



# China-EU Relations in Technology Trade

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1 **Background**

2 **Status-quo**

3 **Prospects**

## 1. Success in China-EU Science and Technology Cooperation

- **Wide in areas**

Cooperation areas covers energy, agriculture, medicine, space etc,

The EU is China's largest source of technology

- **Mature mechanisms**

Political and technical dialogue mechanisms such as Information and Communication Technologies (ICT) Dialogue and the recently established **EU-China High-level Digital Dialogue**

- **Extensive participation**

Universities, research institutions, individual researchers, enterprises...

Many Chinese universities and scholars have participated under the EU Research and Innovation Framework Programme 'Horizon Europe'

- **Future opportunities**

Joint Roadmap for the future of EU-China cooperation in science, technology, and innovation, under discussion

## 2. New Waves of Technological Innovation

- **Fourth Industrial Revolution /Industry 4.0**

(Klaus Schwab, 2016)

artificial intelligence (AI), the Internet of Things (IoT),  
Quantum Computing, Biotechnology...

- **Growing National Competition**

Made in China 2025

Industrie 4.0 (Germany)

European Industrial Strategy

Biden-Harris 21st Century industrial strategy

- **Rise of Techno-nationalism**

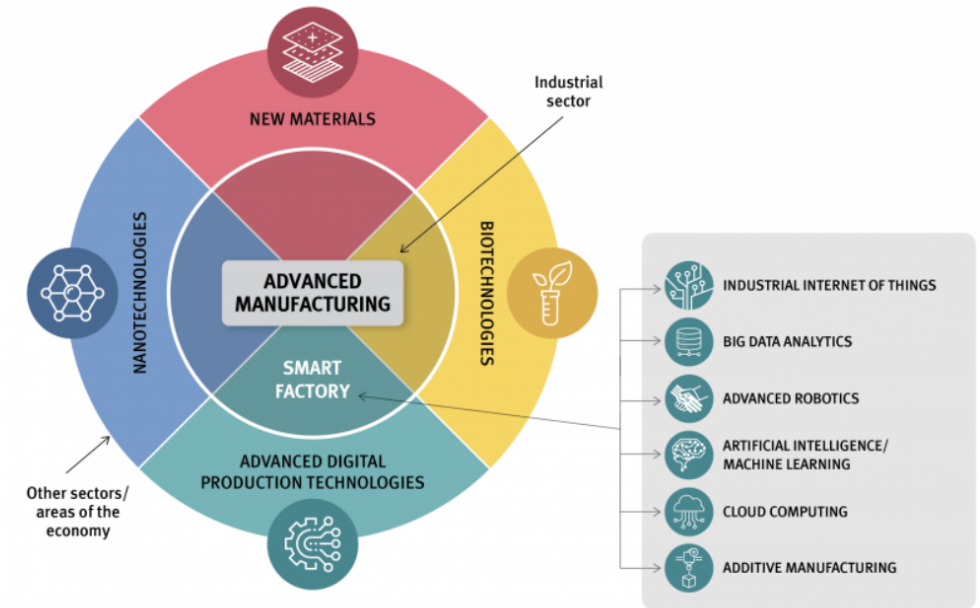
uneven developments of globalization (de-

industrialization and re-industrialization)

geopolitical tensions (US-China rivalry)

...

Fourth Industrial Revolution



Source: UNIDO Industrial Development Report 2020.

Source: UNIDO

### 3. Securitization of Economy and Technology

- **EU Economic Security Strategy**

“Technological Sovereignty”

- **EU Economic Security Package**

“Research Security”

- **List of Critical Technologies**

The European Commission has identified 4 key areas for further risk assessment with member states -- advanced semiconductors, artificial intelligence, quantum, biotechnologies

- **EU’s increasing precaution on China**

State-agnostic safeguarding measures on most sensitive technologies in the 2021-2022 Horizon Europe work programme  
 Additional China-specific limitations in the 2023-2024 Horizon Europe work programme

EU’s Critical Technologies List

Technology Area		Technologies*
1. ADVANCED SEMICONDUCTORS TECHNOLOGIES		<ul style="list-style-type: none"> <li>• Microelectronics, including processors</li> <li>• Photonics (including high energy laser) technologies</li> <li>• High frequency chips</li> <li>• Semiconductor manufacturing equipment at very advanced node sizes</li> </ul>
2. ARTIFICIAL INTELLIGENCE TECHNOLOGIES		<ul style="list-style-type: none"> <li>• High Performance Computing</li> <li>• Cloud and edge computing</li> <li>• Data analytics technologies</li> <li>• Computer vision, language processing, object recognition</li> </ul>
3. QUANTUM TECHNOLOGIES		<ul style="list-style-type: none"> <li>• Quantum computing</li> <li>• Quantum cryptography</li> <li>• Quantum communications</li> <li>• Quantum sensing and radar</li> </ul>
4. BIOTECHNOLOGIES		<ul style="list-style-type: none"> <li>• Techniques of genetic modification</li> <li>• New genomic techniques</li> <li>• Gene-drive</li> <li>• Synthetic biology</li> </ul>

