Chips Act

ZeroAMP workshop

Marco Ceccarelli
Microelectronics and Photonics industries
DG CNECT - European Commission

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Global semiconductor crisis
detrimental effects across industries

Increasing demand

- Accelerated digital transition
- **Increased demand** for semiconductors fueling severe shortage

Fragile supply chain

- Not resilient to **disruptions** such as COVID-19 pandemic
- **Concentration of production** in Asia (Taiwan, Korea) and high entry costs
- **Geopolitical** tensions (e.g., South China Sea)

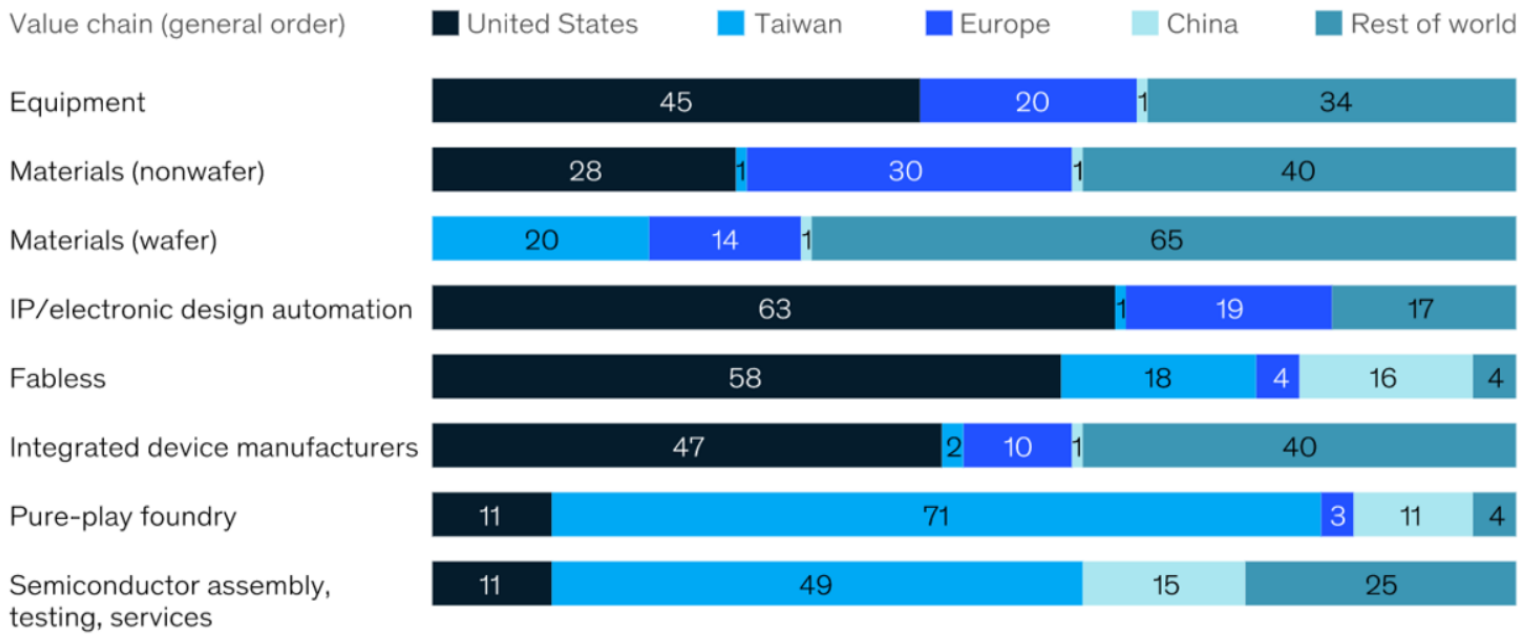
Detrimental effects across industries

Example: **Automotive**

- **11 million** cars **less** produced **globally** in 2021
- **23% drop** in **German** car sales in 2021

EU position in value chain

Dependence in design, manufacturing, packaging



Source: Gartner; IHS; Strategy Analytics; McKinsey

Industries

+ Europe is leading the world in chips for the **automotive industry** and **security**

− The EU has fallen behind on chips needed for **computing** and **telecommunications**

