ICOS
International Cooperation On Semiconductors

Challenges in Advanced Computing and Functionalities
International Cooperation on Semiconductors

Horizon Europe ICOS CSA: Introduction to the Workshop

ICOS Workshop
Athens, May 13-14, 2024

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Grenoble INP/CNRS/SiNANO

INTRODUCTION

- ICOS Project starts 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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Motivation & Objectives

- **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 **speeding up** technological innovation (e.g. ITRS/IRDS, IPSR-I), reducing **cost** by avoiding duplicated research, and is encouraged by the new **strategies** of leading semiconductor countries

=> 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 support the growth of the European Semiconductor industry through **focused research alliances** based on awareness of advanced research activities

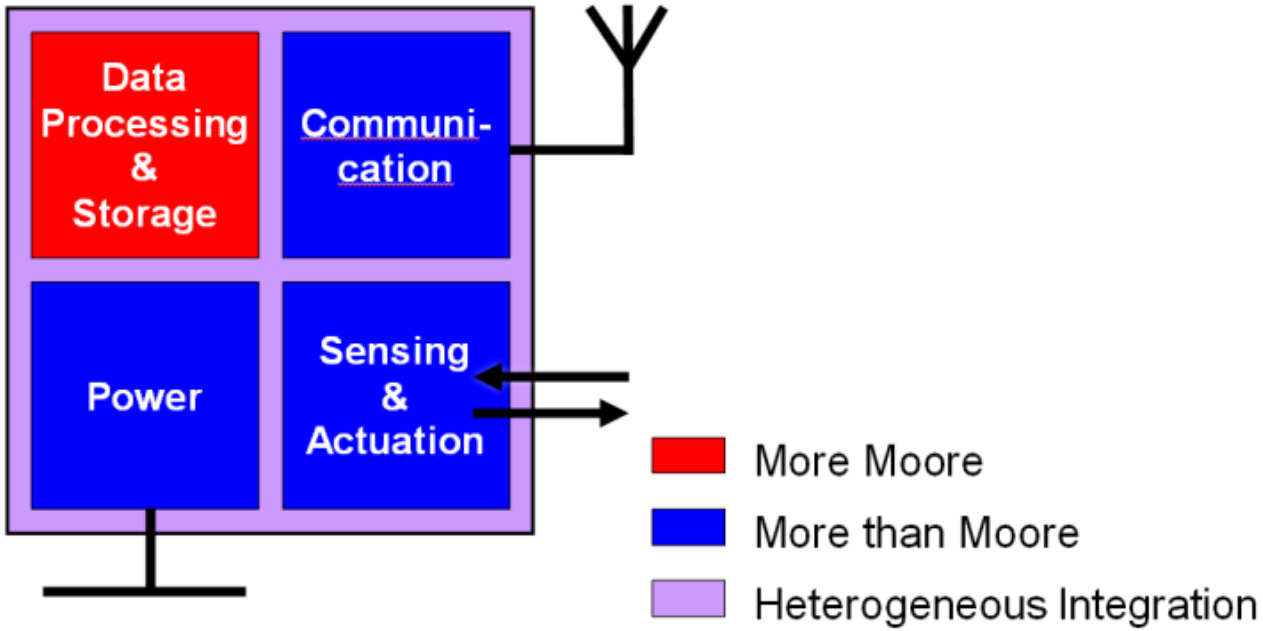
=> To strengthen **Europe's position** in global value chains in this area and to contribute to the **EU Chips Act and Green deal**

OBJECTIVES OF ICOS

- Investigated countries:

  - The United States of America
  - India
  - The Republic of Korea
  - Japan
  - Taiwan
  - Singapore
  - China
  - Canada (for some analysis)

MAIN SCIENTIFIC TOPICS



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

IMPLEMENTATION

IMPLEMENTATION

EXHAUSTIVE ANALYSIS OF SEMICONDUCTORS' VALUE CHAINS, FOR ELECTRONICS & PHOTONICS

Identification of :

- EU's economic and industrial strengths & weaknesses
- Strategic dependencies
- Market and cooperation opportunities

IDENTIFICATION OF RESEARCH AREAS FOR INTERNATIONAL COOPERATION

Identification of next generation & emerging technologies, especially in advanced computation and functionalities.

DETERMINATION OF MOST INTERESTING COUNTRIES FOR INTERNATIONAL COOPERATION

Identification of challenges for which international cooperation is critically important.