Source: European Commission, Directorate-General for Research and Innovation (DG RTD)

1 Background

2 **Status-quo**

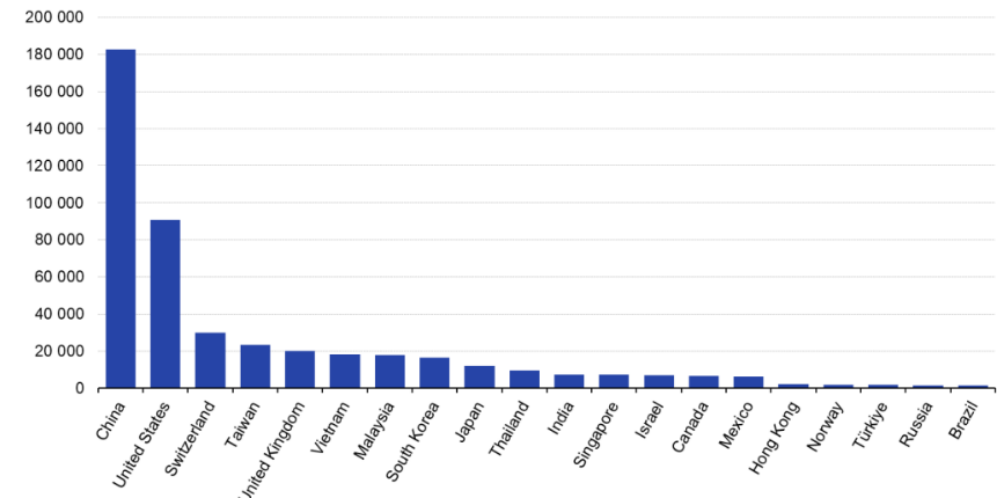
3 Prospects

# Status Quo

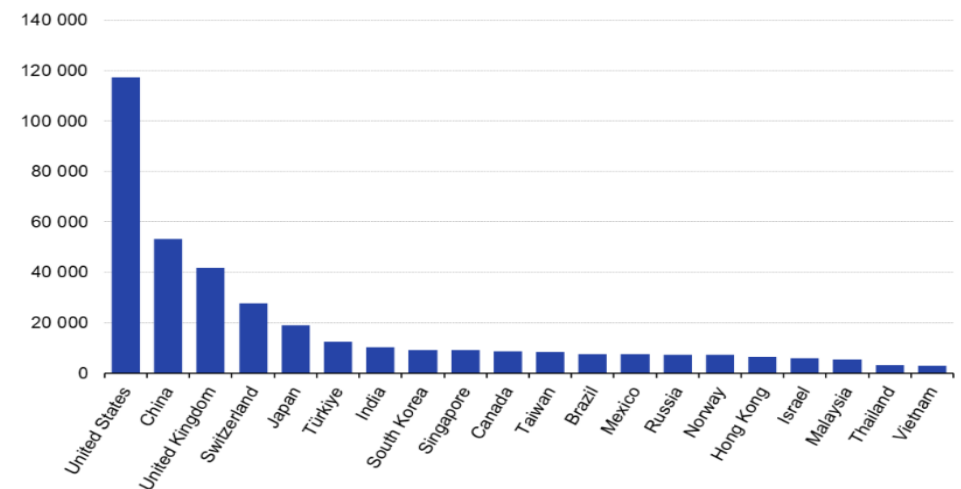
## 1. Trade in Technology

- China is the largest importer and second largest exporter of high-tech products of the EU
- High-tech products imported by the EU from China account for about 30% of the EU's total high-tech product imports
- High-tech products exported to China account for about 10% of the EU's total high-tech product exports.

