Technology Industries of Finland

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Recommendations for an EU Chips Act 2.0: A stronger strategy for Europe's technological competitiveness and resilience

Europe's competitiveness and economic security hinge on keeping pace with the fast-evolving semiconductor landscape. Chips are the foundation for connectivity, defence, AI, clean energy, robotics and mobility. Europe holds world-class expertise in several parts of the global semiconductor value chain, yet its overall position remains fragile, exposing it to geopolitical risks, economic coercion, trade conflicts and supply shocks. The first Chips Act created momentum, but Europe now needs a stronger and more coordinated effort to meet its ambitions. As the semiconductor space accelerates globally, EU chips policy should respond with urgency and determination, ensuring that implementation is not only ambitious but also rapid enough to match international developments.

A *Chips Act 2.0* must therefore provide a systemic and forward-looking strategy: consolidating Europe's competitive advantages, tackling dependencies, generating demand for manufacturing capacity and ensuring that policies at national and EU levels work in synergy. This means setting realistic yet ambitious targets, leveraging investment, enabling collaborative R&D, addressing workforce shortages and embedding sustainability at the core of Europe's semiconductor ecosystem. Furthermore, it must establish robust platforms for closer cooperation with like-minded partners, aimed at ensuring resilient and interconnected semiconductor supply chains and innovation ecosystems.

Through its national strategy, *Chips from the North*, Finland brings to the table strengths such as chip design, advanced pilot lines, and specialised materials and process technologies — reinforcing the EU's collective capacity in a critical technology domain.

1 Secure excellence-based funding and market demand for high-growth chip technologies

- **Centralised semiconductor budget with targeted support for strategic technologies**: The EU should create a semiconductor budget of critical mass under the next Multiannual Financial Framework (MFF), specifically within the European Competitiveness Fund (ECF). This budget should be aligned with national and private funding streams to maximise scale, coherence and impact. Funding should prioritise high-growth and strategic areas such as chip design (e.g. Edge AI and 6G chips based on EUV technology), MEMS/sensors, photonics, quantum chips, advanced materials and process innovations (e.g. atomic layer deposition). Europe should not limit its ambition to catching up in semiconductor manufacturing. It should also focus on defining and building strategic niches where it holds and can achieve global relevance and sustained market leadership – whether through specialised technologies, critical applications or unique strengths across the value chain.

- **Excellence first:** Funding should be allocated based on demonstrated excellence and potential for global leadership, ensuring that only the most promising projects receive support.

- **Broader scope for FOAK and DSE:** The scope of First-of-a-Kind (FOAK) facilities should be expanded to include critical upstream actors such as chemicals and materials providers, as well as downstream actors such as assembly, testing and packaging providers. It should also cover quantum chip fabrication. At the same time, Design Centres of Excellence (DSE) should have a clear definition and broadened scope to include startups, SMEs and large companies

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working on state-of-the-art chip design, architecture and Electronic Design Automation (EDA) tools.

- **Demand creation through industry-led alliances:** Europe should catalyse and support industry-led alliances, ecosystems and consortia that connect chip providers with end-users, ensuring early adoption of innovative chips designed and made in Europe. Such initiatives would help secure anchor customers, strengthen downstream competitiveness in sectors like automotive, telecoms and energy and reinforce Europe's global market position.

- **Next-generation IPCEI for advanced semiconductors**: The forthcoming IPCEI on Advanced Semiconductor Technologies (AST) should place strong emphasis on reinforcing Europe's microelectronics design capabilities, which are essential for next-generation connectivity. Europe's global leadership in mobile networks and optical backbones can only be sustained through continued and targeted support for design excellence under IPCEI AST. The new initiative should also streamline procedures, minimise administrative burdens and prioritise edge AI and cutting-edge chip design. It must ensure a level playing field for European semiconductor and connectivity champions, as well as emerging innovators, in the face of extensive state support in Asia and North America. Funds should be deployed to enhance the global competitiveness of EU companies, with flexibility to support individual company initiatives.