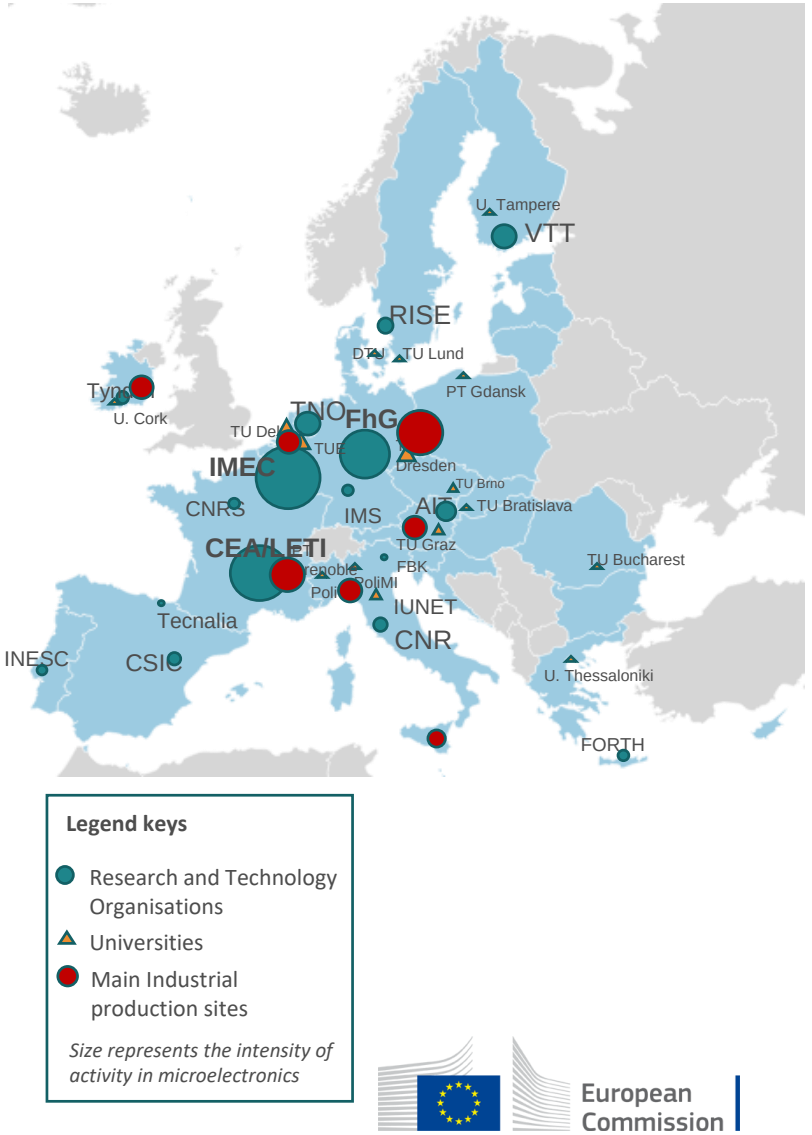
EU: investments have stagnated and its global market share has fallen below 10%

European Commission

EU position: R&D

- EU is strong in R&D, with world-leading **RTOs**
- EC supports: basic research, applied research, development
  - **EU R&I Framework programmes** (HE, ERC, EIC)
  - **Joint Undertakings**: Ecsel=> KDT => Chips JU
    - SRIA; bottom-up + top-down (new)
  - **IPCEI**: R&I up to FID

