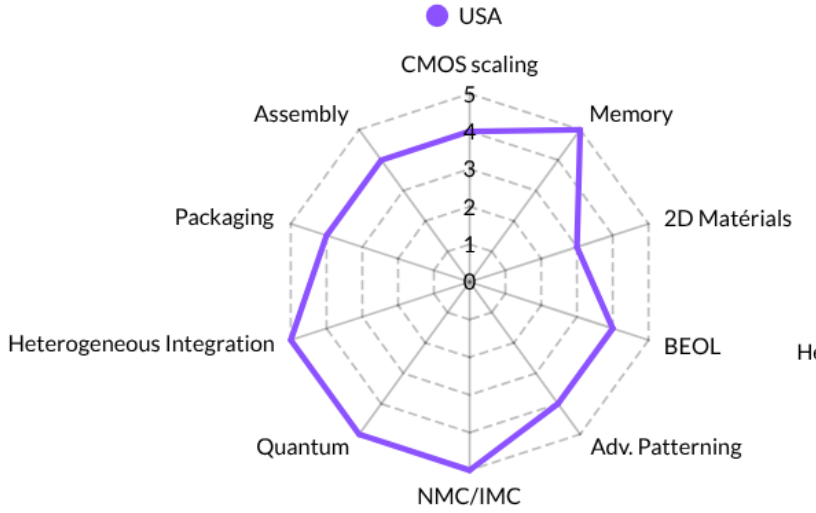
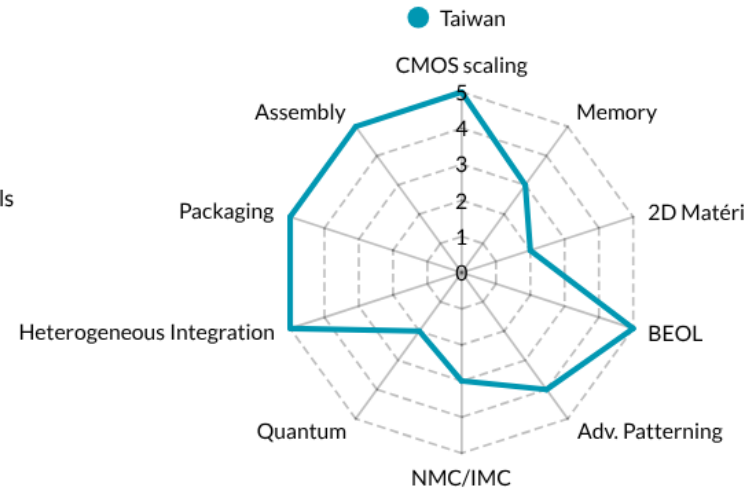
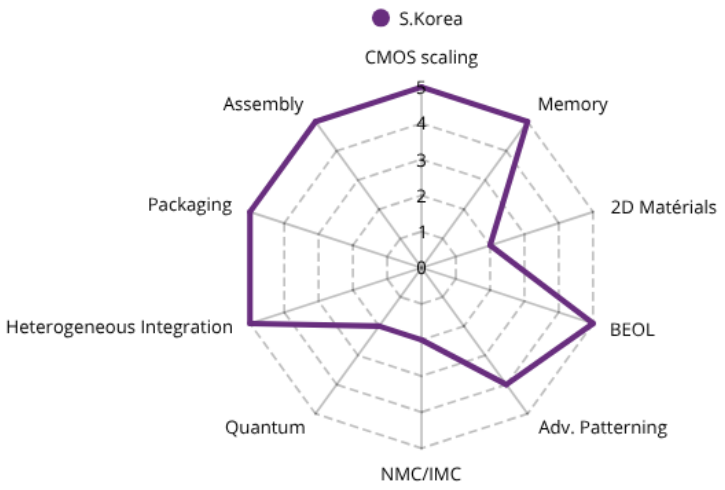
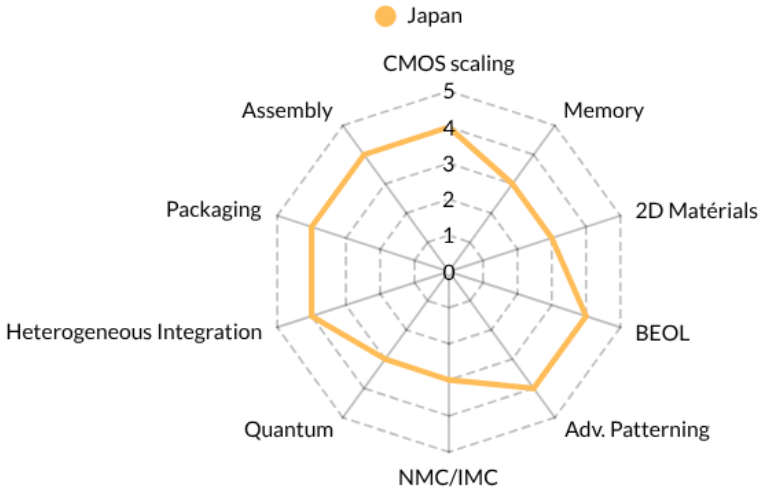
Strength matrix involving industry for advanced computing