AGENDA FOR AND INITIATION OF INTERNATIONAL COOPERATIONS

- Dialogue with actors of existing cooperation
- International collaboration with non-EU national authorities
- Define standardisation needs and activities
- Support the European Commission

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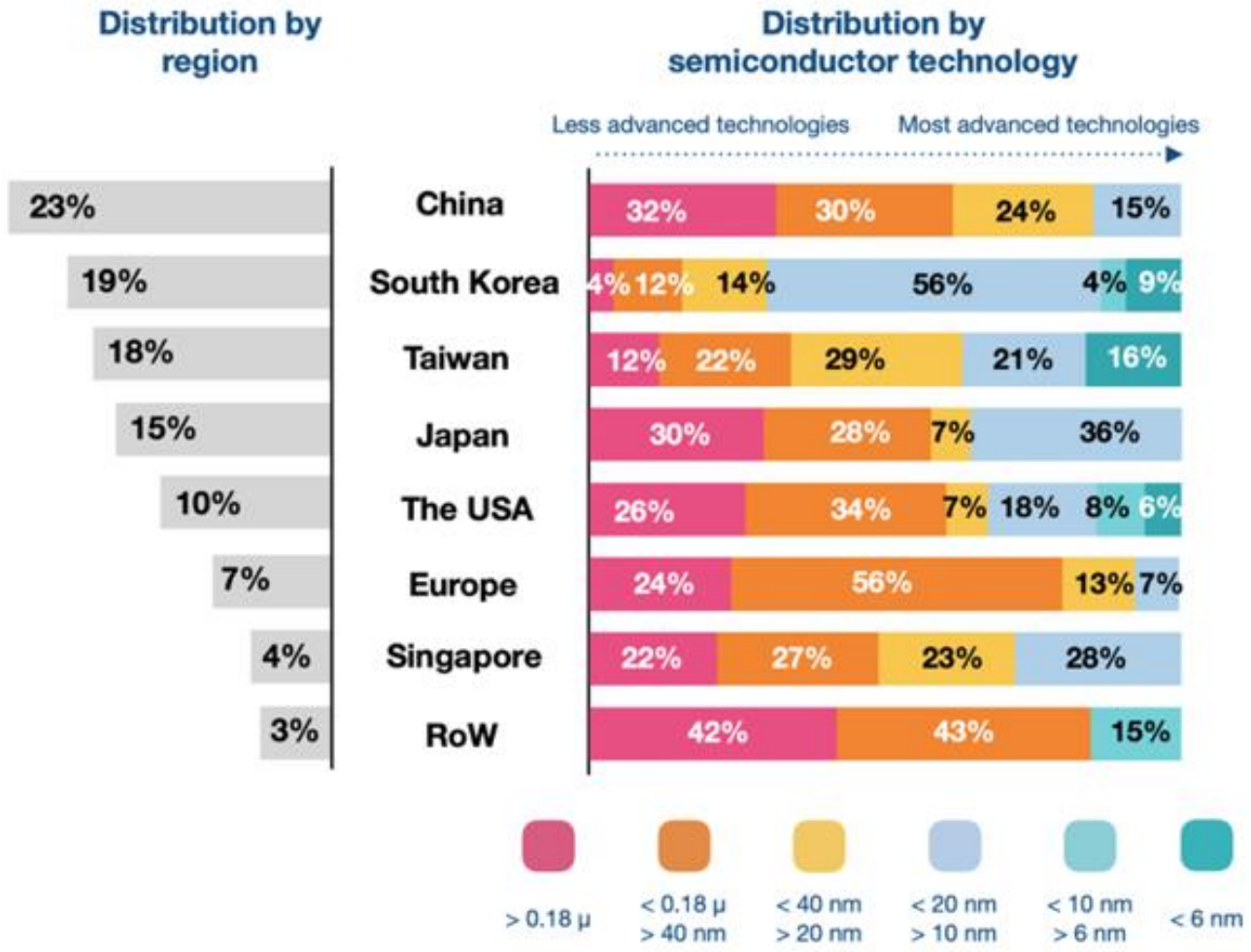
Analysis of the semiconductor industrial ecosystems