EU Industry invests >14% of revenues in R&D



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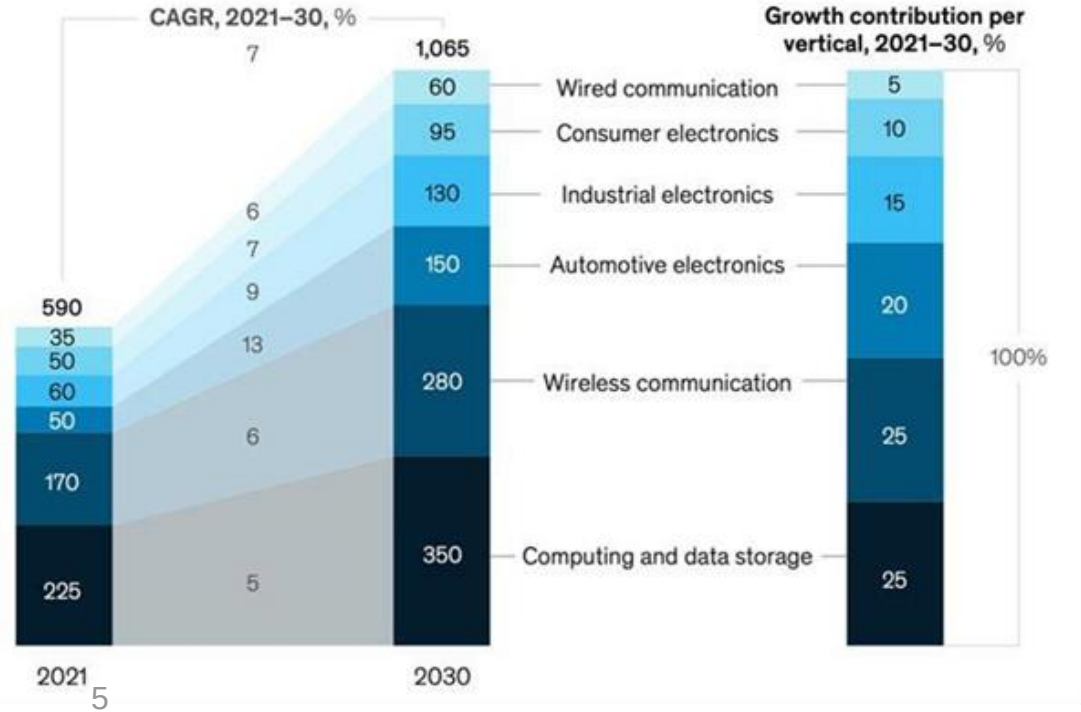
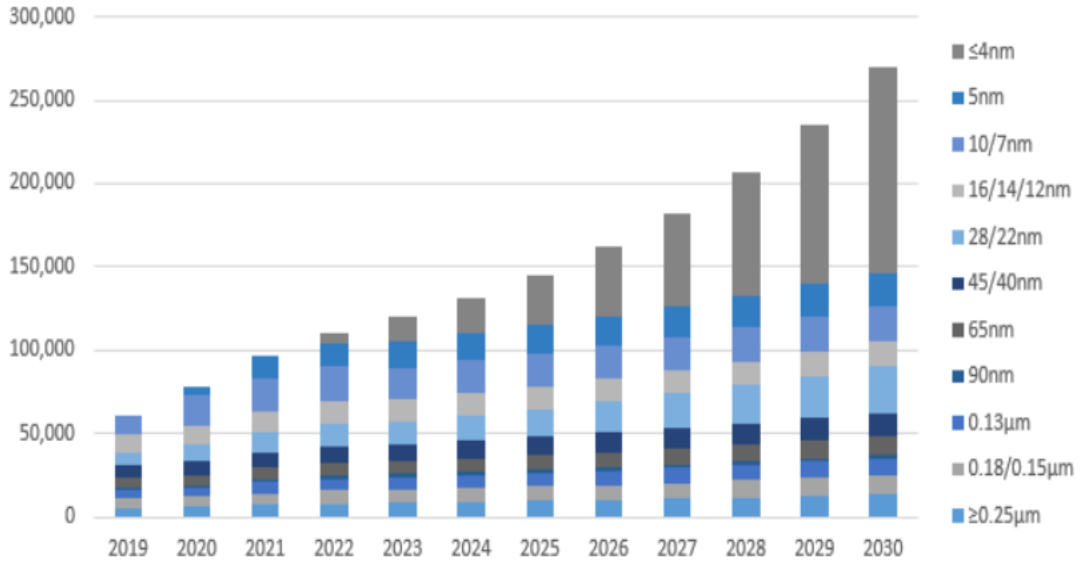
Market evolution

- Market grows with fast CAGR > 7%, expected to double (>1T$) before 2030
- Main drivers: **digital transformation** and increased semiconductor content in systems
- Opportunities: AI, edge computing, digital transformation, **5G/6G**