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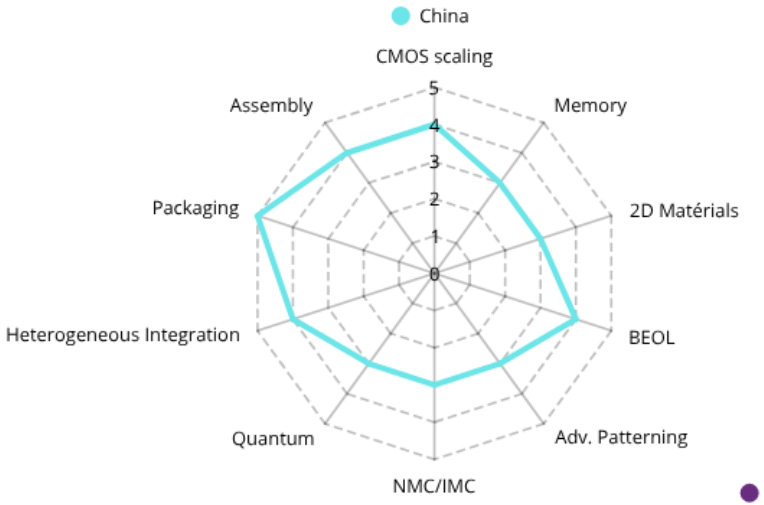

