

Background Paper: ECOSOC committee

**Promoting European technological independence
regarding chips (electronics)**



In an increasingly digitalized world, electronic chips and printed circuit boards (PCBs) are at the core of nearly every industry, from telecommunications and automotive to defense and healthcare. However, the European Union remains highly dependent on non-European countries—primarily Taiwan, South Korea, China, and the United States—for the production and supply of these critical components. This reliance not only exposes Europe to supply chain disruptions and geopolitical tensions but also threatens its economic sovereignty and technological competitiveness.

To address this challenge, the European Economic and Social Committee (EESC) must explore strategies to enhance Europe's independence in the semiconductor and PCB sectors. This background paper will provide an in-depth analysis of the current situation, the risks associated with dependence, existing EU initiatives, and possible policy solutions to promote European technological sovereignty while maintaining a balanced approach to global trade and cooperation.

I. Definitions :

1. Electronic Chips (Semiconductors)

Semiconductors are materials that partially conduct electricity, making them essential for producing microchips used in all electronic devices. They are the foundation of modern computing, telecommunications, automotive systems, and industrial automation.

2. Printed Circuit Boards (PCBs)

PCBs are thin boards made of insulating materials with conductive pathways that connect electronic components. They are essential for assembling and operating any electronic system, from consumer electronics to industrial and military applications.

3. Technological Sovereignty

This term refers to a nation or region's ability to develop, produce, and maintain critical technologies without excessive reliance on foreign suppliers. Achieving technological sovereignty is crucial for economic resilience, national security, and industrial competitiveness.

4. Monopoly and Dependence

A monopoly occurs when a small number of companies dominate a particular industry, limiting competition. In the semiconductor sector, major players such as Taiwan Semiconductor Manufacturing Company (TSMC), Intel (US), and Samsung (South Korea) hold significant market shares, making Europe highly dependent on external suppliers. This dependence presents risks, including price fluctuations, geopolitical instability, and supply chain disruptions.

5. Strategic Autonomy

Strategic autonomy is the EU's long-term objective of reducing its reliance on non-European countries for critical resources and technologies. It involves investments in research, local manufacturing, and policy measures to safeguard Europe's technological future.

6. The European Chips Act

Introduced in 2022, the European Chips Act is a policy framework aiming to increase the EU's global semiconductor market share from 10% to 20% by 2030. It includes investments in research, incentives for semiconductor production, and international partnerships to enhance Europe's position in the global semiconductor supply chain.

These definitions provide the foundation for understanding the challenges and opportunities Europe faces in reducing its reliance on non-European electronic components. The next section will examine the current state of Europe's semiconductor and PCB industries, highlighting key risks and existing EU initiatives.

II. Current Situation and Challenges

The European Union (EU) is a global economic powerhouse, yet it remains heavily dependent on foreign countries for the supply of electronic chips and printed circuit boards (PCBs). This reliance presents significant economic, geopolitical, and technological risks. While the EU has recognized the urgency of achieving greater autonomy, numerous challenges remain in implementing effective policies and industrial strategies.

1. Europe's Dependence on Non-European Countries

The EU currently accounts for only about 10% of global semiconductor manufacturing, with most advanced production concentrated in Asia (Taiwan, South Korea, China) and the United States. This dependence is particularly evident in two key areas:

- **Semiconductor Production:**
 - The world's most advanced semiconductor manufacturing is dominated by Taiwan Semiconductor Manufacturing Company (TSMC) and Samsung (South Korea).
 - The United States leads in chip design, with companies such as Intel, NVIDIA, and Qualcomm setting industry standards.
 - China has invested heavily in domestic semiconductor production, with SMIC (Semiconductor Manufacturing International Corporation) emerging as a key player.

- **Printed Circuit Boards (PCBs):**

- Over 80% of global PCB manufacturing is concentrated in China and Southeast Asia.
- European companies still design high-end PCBs but lack mass production capacity, making them vulnerable to supply chain disruptions.

This situation places the EU in a weak position in terms of technological self-sufficiency and resilience against global crises.

2. Strategic Risks for Europe

Europe's reliance on external semiconductor and PCB supply chains creates multiple risks:

- **Supply Chain Vulnerabilities:**

- The COVID-19 pandemic and the global chip shortage exposed Europe's fragile supply chains, leading to production delays in the automotive, telecommunications, and medical sectors.
- A geopolitical crisis—such as a potential conflict involving Taiwan (home to TSMC, the largest chip producer)—could have catastrophic consequences for the EU's economy.

