

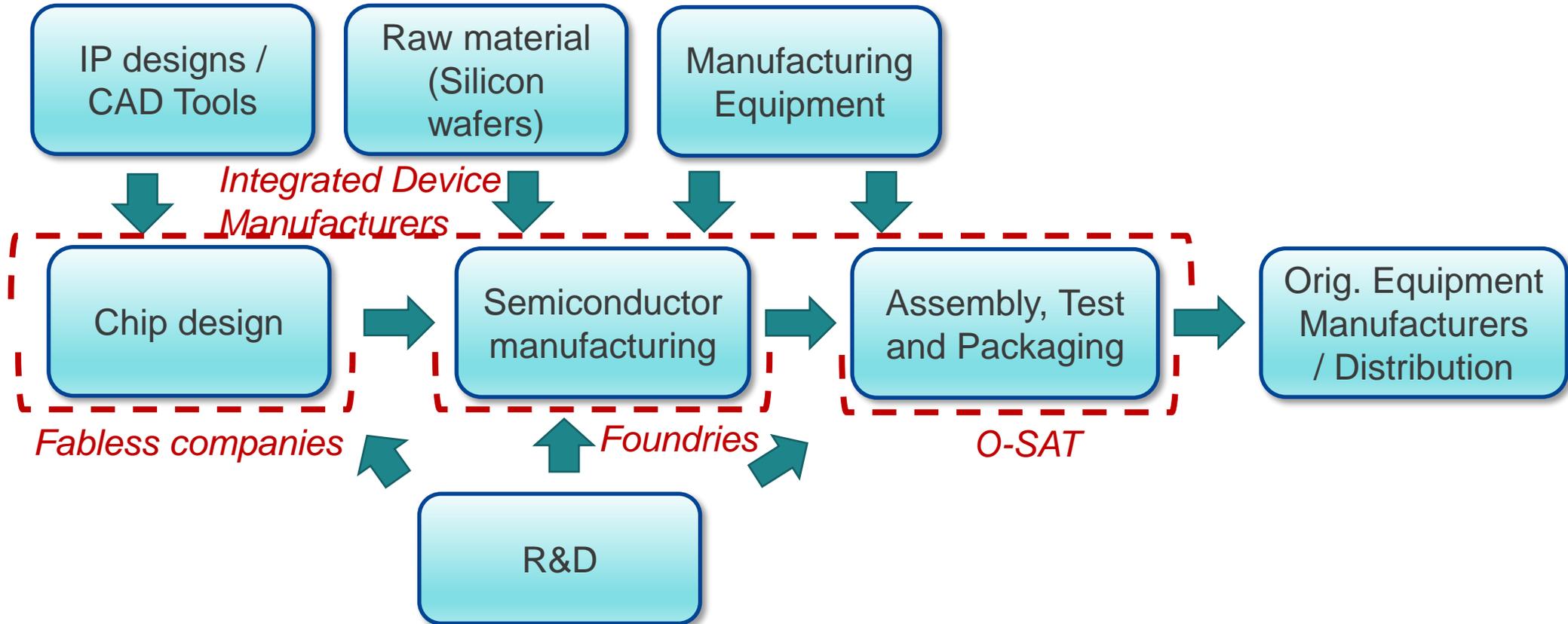


# Micro-nano electronics challenges in KDT

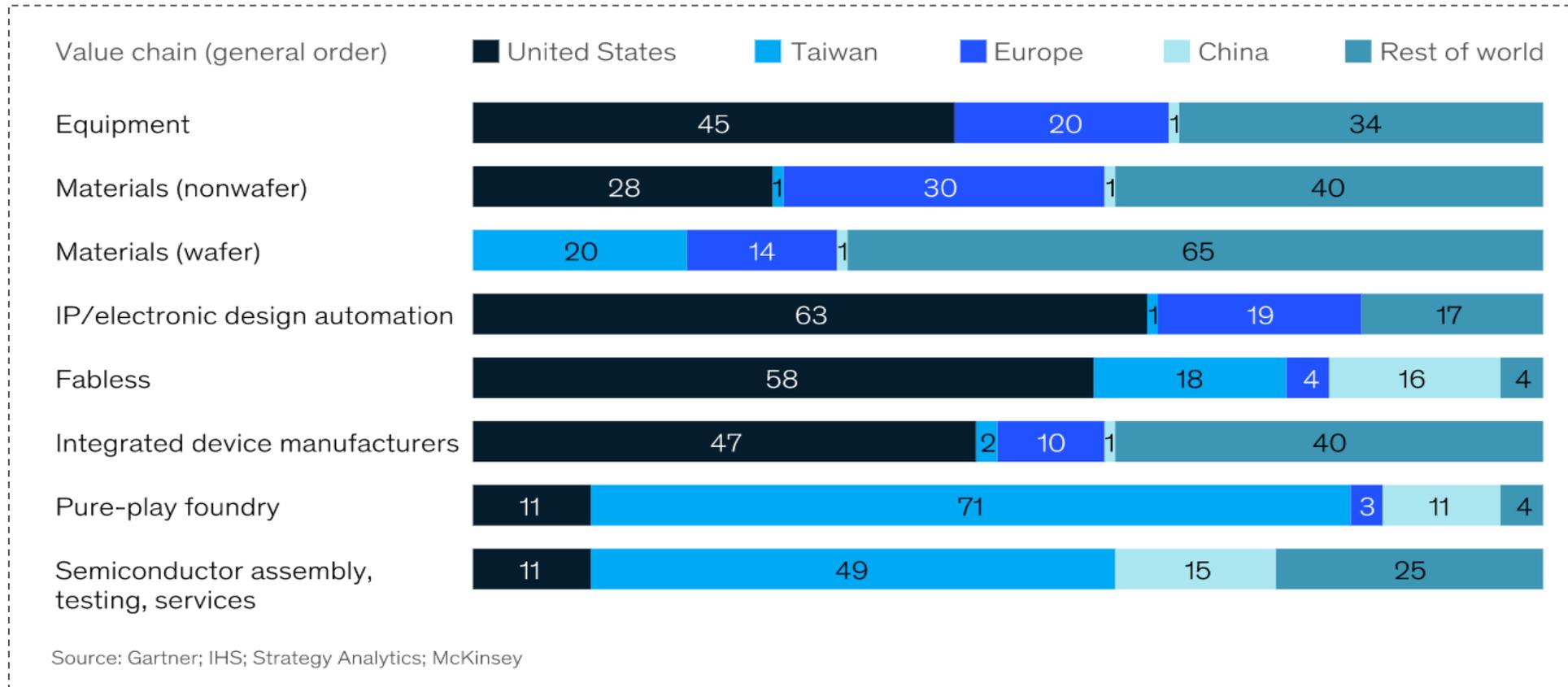
ECS-SRIA workshop  
27/05/2021

*Colette Maloney, PhD  
Head of Unit  
Microelectronics and Photonics Industry  
DG CNECT, European Commission*

# The semiconductor value-chain



# Share of revenues per region



- Global value chain, strong interdependencies, low resilience