Some examples

Installed capacity of semiconductor production in the world



Source: DECISION Etudes & Conseil, Semi Database 4Q2022

Where europe is leading

Automotive Semiconductor Market Leaders

1. NXP Semiconductor NV
2. Infineon Technologies AG
3. Renesas Electronics Corporation
4. STMicroelectronics NV
5. Toshiba Electronic Devices & Storage Corporation (Toshiba Corporation)

Power Semiconductor Top Companies

1. Infineon Technologies AG
2. Texas Instruments Inc.
3. STMicroelectronics NV
4. NXP Semiconductors NV
5. On Semiconductor Corporation

MEMS Market Leaders

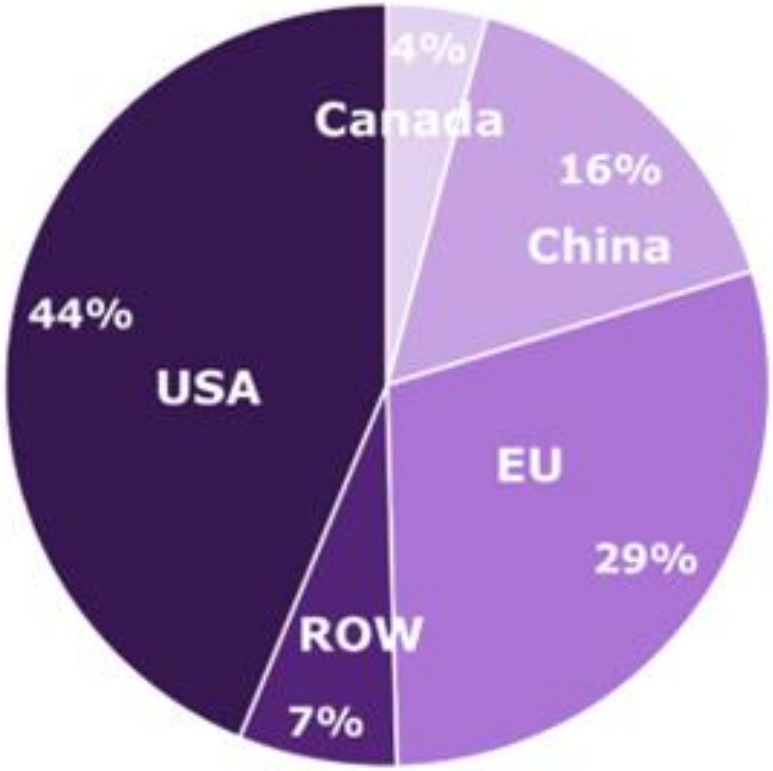
1. Broadcom Inc.
2. Robert Bosch GmBH
3. STMicroelectronics N.V.
4. Texas Instruments Inc.
5. Qorvo Inc.

Source: Mordor Intelligence, 2022

Global spread of silicon photonics end-users

Industries served:

- ☐ Agrifood
- ☐ Automotive
- ☐ HPC
- ☐ Industrial sensing
- ☐ Medical Diagnostics
- ☐ Optical IO
- ☐ Photonics AI
- ☐ Quantum Computing
- ☐ Telecom/datacom

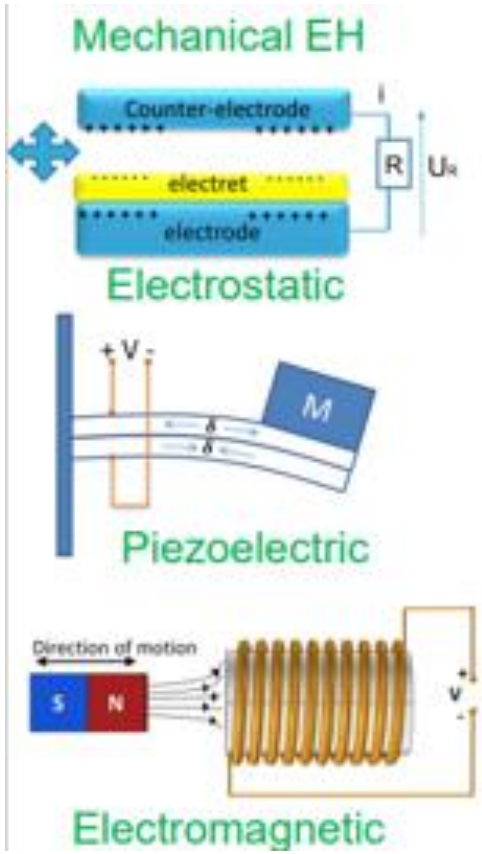


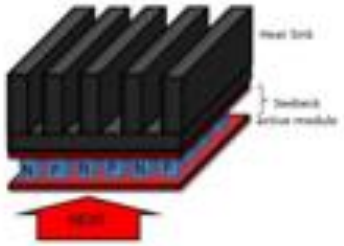
An analysis based on 125 companies developing SiPh-enabled products