2 Foster cross-border, company-led R&D and chip innovation hubs with continued pilot line support

- **Company-led innovation through EU Tech Frontrunners**: Establish a dedicated scheme for the semiconductor sector under the EU Tech Frontrunners model found in the European Competitiveness Fund (ECF). This instrument would channel EU R&D funding directly to lead companies that drive ambitious, high-impact innovation agendas together with their ecosystems of SMEs, startups, research institutions and suppliers. By empowering lead firms to coordinate large-scale, mission-driven R&D and deployment projects, this approach would accelerate breakthroughs in areas such as chip design, advanced materials and sustainable manufacturing, while ensuring that value creation and industrial capacity remain anchored in Europe.

- **Chip innovation hubs**: The EU should establish chip innovation hubs as centres of excellence for semiconductor research, development and commercialisation, supporting cross-border R&D collaboration. These hubs, supported by Chips Competence Centres, should incorporate industry clusters, pilot lines and the EU design platform to enable swift prototyping and testing of new semiconductor technologies. To support the development of the hubs, an international benchmarking analysis should be performed, drawing on the best available models and practices.

- **R&D funding for future breakthroughs**: The upcoming EU R&D framework programme (FP10) needs to swiftly ensure strong funding for the chip sector. By continuing to fund pilot lines, the design platform and ambitious R&D projects within the innovation hubs, the EU can ensure that breakthroughs in innovative semiconductor technologies are efficiently transitioned from research to manufacturing and deployment in digital infrastructure. Building on this approach, Finland's VTT should serve as the host for a 300mm line dedicated to specialised microelectronics for dual-use applications. This initiative would focus on the key technological strongholds identified: superconducting quantum technologies, advanced computing solutions such as analogue, quantum and photonic computing, as well as connectivity.

- **Sustained leadership in quantum chip technologies:** To maintain Europe's competitiveness in quantum chip technologies, the Commission should build on the quantum pilot lines already launched through Chips JU calls and ensure their development well beyond initial funding. This requires long-term support, integration with innovation hubs and proactive planning for the next wave of disruptive quantum technologies, securing Europe's future leadership in this strategic domain.

3 Address critical workforce shortages with relevant programmes and mobility initiatives

- **Robust skills pipeline**: To meet the growing demand for talent, the EU should prioritise education and workforce development programmes tailored to the needs of the semiconductor industry, in partnership with universities and Chips Competence Centres. Programmes such as Erasmus+ for STEM students, Digital Europe, Horizon Europe and European Social Fund should be leveraged to build expertise in key areas like AI and connectivity chips, quantum computing, advanced materials and MEMS/sensors.

- **EU Tech Talent Visa pathway**: The EU should simplify and harmonise work visa processes across Member States by introducing a dedicated EU Tech Talent Visa. This would streamline and accelerate entry for experts and scientists in key fields such as semiconductors. Special provisions should be considered for mobile researchers and specialists to remove barriers and foster cross-border collaboration, ensuring that Europe attracts and retains the best global talent to strengthen its chips ecosystem.

4 Lead in green semiconductor manufacturing

- Europe has an opportunity to become a global leader in sustainable semiconductor manufacturing. The EU should direct funding, particularly in R&D, towards green technologies with the greatest positive impact, including energy-efficient chip production, water conservation, recyclable and sustainable materials, circularity and safer substances. A key priority should be innovative material substitution and advanced recycling to cut dependence on rare earths from third countries. Support should also cover semiconductors and components that enable the green transition, such as integrated photonics, heterogeneous integration and chips for renewable energy applications. By aligning industrial policy with environmental objectives, Europe can combine technological innovation with climate leadership and greater strategic autonomy.

5 Forge closer international partnerships

- The EU should prioritise closer collaboration with like-minded countries such as the US, Japan, Korea and Taiwan to strengthen supply chains, drive innovation and enhance resilience. This should include promoting co-investments and technology partnerships with global leaders by enabling partners to form joint ventures with EU firms and access EU-funded R&D infrastructures, in line with the principle of open strategic autonomy. In parallel, the EU should establish bi- and multilateral collaboration platforms on critical technologies such as semiconductors (e.g. through Trade and Tech Councils) to align policies, foster digital innovation and reinforce critical infrastructure and supply chain resilience.

6 Towards industrial-scale quantum chip production

- **Fabrication support:** To reach systems with 100 error-corrected qubits by 2030, Europe needs scalable public–private infrastructure and dedicated funding for startups and SMEs developing quantum chips. The key challenge is moving from lab research to commercial production, as superconducting chips use semiconductor-like methods but with materials that contaminate standard tools. Dedicated production equipment for startups is therefore essential to enable scaling.