- Sovereignty: cannot eliminate dependencies => reinforce unique strengths, reduce vulnerabilities
- **EU strengths:** Equipment, Materials; **EU gaps** in IP & Digital Design, Fabrication, Packaging

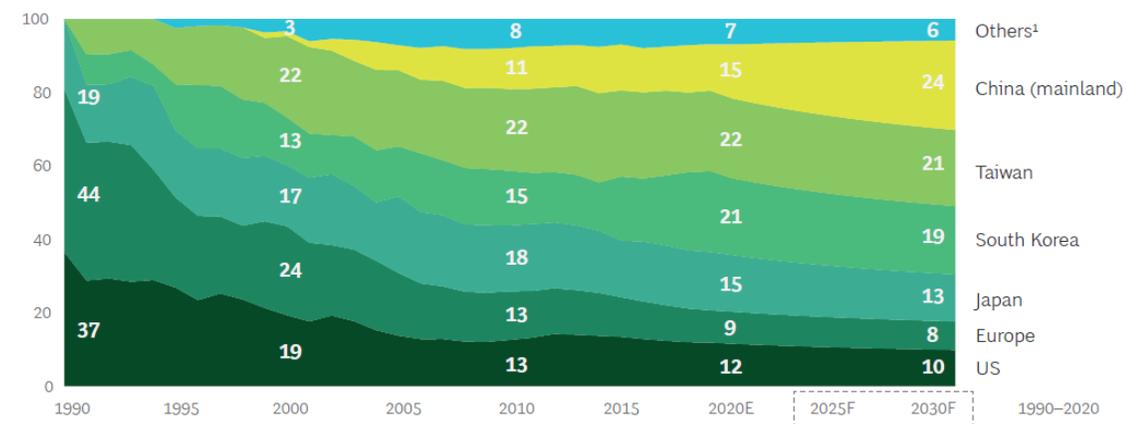
# Challenges and trends for semiconductors in Europe

- Geopolitics & trade tensions
- Mergers & acquisitions
- Pandemic & its impact on digital transformation
  - accentuated strengths and gaps in supply chain
  - speed and the scale of this transformation