**EU imports of high-tech products, top 20 partners, 2022**  
(€ million)



**EU exports of high-tech products, top 20 partners, 2022**  
(€ million)



Source: Eurostat



## 2. Bilateral FDI and Technology

Technology is now closely related to investment

### (1) EU FDI into China.

- The top 3 sectors were

Automotive

Basic Materials

**Information and Communication Technology (ICT)**

### (2) China FDI into the EU

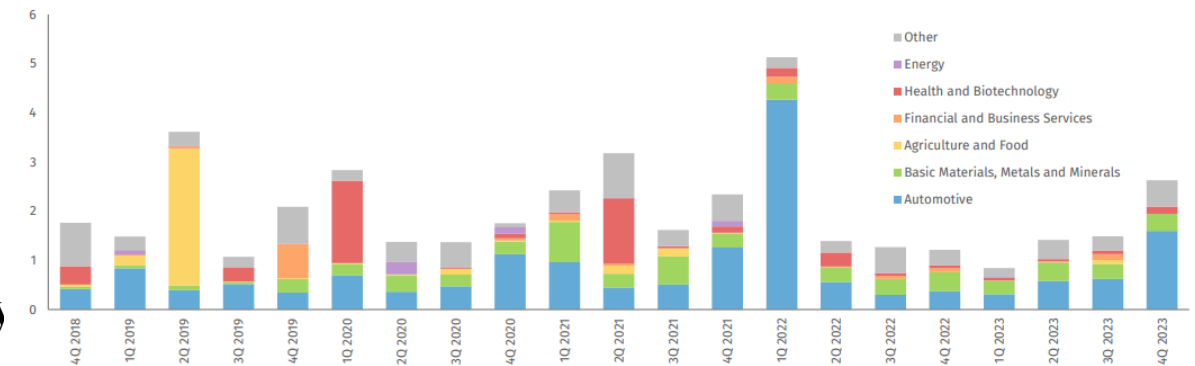
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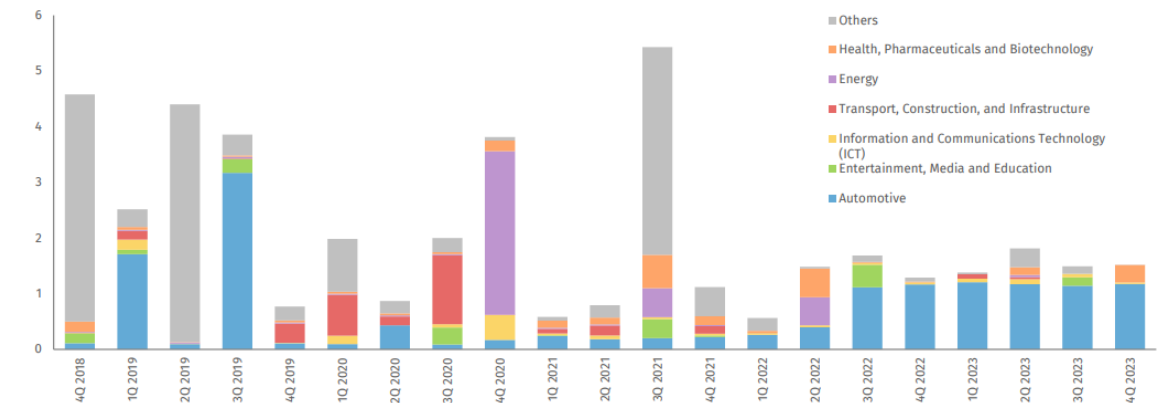
**Health, Pharmaceuticals and Biotechnology**

**Information and Communication Technology (ICT)**

Value of Completed EU FDI Transactions in China by Industry  
EUR billion



Value of Completed Chinese FDI Transactions in the EU by Industry  
EUR billion



Source: Rhodium Group



### 3. Problems

#### EU's Concerns:

- **“Forced technology transfer” (intellectual property protection)**
- **“Overcapacity” in certain sectors (EVs...)**
- **Cross-border data transfer**
- Dual-use technology and geopolitical issues

...

#### China's concerns

- **De-risking (and potential over de-risking in research)**
- EU's growing emphasis on “Research security”
- Export control
- **US interference (ASML case)**

...