- **Foundries and scale-up:** Large-scale foundries will be crucial to achieve cost efficiency and production capacity. Shared clean-room facilities where multiple startups access production tools can reduce contamination risks, maximise utilisation rates and accelerate the commercialisation of superconducting quantum processors.

- **Roadmap 2026 and coordination:** The Quantum Chips Industrialisation Roadmap, due in 2026, should focus on targeted scale-up support and prepare for quantum-specialised fabs. Coordination with the Chips Act 2.0 is essential to align funding instruments and secure long-term growth for European quantum developers.

- **Intellectual property and investment:** Clear IP ownership rules are vital in a sector dominated by SMEs and rapid process evolution. Startups must retain control of proprietary technologies, while foundries need legal certainty to build stable supply chains. Well-defined IP distribution enables validated processes to be transferred to private fabs, giving investors confidence and allowing firms to focus on innovation.

7 Strengthen governance, coordination and industry engagement

- **Strengthen EU-level governance**: The European Semiconductor Board must be reinforced with real coordinating powers, enabling pooling of national and EU resources to achieve critical mass for projects of strategic importance. A consolidated and transparent overview of all semiconductor investments across the Union is needed. Current arrangements leave the Commission with only partial oversight of funding, which weakens alignment and slows implementation.

- **Make industry consultation systematic and strategic**: The Industrial Alliance on Semiconductors, alongside other representative bodies, should be given a more structured role in advising on priorities, helping guide investment decisions, and informing crisis preparedness. This would improve coherence between EU actions, Member State plans and industry needs.

- **Streamline, not burden**: New measures related to economic security must avoid creating additional administrative reporting. Coordination of national chips plans should focus on alignment and efficiency, ensuring monitoring and crisis-response mechanisms function effectively, rather than multiplying compliance costs for companies.

- **Ensure regulatory coherence**: The drafting and implementation of the Chips Act should align closely with other EU legislation — such as the Quantum Act and Advanced Materials Act — to guarantee smooth interplay and strong complementarity across policy domains.

8 Key targets

Market share & competitiveness

- Raise the EU's share of global semiconductor manufacturing capacity to at least 15% by 2035 (compared to ~8% today), with a focus on both advanced nodes and mainstream chips.
- Achieve global leadership in at least three mainstream or specialty chip niches (e.g. MEMS, sensors, RF, photonics) by 2035, where EU companies already have a competitive edge.
- Secure a minimum of two European chip design companies ranked in the top five globally within their segments by 2030.
- Sustain EU global leadership in photolithography (incl. EUV) and raise Europe's share of the global photonics market to 25% by 2035 and grow EU share in selected equipment (e.g. ALD) and materials niches.

Investment & scale

- Triple the combined EU, national and private investments in semiconductor R&D, design, pilot lines and production by 2035, with a minimum 2:1 and aspirational 3:1 leverage ratio of private to public investment.
- Approve at least one new fast-track IPCEI on advanced semiconductors by 2028.

Demand creation

- Ensure 20% of chips used in key EU industries – particularly automotive, energy, defence and connectivity – are sourced from EU production by 2030.
- Generate long-term anchor demand agreements for at least 10 cutting-edge fabs and FOAK facilities across Europe by 2035.

Skills & workforce

- Train and upskill 200,000 semiconductor professionals by 2035.
- Attract 10,000 foreign experts and researchers into the EU semiconductor sector by 2030 through streamlined visa pathways, with a stretch target of 30,000–40,000 by 2035.

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Chips from the North: Finland's commitment to EU competitiveness and technological sovereignty

Released in April 2024, Finland's industry-driven semiconductor strategy aligns with the EU's vision of strengthening technological sovereignty and global competitiveness. By focusing on key areas such as chip design, MEMS and sensors, photonics, quantum technologies, advanced materials, and process technologies, Finland aims to foster innovation that benefits the entire European semiconductor ecosystem. Finland's strategy includes a goal to triple the semiconductor industry's revenue to €5-6 billion by 2035, supporting the growth of a competitive and resilient sector. Finland is committed to R&D collaboration, workforce development, and attracting strategic investments to ensure Europe's leadership in the semiconductor industry.

- Chips from the North – Semiconductor Strategy for Finland
- Chips from the North – Summary