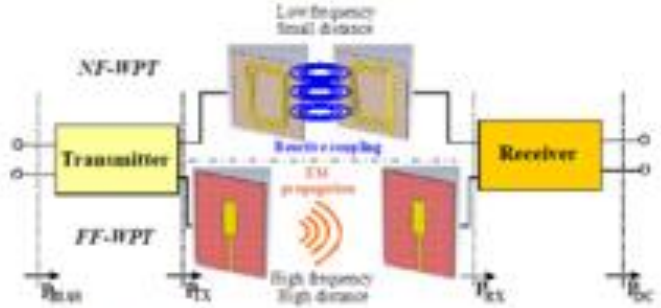
Identification of the main technologies for international cooperation

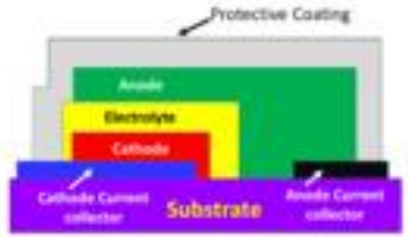
Some examples

Energy Harvesting technologies

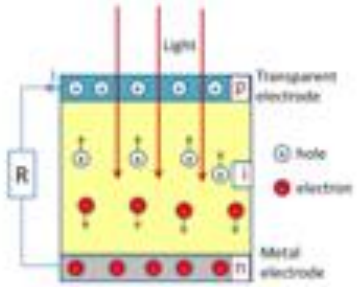


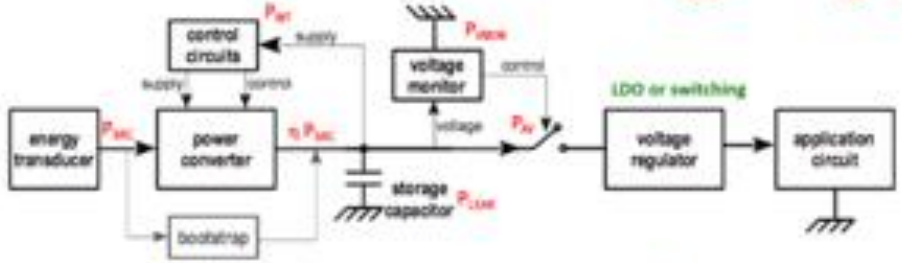




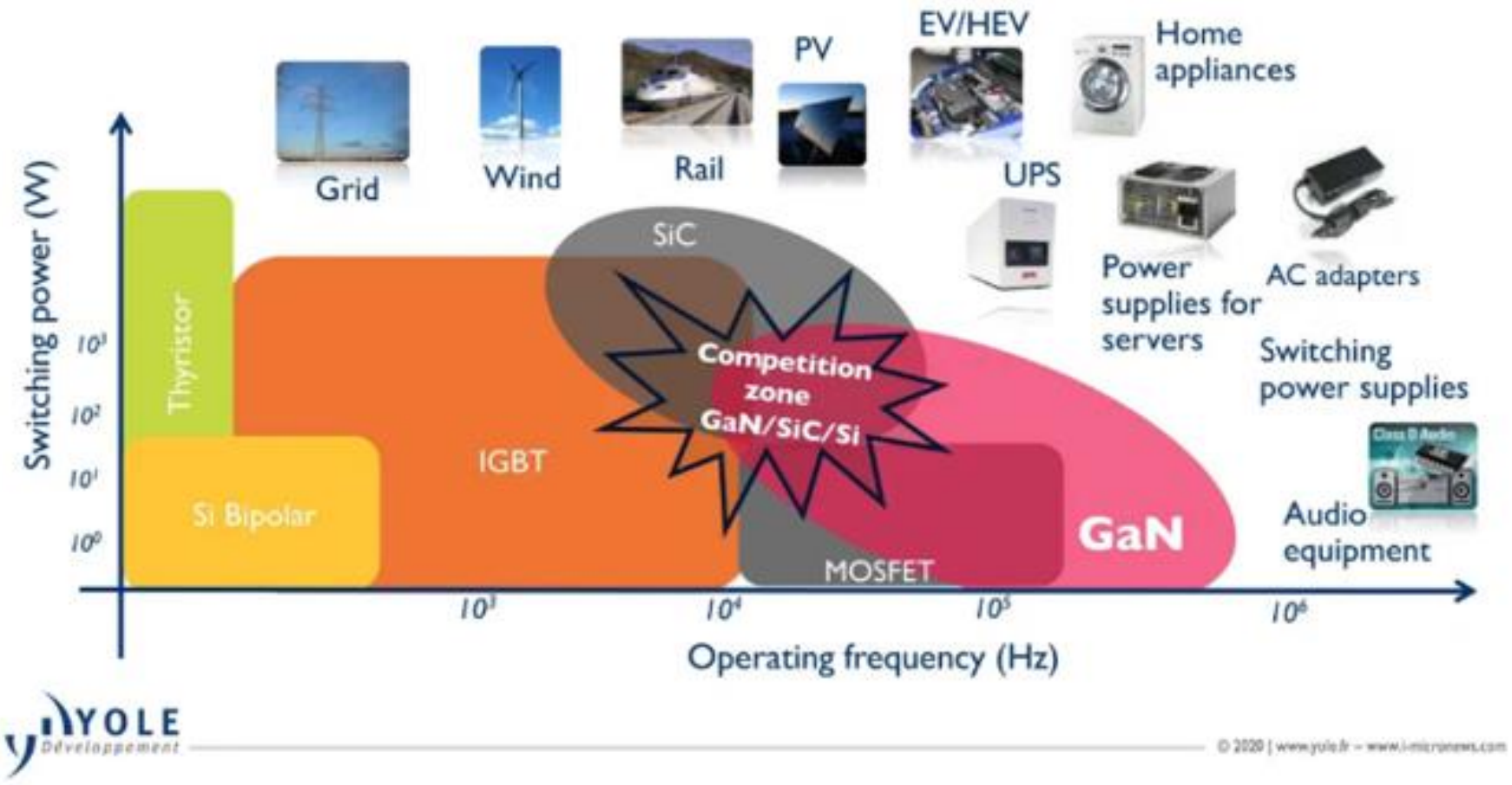


Energy storage (µbatteries)

