DAS PROGRESSIVE ZENTRUM

Discussion Paper

Europe's Industrial Stack

Ten Theses on Strengthening Sovereignty through a Competitive Industrial Base

April 2026

Technological and digital sovereignty* has shifted from an academic concept to a political imperative, becoming a core pillar of economic resilience. This paper, **the product of a cross-sectoral workshop and twelve expert interviews**, aims to give that dynamic a new direction. It is based on the conviction that consistently leveraging of industrial potential and strengths offers the opportunity to transform Europe's sovereignty from an abstract goal into a measurable and resilient ecosystem. Against this backdrop, the Industrial Stack forms the technological architecture linking physical industry (OT) and software intelligence (IT). By uniting key industrial technologies, the deep domain expertise of workers, and the innovative strength of small and medium-sized enterprises (SMEs) under open standards grounded in the rule of law, the Stack forges a distinct **European competitive advantage**.

Instead of pursuing costly full-stack approaches, the position paper advocates a strategy of **"Selective Sovereignty"**. This approach shifts the focus toward leveraging existing strengths and potential within key industrial sectors, such as microelectronics, automation technology, battery cell manufacturing, and mechanical and plant engineering. The goal is to establish **leverage points**[1] within value-critical processes, data flows, and standards through continuous learning and the coordinated fostering of innovation ecosystems.

The following **ten theses** outline how this potential-driven path toward greater technological and digital sovereignty can be practically achieved using the Industrial Stack.

* Digital sovereignty means gaining control over digital technologies, data, and infrastructure, ensuring the ability to act freely and securely through the strategic management of technological dependencies.

The Industrial Stack: Significance & Framework for Action

Thesis 1: Technological sovereignty arises from global innovation capacity within a legally secure, fair competitive environment. Even amid geoeconomic upheaval, European industrial companies remain globally engaged.Strategic innovation and technology policies are therefore essential to Europe's independence, turning industrial strengths into resilience and securing the leverage needed to maintain agency in a fragmented world. At the same time, to protect emerging industrial-technological sectors from market distortions like subsidies and currency effects, temporary trade protections and targeted local content requirements can serve as vital tools to promote Europe's innovative strength.

An analysis of the Industrial Stack proves that Europe's innovative strength remains deeply anchored in its industrial and research sectors. Europe continues to be a top global player in industrial digitalization research[2]. Germany clearly demonstrates this, ranking fourth globally in key technologies with distinct strengths in new materials and production technologies[3]

Thesis 2: Technological sovereignty requires a targeted innovation policy that integrates strategic and political objectives with investment initiatives and social criteria. Leverage points emerge only where technological strength intersects with growth markets and geopolitical risk. Instead of scattering public funding widely, Europe must prioritize two key areas. First, it requires strategic foresight and concentrated resources in critical sectors, supported by a financing strategy that treats funding systems and risk transfer as institutional, European-level questions. Second, fiscal policy must better reflect how public infrastructure spending crowds in private investment. Establishing clear, transparent criteria for critical value chains and strategic dependencies enables the creation of robust technology roadmaps. In this regard, Japan's Semiconductor Revitalization Strategy[4] and China's new 2030 Roadmap[5] offer instructive models.

Systematic, coordinated monitoring of capabilities at the national and EU levels can redirect investment away from political showcase projects and toward the deeper layers of the stack—such as post-silicon compute or novel semiconductor architectures. Traditional sectors like chemicals and steel should also be included in this monitoring to ensure that the conditions for innovation leadership and scale within the Industrial Stack are made explicit.

Thesis 3: Political roadmaps and blueprints do not inherently guarantee value creation. Effectively supporting key technologies requires the federal government to act decisively, swiftly, and across departmental lines, integrating the European level from the very beginning. The classic principle of ministerial silos is no match for the complexity of today's transformations. Instead, resources must be pooled to fit the task at hand and deployed through flexible European delivery vehicles—especially during the critical implementation phase.