- **National Security Concerns:**

- Advanced semiconductors are critical for defense, cybersecurity, and critical infrastructure.
- Dependence on foreign technology could limit Europe's strategic autonomy in key sectors, including artificial intelligence, quantum computing, and military defense systems.

3. EU's Current Initiatives

Recognizing the urgency of the situation, the European Union has launched several initiatives aimed at reducing dependency and boosting domestic production.

- **The European Chips Act (2022):**

- Aims to **increase the EU's semiconductor market share from 10% to 20% by 2030.**

- Allocates **€43 billion** to research, development, and chip production facilities within the EU.
- Seeks to attract major chip manufacturers to establish fabrication plants (fabs) in Europe.
- **IPCEI (Important Projects of Common European Interest) on Microelectronics:**
 - Provides funding for cutting-edge semiconductor research and innovation.
 - Supports European companies such as **STMicroelectronics, Infineon, and NXP** in developing next-generation chips.
- **Strengthening Key Industry Players:**
 - **ASML (Netherlands):** The world's only producer of **EUV lithography machines**, which are essential for manufacturing the most advanced chips.
 - **STMicroelectronics (France & Italy):** A leading European semiconductor company working on next-generation power electronics.
- **International Cooperation and Diversification:**
 - The EU is negotiating strategic partnerships with **Japan, India, and the US** to secure alternative semiconductor and PCB supply chains.
 - Plans to establish **strategic reserves** for critical electronic components.

III. Positions of Key European Countries on Semiconductor and PCB Independence

Country	Position & Strategy	Key Companies & Initiatives
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Germany	<ul style="list-style-type: none"> - Strong advocate for EU semiconductor independence. - Focuses on attracting chip manufacturing plants and supporting automotive chip production. - Supports subsidies for chipmakers through the European Chips Act. 	<ul style="list-style-type: none"> - Infineon Technologies (leader in power semiconductors). - Bosch (developing automotive chips). - Intel investment: €30 billion pledged for a semiconductor plant in Magdeburg.
France	<ul style="list-style-type: none"> - Supports EU-wide investments in advanced chip manufacturing. - Focuses on research & development in microelectronics and AI-driven chips. - Home to major European chip design companies. 	<ul style="list-style-type: none"> - STMicroelectronics (leader in microcontrollers & power semiconductors). - Leti (CEA-Leti) (advanced research in nanoelectronics). - Plans for new semiconductor plants with EU funding.
Netherlands	<ul style="list-style-type: none"> - Key player in global semiconductor manufacturing technology. - Strongly supports EU autonomy but also maintains international trade relationships. - Restricts exports of advanced chip-making technology to China. 	<ul style="list-style-type: none"> - ASML (world's only producer of EUV lithography machines for advanced chips). - NXP Semiconductors (major supplier of automotive & industrial chips).
Italy	<ul style="list-style-type: none"> - Supports EU-wide initiatives but focuses on industrial partnerships. - Aims to expand semiconductor production in collaboration with France. 	<ul style="list-style-type: none"> - STMicroelectronics (jointly owned with France). - Tower Semiconductor (investments in silicon-based technology).
Belgium	<ul style="list-style-type: none"> - Research hub for next-gen chip technologies. - Advocates for European collaboration in semiconductor R&D. 	<ul style="list-style-type: none"> - IMEC (Interuniversity Microelectronics Centre) (leading research institute in nanotechnology and chip design).

Spain	- Developing its semiconductor industry to reduce dependency. - Seeks to attract investments through government incentives.	- PERTE Chip Plan: €12 billion government program for semiconductor manufacturing. - Open chip design initiatives for startups.
Ireland	- Major European hub for semiconductor design & manufacturing. - Attracts US investments in chip production.	- Intel (large semiconductor manufacturing facility in Leixlip).
Austria	- Focuses on semiconductor materials & specialized chips.	- Infineon Austria (leader in power electronics & energy-efficient chips).

RESOURCES (mostly short videos, explaining the general use of chips and the point of view of the EU)

<https://moderndiplomacy.eu/2025/03/08/the-geopolitics-of-semiconductor-supply-chains/>

<https://thegeopolitics.com/semiconductor-diplomacy-the-21st-century-oil/>

<https://www.youtube.com/watch?v=bKINwXXzlaQ>

https://www.youtube.com/watch?v=5PHs1pPg_uE

<https://www.youtube.com/watch?v=Q4YUvXJs9-4>