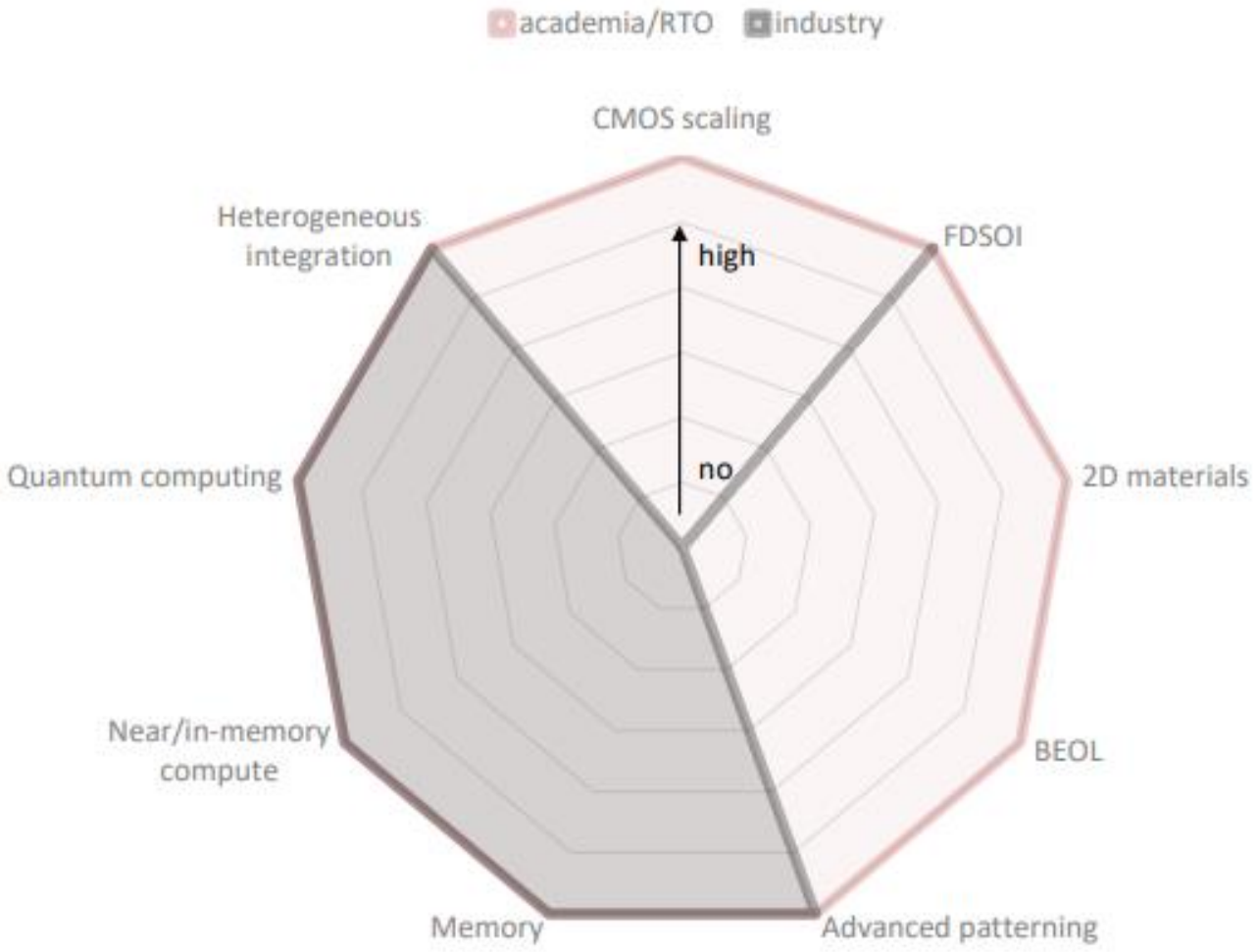




Smart power technologies



Advanced computing:
EU actors – Strengths & Weaknesses



R&D very strong in all areas of compute

Summary of the Survey on Stakeholder feedback on EU International Cooperation on