Value is created where things get made. Accordingly, the European Competitiveness Fund provides targeted production support so that key technologies can mature and scale in real manufacturing environments. Agencies like SPRIND[6] demonstrate how federal bottlenecks can be bypassed and Germany's structural inertia broken. Thanks to the SPRIND Freedom Act, the agency operates free from rigid budget cycles, enabling agile project management and predictable funding. Going forward, industry must be integrated even more closely into these instruments to fully capture the synergies between political goals and industrial ventures.

Thesis 4: Technological sovereignty entails risks—its economic and social viability requires shared responsibility among policymakers, the financial sector, and industry. Because geoeconomic risks are routinely underpriced in favor of short-term cost efficiency, government and industry must jointly de-risk investments deep within the value chain, bolstered by the active engagement of the European financial system. Alongside a clear strategic vision, Europe requires a compelling public narrative—one that frames selective technological self-determination as a cornerstone of lasting European prosperity.

Public-private financing vehicles like the High-Tech Gründerfonds[7] and the federal DeepTech & Climate Fonds[8] demonstrate how risk-sharing with industry can succeed during the growth phase, even if the utilization of certain instruments remains modest. Furthermore, targeted public investments in key technologies should be linked to employment criteria—such as measurable regional impacts on jobs, skills, and value creation—to foster public support for the broader sovereignty agenda.

The Industrial Stack: Key Technologies for the Next Generation

Thesis 5: Europe's competitive strength lies in the seamless integration of next-generation key industrial technologies directly on the factory floor. Technological sovereignty has an unmistakably physical dimension, extending from industrial equipment to the raw materials upon which key technologies depend. The Industrial Stack therefore spans not just cloud computing and AI, but also classical robotics, sensing, and modern control technology. Combined with industrial AI, shop-floor networking (5G/6G, TSN), digital twins, and embedded software, these elements form the foundation for productivity, quality, and resilience in tomorrow's industrial operations. Realizing this potential for the next generation requires establishing the structural conditions for industrial scale-up early on. Europe's existing strengths—particularly in microlithography, automation software, and laser and photonics technologies—warrant systematic backing, as they are already highly exportable and strategically defensible.

Three areas clearly illustrate where Europe's industrial potential is strongest:

- *Industrial AI & digital twins:* Combining European engineering expertise with industrial AI delivers market-leading precision in process control. A focus on zero-defect manufacturing significantly reduces scrap and energy consumption, positioning European industry as a leading provider for the green transformation[9].
- *Automation software:* European market leaders hold critical positions in programmable logic controllers and global manufacturing standards. Establishing OPC UA as a universal, European-made machine language represents a major strategic opportunity, especially given that 82% of Industry 4.0 frontrunners already utilize it[10].
- *Lasers & photonics:* Germany commands over 40% of the global market for industrial beam sources, occupying a vital role in deep-tech fields like quantum technology. Furthermore, corporate expertise in EUV lithography grants Europe a strategic gatekeeper function within the global semiconductor industry[11].

Thesis 6: The expertise of highly skilled professionals serves as a driving force behind the development of next-generation key technologies. When employees have a meaningful voice, companies perform better—operating more sustainably, profitably, and innovatively[12]. Workers actively drive innovation, develop future strategies for entire sites, help secure jobs, and shape training and upskilling initiatives. Crucially, they also ensure that these innovations actually succeed in real-world application.

Unlocking this potential requires strengthening vocational and continuing education alongside co-determination, as well as investing in targeted upskilling—especially in key technologies. Workplace co-determination and social partnerships represent a genuine European competitive advantage

Thesis 7: Europe's future prosperity relies on the sovereign use of industrial data generated by the seamless integration of IT and OT across the value chain. To scale this model globally, federated data spaces must be designed to ensure that, where necessary, data sovereignty remains in Europe—a crucial priority for the future. Data regulations must be revised accordingly to guarantee the protection of trade secrets in the manufacturing industry. Combining domain-specific knowledge, high-quality data, and targeted AI creates a distinct competitive advantage. However, a key precondition is providing companies with greater financial headroom to invest in data utilization.