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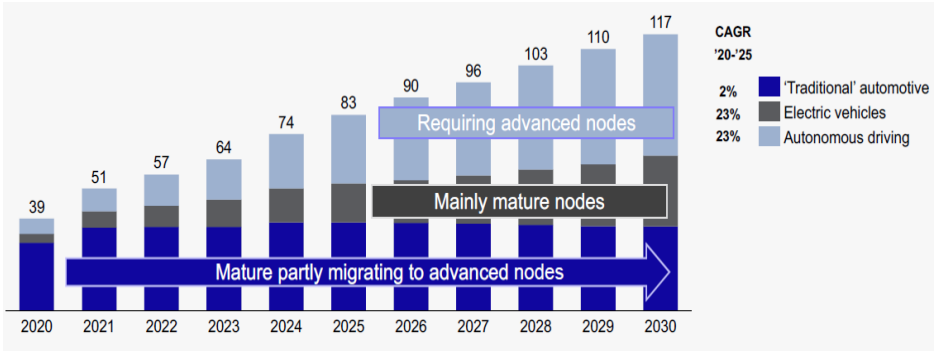
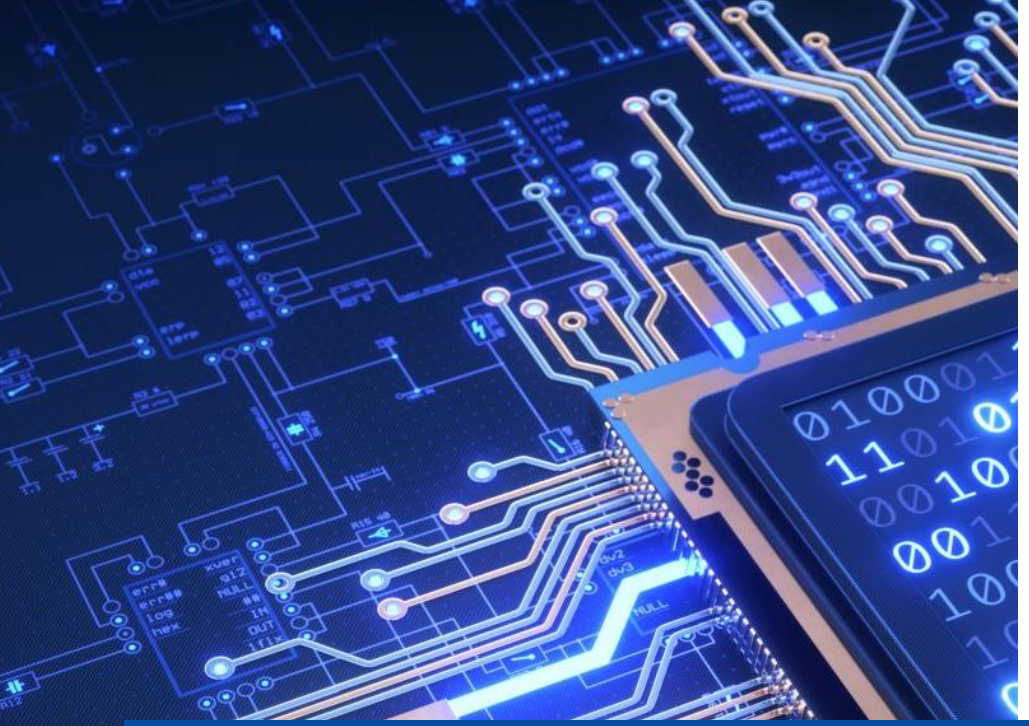
Technology trends



Automotive market forecast: faster growth in advanced nodes

Automotive	•highest CAGR due to electrification and increased autonomy: 1500=>3000 chips/car, centralised architectures •growth in both mature (e.g. power electronics) and advanced nodes, shifting to the latter
5G and 6G Communications	•Smartphones (1.5B/y) drive scaling •Infrastructure trend: virtual, SW, cloud-based management. Require high-performance CPUs, III-V(GaN), silicon photonics, hetereogenous integration •Full EU ecosystem approach needed to capture opportunities in 6G (incl. standardisation)
Industrial Automation	•digitisation, automation of factories, using Industrial IoT and robotics, with advances in AI •Require heterogenous integration and leading edge
Healthcare	•low volume, highly specialised chips •industry standard platforms to secure supply for critical needs
Aerospace, Defence and Security	•demanding performance, reliability and robustness; •need for “trusted” chips
Energy	•power electronics (Sic, GaN) need for transition to renewable sources