Semiconductors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CALL FOR PARTICIPATION
SURVEY
STAKEHOLDER FEEDBACK ON EU
INTERNATIONAL COOPERATION ON
SEMICONDUCTORS
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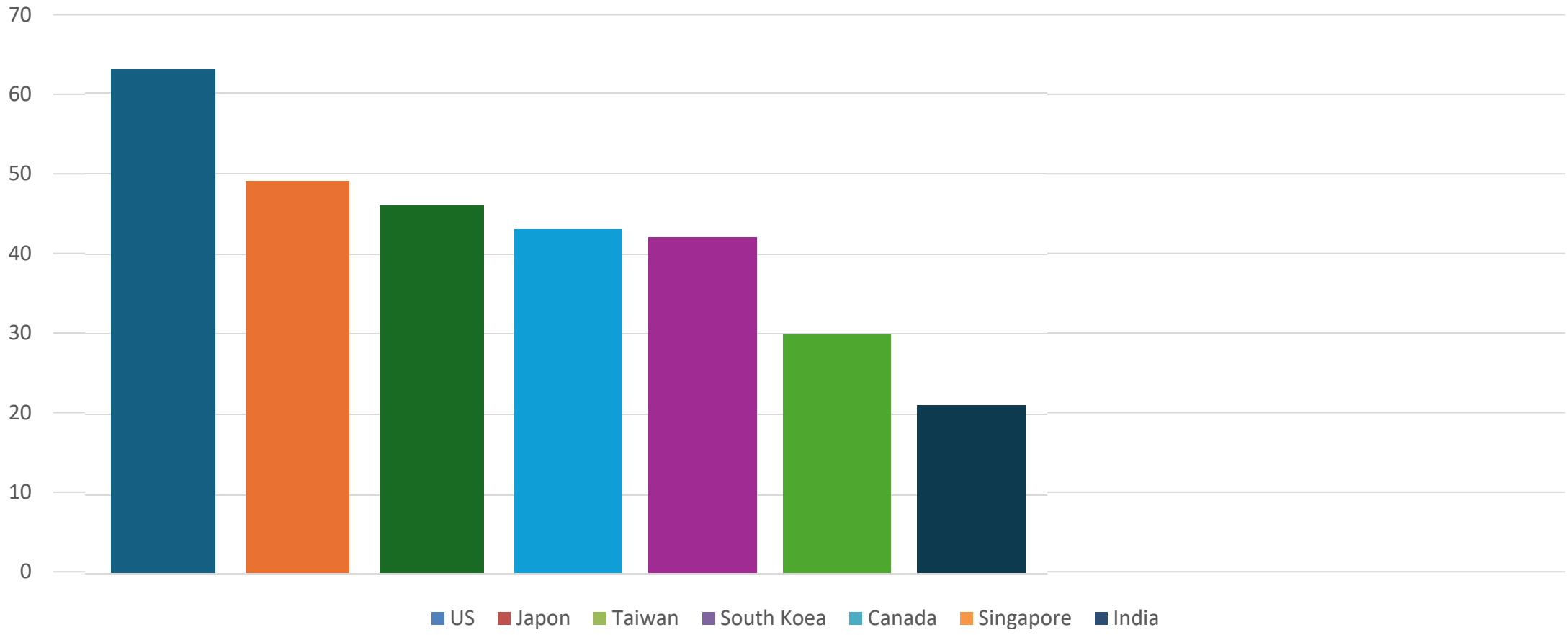