*“and we need to make sure that our industry does not only keep pace with that change – but it should also drive it”*

President von der Leyen, 23 February 2021

Global manufacturing capacity by location (%)



# The Digital Decade Communication: Digital Compass

## Skills

**ICT Specialists:** 20 million + Gender convergence

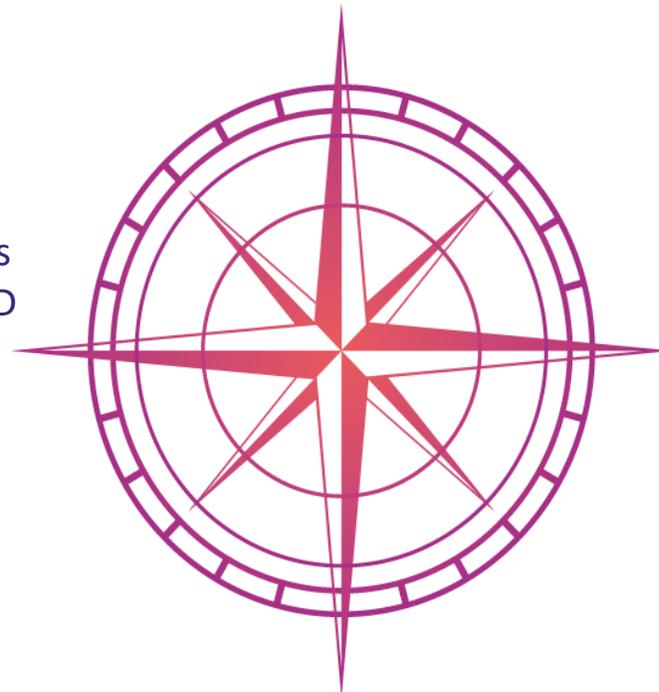
**Basic Digital Skills:** min 80% of population

## Government

**Key Public Services:** 100% online

**e-Health:** 100% availability medical records

**Digital Identity:** 80% citizens using digital ID



## Infrastructures

**Connectivity:** Gigabit for everyone, 5G in all populated areas

**Cutting edge Semiconductors:** double EU share in global production

**Data – Edge & Cloud:** 10,000 climate neutral highly secure edge nodes

**Computing:** first computer with quantum acceleration

## Business

**Tech up-take:** 75% of EU companies using Cloud/AI/Big Data

**Innovators:** grow scale ups & finance to double EU Unicorns

**Late adopters:** more than 90% of European SMEs reach at least a basic level of digital intensity

# Processors & Semiconductor technologies declaration

## Declaration A European Initiative on Processors and semiconductor technologies

Royaume de Belgique / Koninkrijk België  
And  
Bundesrepublik Deutschland  
And  
Eesti Vabariik  
And  
Ελληνική Δημοκρατία  
And  
Reino de España  
And  
République Française  
And  
Republika Hrvatska  
And  
Repubblica italiana  
And  
Repubblika ta' Malta  
And  
Koninkrijk der Nederlanden  
And  
República Portuguesa  
And  
Republika Slovenija  
And  
Suomen tasavalta/Republiken Finland  
And  
România

And  
Republik Österreich  
And  
Slovenská republika  
And  
Κοινωνική Δημοκρατία  
And  
Rzeczpospolita Polska  
And  
Magyarország  
And  
Latvijas Republika  
And  
Česká republika  
And  
Éire/Ireland

*The signatory Member States agree to work together in order to bolster Europe's electronics and embedded systems value chain. This will include a particular effort to reinforce the processor and semiconductor ecosystem and to expand industrial presence across the supply chain, in order to address key technological, security and societal challenges. We agree to consolidate and build on Europe's position in areas of proven expertise, and aim to establish advanced European chip design capabilities and production facilities progressing towards leading-edge nodes for data processing and connectivity.*

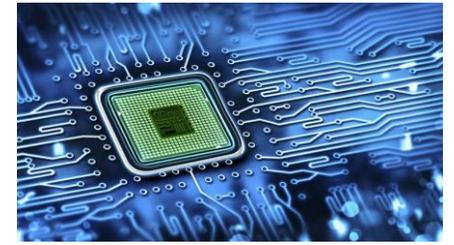
Semiconductor components, among them processors, are today embedded in almost everything, from cars and medical equipment to cell phones and networks, and environmental monitoring. They power the smart devices and services we use today. As such, they are the cornerstones of innovation and are central to industrial competitiveness in a digital world. They determine the characteristics of the products into which they are embedded - including security, privacy, energy-performance and safety - shaping how Europe's green and digital transition will unfold.