Europe needs a Chips Act

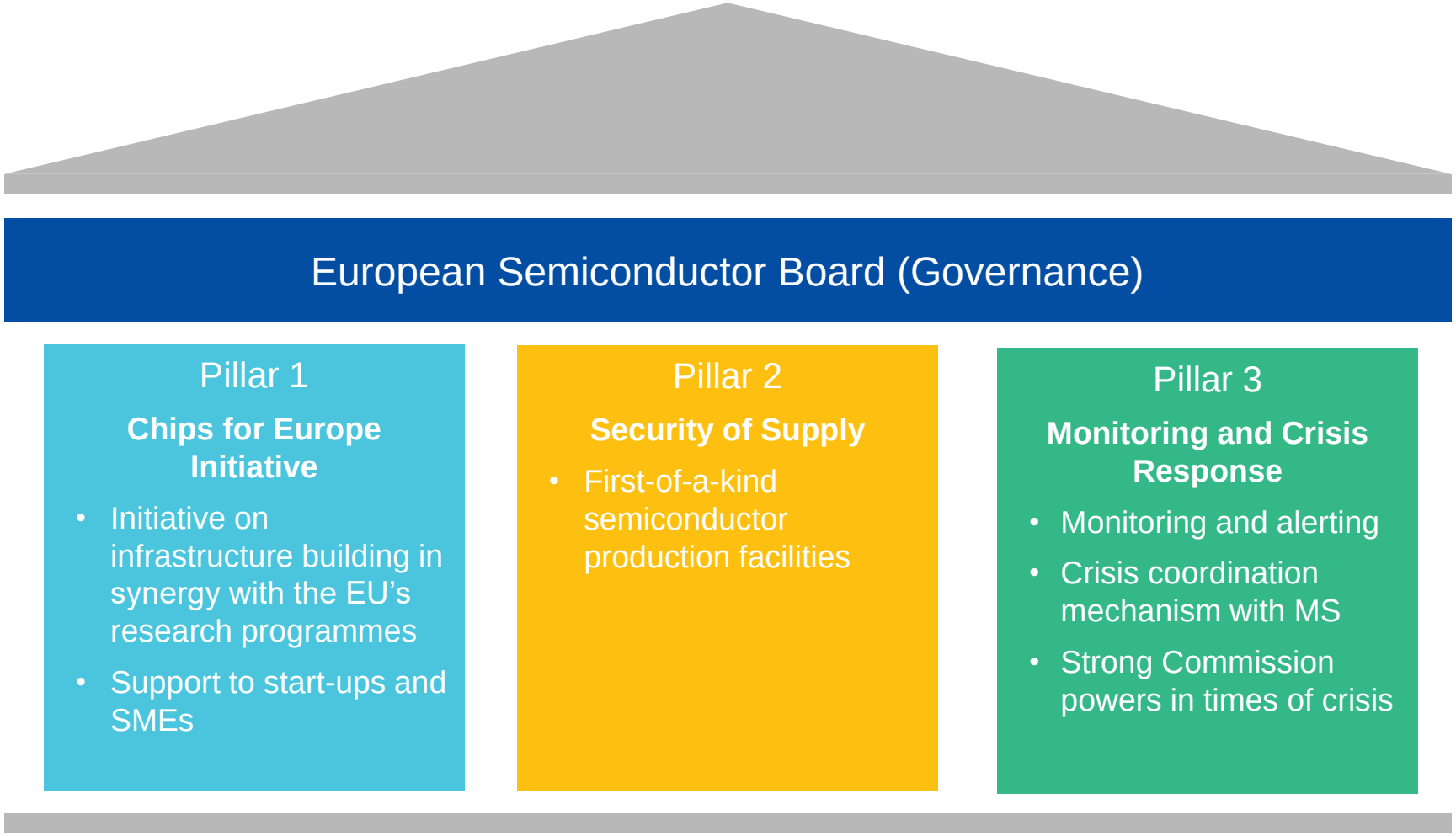
This is not just a matter of our competitiveness. This is also a matter of **tech sovereignty**.