#### Others:

- Dominance of China-UK science and technology cooperation within the EU's framework

1 Background

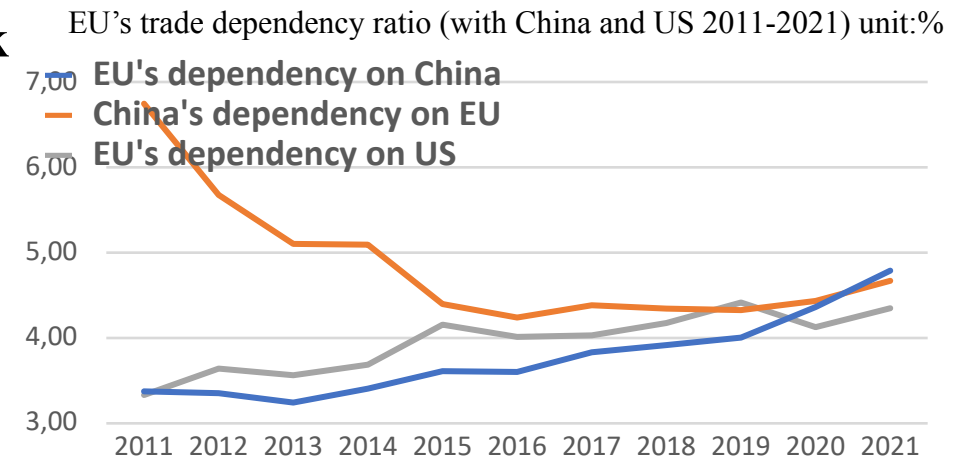
2 Status-quo

3 **Prospects**

# Prospects

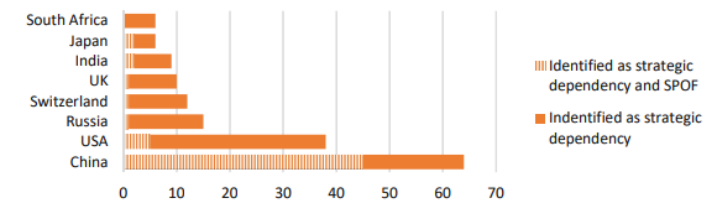
## 1. De-risking is likely to continue, but is not without risk

- China and the EU are interdependent in economy.
- Cooperation is good for innovation
- Both economies are under pressure.
- The border of de-risking is unclear. There are disputes within member states (e.g. Hungary)
- Chinese import cannot be easily replaced
- “China+1” strategy is costly for European companies



Data Source: EUROSTAT

Figure 11 – Identified strategic dependencies and single points of failure (SPOFs)



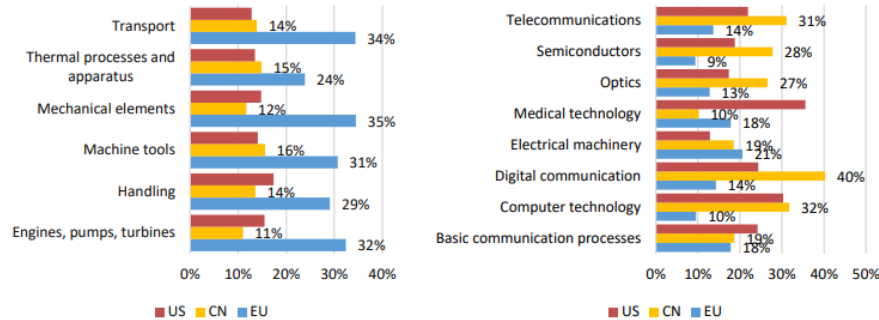
Source: R. Arjona, W. Connell, C. Herghelegiu (2023): "An enhanced methodology to monitor the EU's strategic dependencies and vulnerabilities", Single Market Economy Papers

Source: European Commission

## 2. Competition will increase, but should not be exaggerated in the field of technology

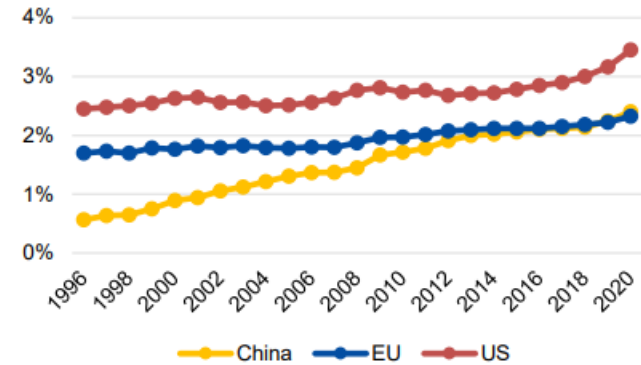
- China is catching up with the EU in research and innovation (R&D expenditure, publications...)
- China seems to lead in some technologies
- EU remains a leading actor in technology (e.g. mechanical engineering)

Figure 34 – World share (%) of patent applications filed under the PCT (2018): mechanical engineering (left); electronics and electrical engineering (right)