The semiconductor industry is a global industry based on very advanced technologies at all phases of the value chain: from semiconductor manufacturing equipment, design, production, testing, packaging to embedding and validation in end products. Expenditure of the semiconductor

*The signatory Member States agree to work together in order to bolster Europe's electronics and embedded systems value chain. This will include a particular effort to reinforce the processor and semiconductor ecosystem and to expand industrial presence across the supply chain, in order to address key technological, security and societal challenges. We agree to consolidate and build on Europe's position in areas of proven expertise, and aim to establish advanced European chip design capabilities and production facilities progressing towards leading-edge nodes for data processing and connectivity.*

December 2020

# Towards a new IPCEI on microelectronics



**Objective:** strengthen capabilities in digital IC **design** and **manufacturing** for **data processing and communication** towards **leading-edge** and **low-power** technology

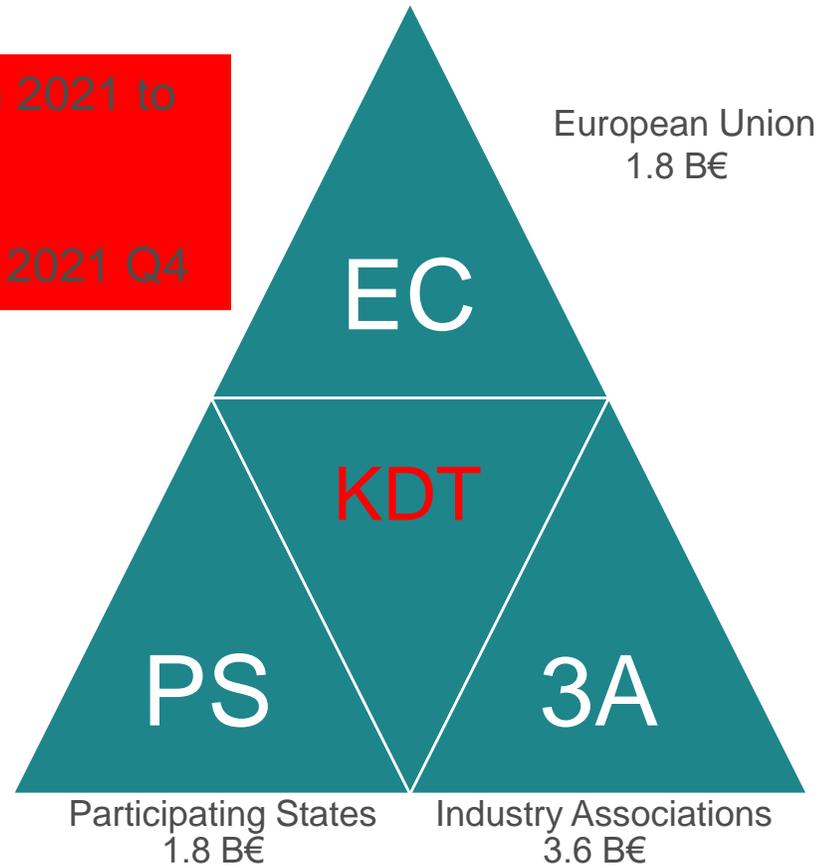
Possible areas of development:

- *Design of low-power **processor** cores and **AI** chips for different vertical markets*
- *Design of chips and systems for **communication** (5G, 6G and other)*
- *Development of advanced **semiconductor processes** (Beyond Moore, More Moore)*
- *Advanced packaging for 2D/3D **heterogeneous integration***

Sensing, power electronics, photonics technologies can be integrated if instrumental to the main objectives at system level