– Commission President Ursula von der Leyen

Europe needs a Chips Act to…

- strengthen its **research** and **technology** leadership
- build and reinforce its own **capacity** to **innovate** in the **design**, **manufacturing** and **packaging** of **advanced** chips
- put in place adequate framework to substantially **increase production capacity** by 2030
- address the acute **skills** shortage, support development of skilled workforce
- develop a mechanism to monitor **global semiconductor supply** chains

Three pillars of the Chips Act



Rationale for intervention - Pillar 1

- EU current semiconductors ecosystem presents strong limitations to convert excellent research into **industrial innovation**
  - *Lack of instruments that provide a path for sustainable research from the lab to **industrialisation***
  - *EU has leading research organisations but their outcomes are often taken up in other parts of the world*
  - *Lack of a **design ecosystem** that brings together multiple tools and competences broadly distributed in Europe and provides an efficient access to IC users*

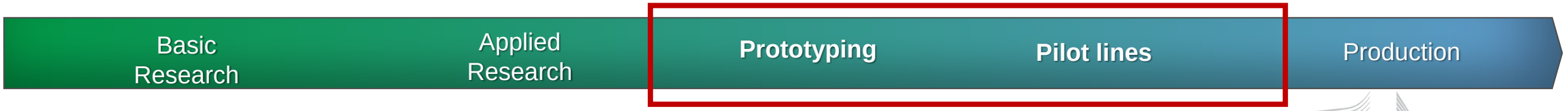
Pillar 1: Chips for Europe Initiative
addresses the gap from lab to fab

Objectives

1. Build a **virtual platform** to reinforce Europe's **design** capacity
2. Enhance existing and developing new **pilot lines**
3. Accelerate the development of **quantum chips**
4. Create a network of **competence centres** across Europe
5. Establish a **Chips Fund** to facilitate **access to loans and equity by start-ups, scale-ups and SMEs** in the value chain

Chips JU

EIC
I-EU



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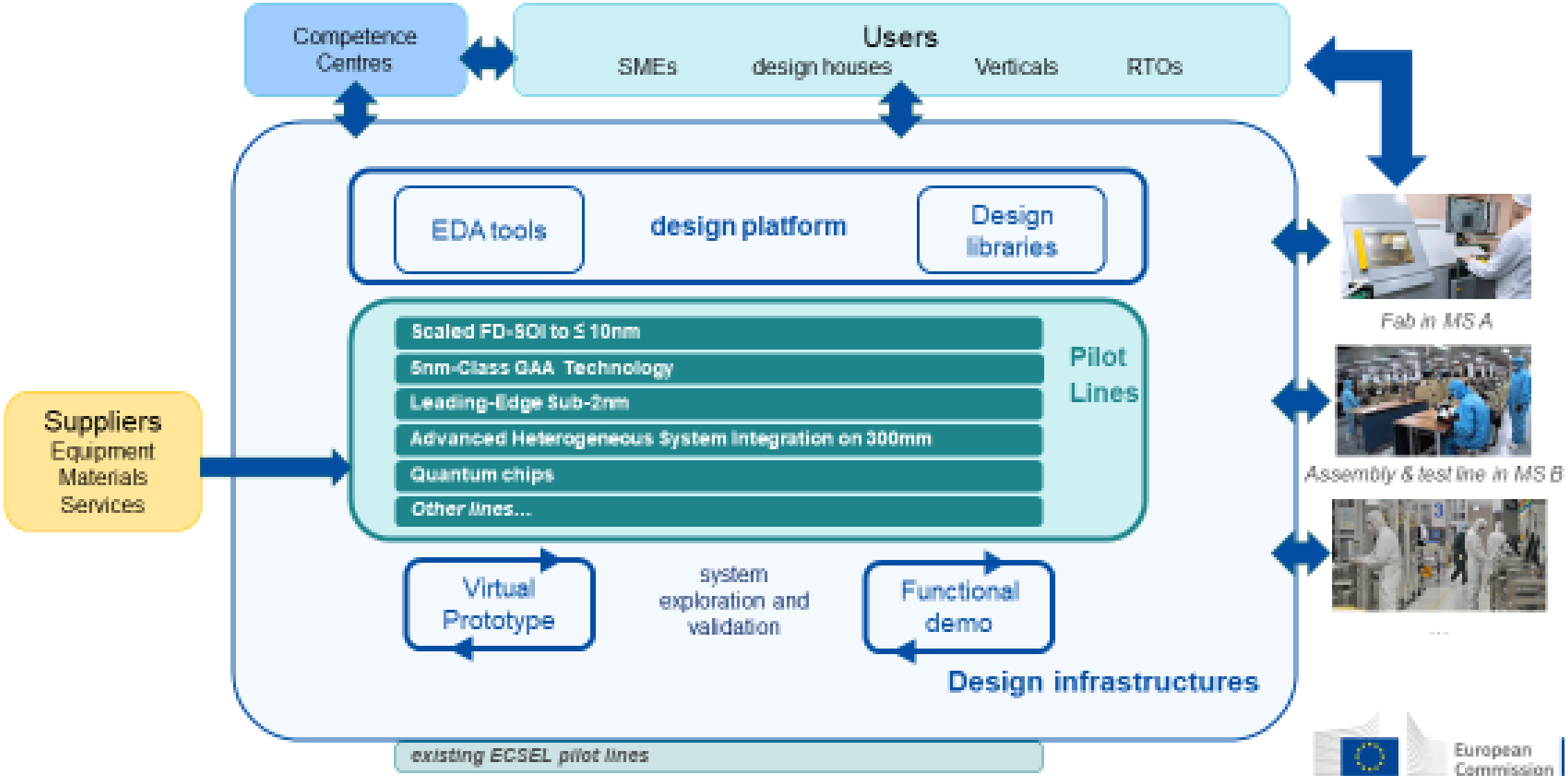
From the lab to the fab