At the Siemens factory in Amberg, roughly 2,800 automation components drive a value chain that is 75% automated. Utilizing Industrial Edge, this system analyzes nearly 50 million data points daily to ensure reliable delivery to 60,000 customers worldwide[13]. Initiatives like Germany's Manufacturing-X aim to scale these successes across the entire supply chain through decentralized data

spaces. At present, however, legal uncertainty, a lack of standards and interoperability, and a hesitant investment climate are slowing widespread implementation.

The Industrial Stack: Areas for Action

Thesis 8: A stronger Single Market, built upon the deeper harmonization of legal standards, is a fundamental prerequisite for sovereignty. Europe must overcome the market fragmentation that currently holds back 75% of its innovative companies[14]. To drive industrial digitalization, the Commission's "One Europe, One Market" plan should deliver integration by 2028, built upon uniform APIs, common approval regimes for B2B software, and deemed approval for industrial permit applications that align with the strategic vision. While the Draghi and Letta reports have supplied this strategic vision, member states still lack a genuinely shared European perspective. Only by removing legal barriers—without compromising labor laws, data protection, or environmental and sustainability standards—can the Single Market become a solid foundation for European prosperity.

A serious deficit is evident, for example, in the ongoing lack of interoperability across industrial data spaces. While American and Chinese competitors are rapidly scaling up within data markets and providing vital data to capital markets, the EU-wide introduction of digital product passports and digital identities—including those for industrial assets—remains in its infancy.

Thesis 9: Structural competitive disadvantages, fragmented capital markets, and a culture of risk aversion are choking private investment in Europe. With €300 billion in private capital flowing to the US every year[15], Europe is effectively exporting its own future. In Germany, only 25% of companies currently plan R&D investments through the end of 2026—a steep decline from 45% in 2022[16]. Beyond completing the Capital Markets Union and enacting fundamental structural reforms, private investors require a new framework. This framework must incentivize venture capital to fund future technology fields, such as dual-use goods and climate tech, while easing the associated regulatory burdens. Ultimately, the goal is to make innovation spillovers—across defense capabilities, industrial decarbonization, and the electrification and digitalization of production, transport, and buildings—commercially attractive[17].

Where private markets alone fall short but Europe possesses strong potential, direct funding instruments like the European Competitiveness Fund should act as targeted incubators for high-risk key technologies and provide a new form of production support for scaling the Industrial Stack. Additionally, strategic risk facilities must be established to mobilize private capital, such as state de-risking through first-loss tranches[18]. This requires an institutional framework for assuming risk that avoids relying solely on state-backed contracts for difference and offtake agreements for individual technologies—as seen with the European Hydrogen Bank[19]. Instead, it should ensure broad-based support aimed at guiding the broader industrial transformation.

Thesis 10: Europe should play its industrial base as its primary strategic card and expand it through intensive international partnerships. Sovereignty grows through strategic cooperation that positions European industry as an attractive anchor for complementary partners. A unified market rooted in open standards and interoperability will generate the gravitational pull needed for a digital ecosystem "Made in Europe." Unlocking this potential requires existing partnerships[20]—with frontrunners such as Japan, South Korea, Canada, and India—to move rapidly from mere declarations of intent to operational supply chains, joint industrial projects, and shared innovation spaces. In parallel, Europe must forge new partnerships, particularly with countries in the Global South, to secure multilateral data alliances, open export markets, and reliable access to critical resources against systemic rivals. Recent export restrictions in the Chinese battery sector—including temporarily tight-

ened controls on lithium-ion components and rare earths—serve as a stark case in point.

The local content approach currently under discussion secures industrial capacities and generates innovation and economies of scale through local demand. However, an overly rigid implementation jeopardizes European competitiveness and strains strategic partnerships. Therefore, the Industrial Accelerator Act (IAA) should pursue a pragmatic understanding of "Made in Europe." To counter circumvention practices and foreign local content requirements, exemption rules must initially remain strategically narrow. In parallel, the mutual dismantling of local content requirements with complementary partners should be actively advanced. In doing so, the IAA can transition from a defensive instrument into a powerful catalyst for growth[21].

Endnotes

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