# Horizon Europe: Key Digital Technologies Joint Undertaking

- From 2021 to 2027
- Start 2021 Q4

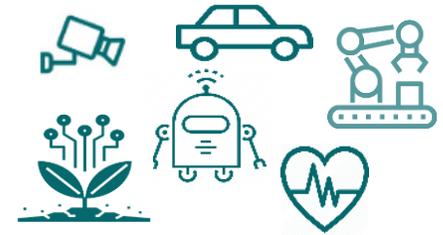


## Objectives

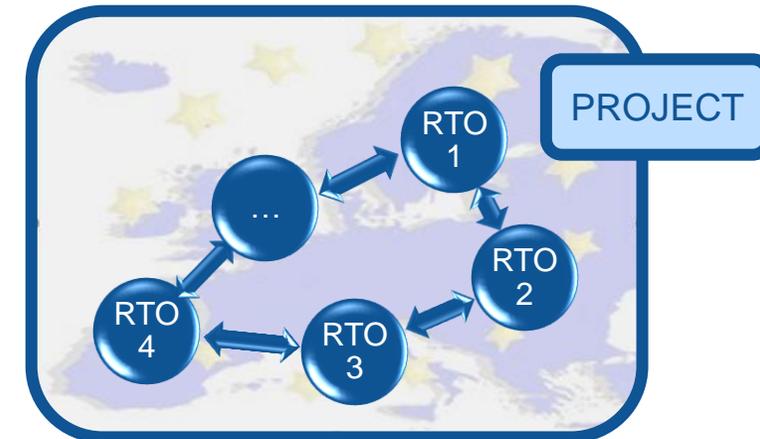
- Reinforce Europe's **strategic autonomy** in ECS to support **future needs of vertical industries** and the economy at large
- Establish EU **scientific excellence** and **innovation leadership** in emerging components and systems technologies, including in activities related to low TRLs, and promote the active involvement of SMEs
- Ensure that components and systems technologies **address Europe's societal and environmental challenges**

# Digital Europe Programme - Edge AI

Edge AI



- Testing and Experimentation Facilities (TEF) on Edge AI - Action in DEP Workprogramme 2021-22
- **TEF Objectives: European platform** bringing together top EU competences to enable companies of any size to test and experiment innovative **edge AI components** based on advanced **low-power computing technologies** (e.g. **neuromorphic computing**)
- Offer end-users: fast-track prototyping, pilot production, industry transfer – support to SMEs via DIHs
- Funding covers mostly CapEx for platform infrastructure
- TEF can be accessed by user companies supported through **KDT JU** (OpEx) for Edge AI chip development

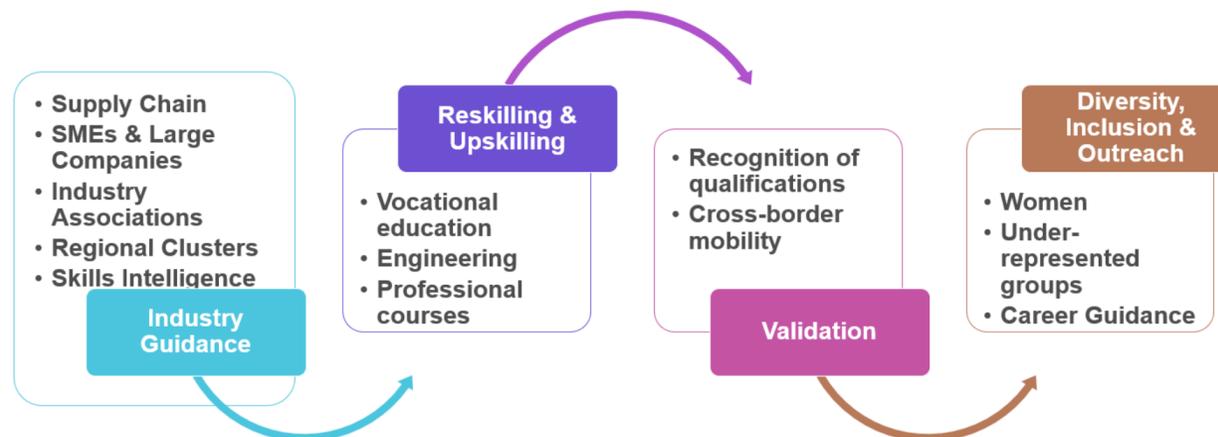


# Skills in microelectronics



- **Advanced Digital Skills** under Digital Europe programme
- **Pact for Skills:**
  - Reskilling and upskilling of workers, apprenticeships - cooperation between companies, educational institutes and local institutions - Microelectronics among the 6 targeted sectors
  - Funding from MFF and RRF – recently launched
- **Sector Skills Alliance** - co-funded by the Erasmus+ Programme:
  - Microelectronics - **METIS project** to develop a skills strategy, define occupational profiles and curricula, and promote microelectronics as a career choice – started Nov 2019

\*METIS project



# Update of the Industrial strategy

## *Deep dive on Semiconductors*

### Analysis

- critical dependencies in advanced manufacturing, packaging and design for digital
- increase design and manufacturing footprints in Europe
- communications, automotive, industrial manufacturing, AI and edge computing

### Measures and policy toolbox

#### Industrial, research and trade policies

- **New IPCEI**, making use of **RRF**
- **Alliance** (under preparation by Com)
- **HE** (including KDT JU)
- **DEP** (edge AI TEF and DIH)
- **Pact for Skills**

#### Regulatory Framework

- EU Foreign Direct Investment (**FDI**)

#### Trade

- Government Authorities Meeting on Semiconductors (**GAMS**)
- Collaboration with like-minded countries

# Thank you

*Colette Maloney  
DG Connect, European Commission*



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