Pillar 1: Expected benefits and impact

Benefits

- Easier use of **design tools** and **libraries** for design companies, industry users and product developers enabling them to design innovative solutions and create **IP** which will improve the **flow of information** and address the EU's shortcomings in design
- Easier access to piloting infrastructure for **developing, testing and refining** new technology concepts and **prototypes** which will accelerate the **innovation cycle**
- Easier and faster access to **foundry services** via a single point of contact**,** and **lower development costs for SMEs** which will bridge the "valley of death" and foster an innovative semiconductor ecosystem

Impact

- **Non-significant burden on national authorities** for implementation
  No administrative costs for businesses (strictly voluntary)

Rationale for intervention - Pillar 2

- EU investments in **manufacturing capacity** have been low in a high growth market
  - ***Global*** *investments in capacity grew 3x in 10y, but* ***EU*** *industry spending did not increase*
  - ***EU's share*** *production capacity kept* ***declining*** *over the past 20 years, not attracting investments*
  - *EU now fully* ***dependent*** *on third countries for advanced production, without control on security and sustainability aspects*
- Without intervention, **risk** of significant **drop** in EU's market share
  - *Production is* ***capital-intensive*** *with major upfront investments,* ***risk offset*** *needed*
  - *Semiconductors is of key* ***strategic value*** *with wide impact: main economies designed important* ***incentive measures***

Pillar 2: security of supply and resilience

Integrated Production Facility (IPF)

Vertically integrated first-of-a-kind facility which produce the chips they design and market

Open EU Foundry (OEF)

First-of-a-kind facility that (also) **produces chips** which are designed and marketed by **unrelated undertakings**

Qualification as first-of-a-kind facility: Facility needs to offer innovation that is not yet present in the Union

Clear **positive impact on the value chain** (security of supply and qualified workforce)

Security of supply: guarantees not to be subject to extraterritorial application of public service obligations of third countries in a way that undermines the ability to accept priority rated orders

Clear commitment to **invest in further innovation**

Rationale for intervention – Pillar 3

Pillar 3

- Lack of **availability of relevant data** for precise assessment of risks
- No instrument for ad hoc data gathering allowing to **rapidly adapt policy response**
- Lack of a **mechanism for coordination** between Member States and the Commission to better anticipate and react to shortages at Union level
- **Critical sectors** are particularly vulnerable in shortage situations
  - *Chips are essential for many critical sectors, e.g. energy, health, defence*
  - *Several sectors depend on chips that are difficult to substitute due to safety requirements*
  - *Many sectors typically buy small quantities, while suppliers privilege high volume demand*
- Need for improved tools to **ensure appropriate allocation of available resources to critical sectors**

Pillar 3: Monitoring and crisis mechanism

Monitoring stage

- Regular monitoring by Member States and update mechanism for alerts by stakeholders
- Board meetings with advisory participation of industry stakeholders and other relevant Union bodies

Crisis trigger

When **assessment of Commission provides evidence** of serious disruptions in the supply

- entailing significant negative effects on one or more important sectors, or
- preventing the repair and maintenance of essential products used by critical sectors

Commission implementing act

Crisis stage

- **Emergency Toolbox** activated: info gathering, priority orders, export control
- Intensified coordination in the European Semiconductor Board

Thank you

Marco Ceccarelli

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