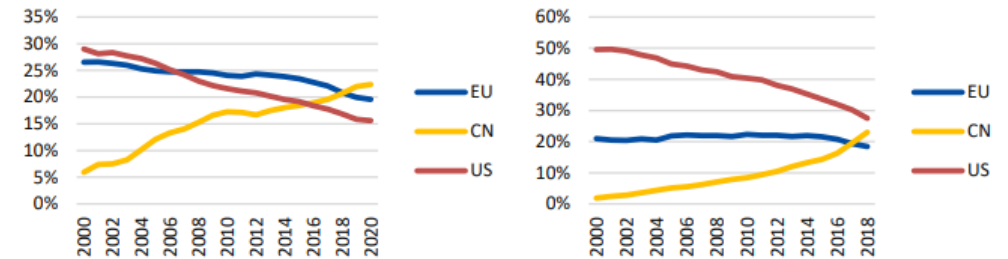
Source: 2022 Science, Research and Innovation Performance of the EU (SRIP) report

Figure 29 – Total R&D expenditure EU, China, US as % of GDP (1996-2020)



Source: Author's elaborations based on World Bank

Figure 31 – Share of all scientific publications (left, 2000-2020) and 1% most-cited scientific publications (right, 2000-2018)



Source: Author's elaborations based on 2022 Science, Research and Innovation Performance of the EU (SRIP) report

Source: European Commission  
Understanding EU-China Economic  
Exposure Report

### 3. Potential Cooperation

#### Research Cooperation

- The number of China+EU co-publications in AI, machine learning and big data has surpassed China+US co-piblications

#### Dialogue

- Joint Roadmap for the future of EU-China cooperation in science, technology, and innovation

#### Governance

- AI (China and EU signed the Bletchley Declaration on AI Safety)

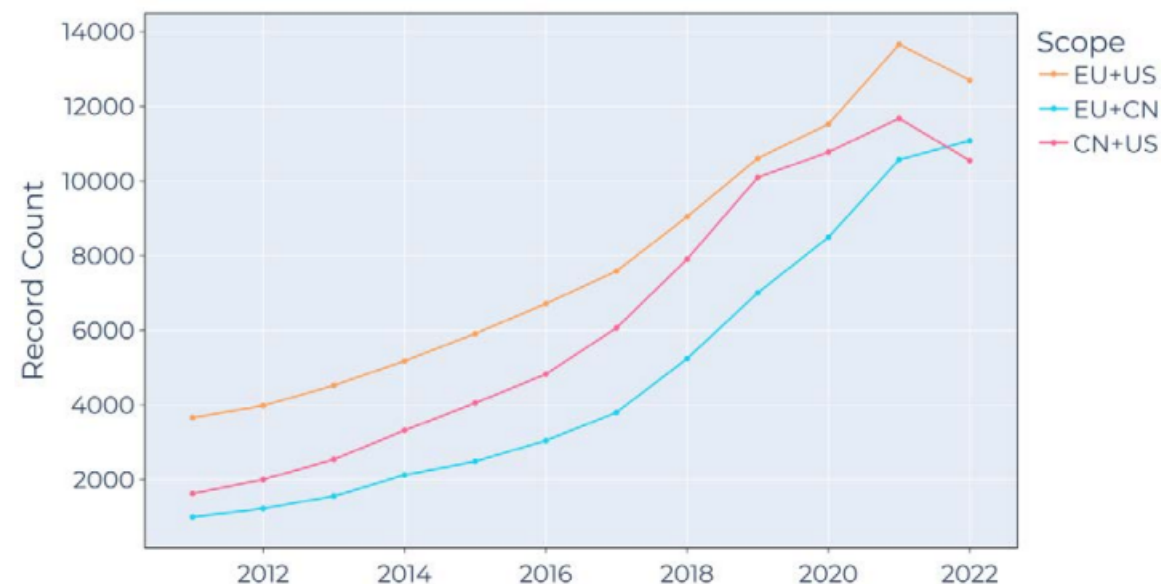


Figure 7. Number of co-publications per year related to artificial intelligence, machine learning and big data published between regions (for keywords see Annex)

Source: ZSI  
 Report on the results of the research cluster  
 on EU-China research cooperation

## **Conclusions: Expand Cooperation, tackle challenges**

- China-EU relation in the fields of trade and technology is a story of mixed cooperation and competition
- Technology now plays an important role in economic growth, and bilateral trade and investment
- China and EU remain important partners in technology
- More challenges lie ahead for both sides
- More dialogues needed for governments, institutions and researchers.

**Thank you for your attention!**

**Vielen Dank fuer Ihre Aufmerksamkeit!**

**感谢您的听讲,敬请批评指正!**



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