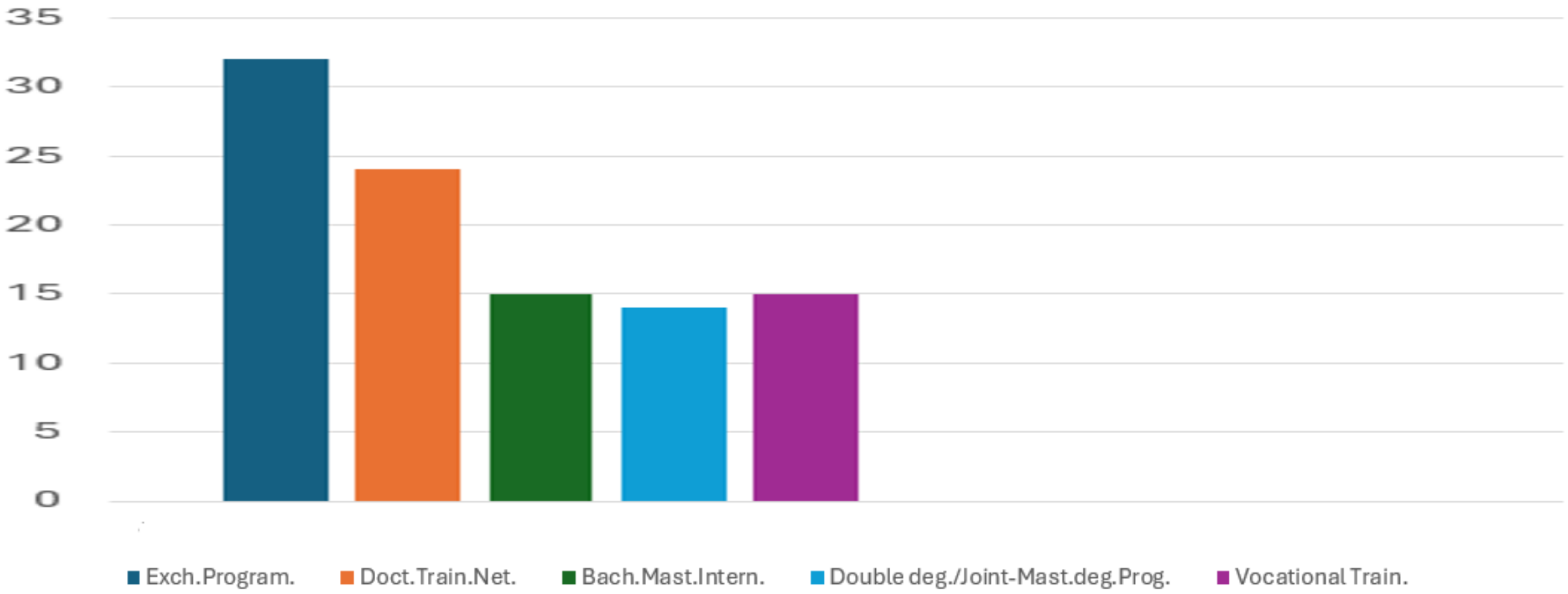
Cooperation in joint skill programmes



Which type of joint skill programmes would you be interested in? (average of the 7 countries)



NEXT EVENTS

with subsequent ICOS studies

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