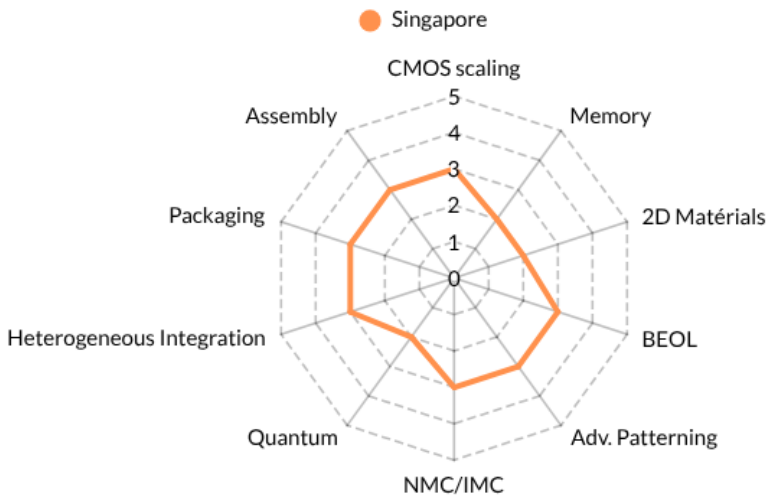

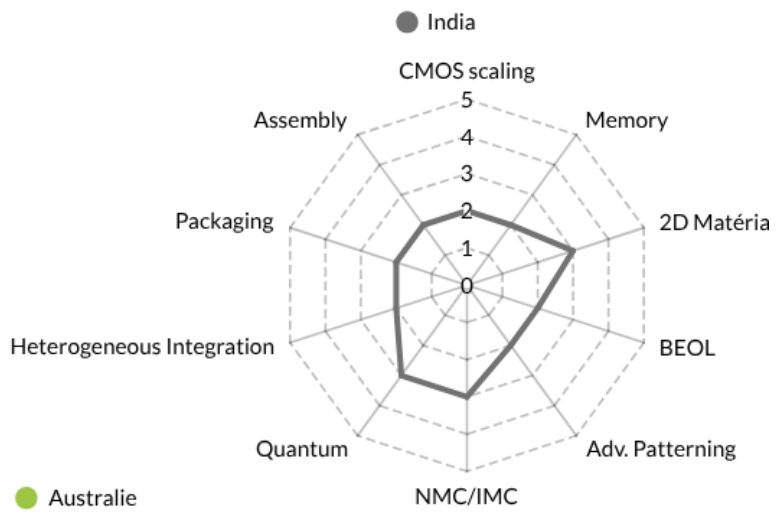

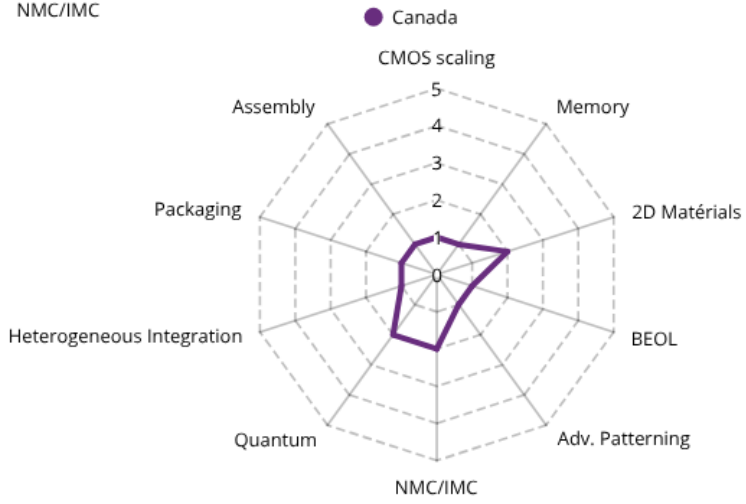

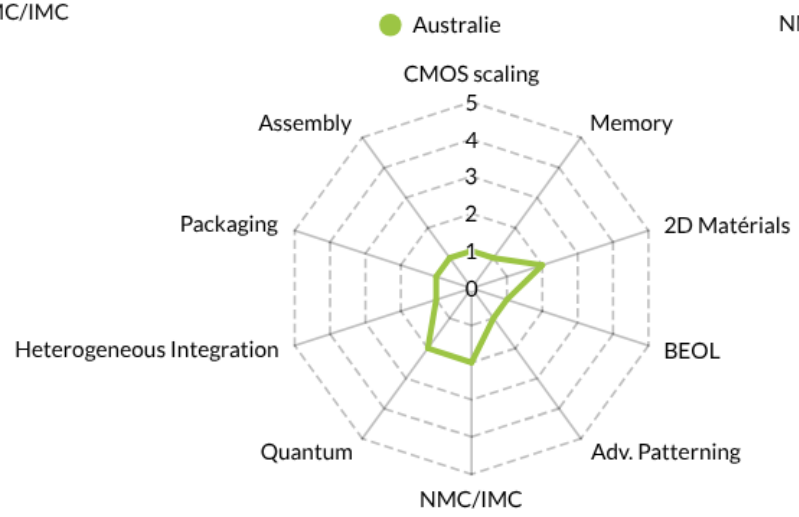

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Recent events (July 2024-October 2025)

- **Online Discussion** on **EU-Japan Semiconductor Research Cooperation** (July 5, 2024): Coordination and writing of the 1 page-paper per topic and selection of sub-**topics for EU-Japan cooperation**
- **ICOS Workshop** "Emerging technologies in Advanced Computation, Advanced Functionalities, Ground-breaking Technologies: Impact on International Cooperation", **ESSERC 2024, Bruges**, Sept 9, 2024
- **Joint EU-India Semiconductors Researchers Forum, Brussels,** (October 9, 2024)
- **ICOS presentation** « Horizon Europe ICOS - International Cooperation on Semiconductors", **EFECS, Ghent**, Dec. 5, 2024
- **ICOS Workshop** "Key emerging technologies for future industrial applications", **EUROSOI-ULIS, Warsaw**, May 12-13, 2025
- **2nd Semiconductor joint EU-ROK Researchers Forum, Jeju**, South Korea, June 16, 2025
- **1st Joint EU-Singapore Researchers Workshop on Semiconductors, Brussels**, July 8-9, 2025
- **EU-Indo-Pacific Digital Partnership Conference 2025, Singapore,** October 29, 2025

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Thank you for your attention

Acknowledgements: *All ICOS Partners*

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