

# NITI FRONTIER TECH RADAR

Issue 1

08<sup>th</sup> September 2025

## A. FRONTIER TECH HUB INSIGHTS

### Overview

#### Insights

##### The Rise of Tech Diplomacy: Power in the Age of Technology Control

In the 20th century, oil defined the levers of global influence; in the 21st, technology has taken its place. Today, the control of supply chains, standards, and strategic alliances forms the core of geopolitical power. Traditional economic and military power is being replaced by control over semiconductors, AI, and critical minerals, where chokepoints and alliances shape technological advantage. Regulation, digital infrastructure exports, and global standards have become powerful tools of geopolitical influence, with China, the U.S., and the EU competing to set the rules. Emerging tech alliances and biotechnology mark the next frontier, and nations that build sovereign capabilities and shape global standards will secure strategic autonomy in the 21st century.

**Detailed Analysis Available At:** Page 4

*Authored By: Debjani Ghosh, Distinguished Fellow, NITI Aayog, Chief Architect, NITI Frontier Tech Hub*

##### The US–EU Trade Agreement

The 28 July 2025 US–EU trade framework sets a roadmap for cross-Atlantic integration in energy, AI, semiconductors, defense, and tech supply-chain security. The EU has committed to purchase \$750 billion in U.S. energy and \$40 billion in AI chips by 2028, while European firms are expected to invest \$600 billion in strategic U.S. sectors. Tariff ceilings, rules-of-origin, and regulatory alignment in frontier tech aim to stabilize flows and deepen cooperation. By harmonizing tech security standards, coordinating export controls, and consolidating digital infrastructure, the framework establishes a transatlantic innovation zone, strengthening their control and likely resulting in creating exclusion risks for third countries.

**Detailed Analysis Available At:** Page 7

*Authored By: Simran Kathuria, Consultant Grade – 1, NITI Aayog*

## B. TECH ALERTS

### **1. FTC Warns Big Tech Against Applying EU's Digital Services Act (DSA)**

31 August 2025

The U.S. Federal Trade Commission, led by Chair Andrew Ferguson, issued a stern letter on August 21, 2025, to major tech firms, including Google, Meta, Amazon, Microsoft, and Apple. The FTC emphasised that these companies must not let compliance with the European DSA override U.S. law, especially regarding freedom of speech and end-to-end encryption protections guaranteed by the First Amendment and Section 5 of the FTC Act. The FTC demanded clarity on how these firms will manage conflicting international regulations.

**Source:** <https://www.wired.com/story/big-tech-companies-in-the-us-have-been-told-not-to-apply-the-digital-services-act/>

### **2. Trump Threatens Tariffs Against Countries Imposing Digital Taxes**

26 August 2025

On August 25–26, 2025, former President Trump warned via Truth Social that the U.S. would impose tariffs and export controls, particularly on semiconductors, against countries that enact digital taxes or regulations targeting U.S. tech firms. He singled out nations with such policies, including several in Europe and Canada, and this stance has raised concerns among chipmakers like Nvidia and AMD.

**Source:** <https://www.wsj.com/politics/policy/trump-threatens-new-tariffs-on-countries-that-tax-tech-companies-cf5ae48f>

### **3. France & Germany Push Back, EU Antitrust Chief Defends Sovereignty**

30 August 2025

In response to Trump's threats, France and Germany reaffirmed that digital regulation and taxation are sovereign matters and vowed reciprocal action if U.S. pressure persists. They defended the EU's Digital Markets Act (DMA) and Digital Services Act (DSA) as universally applied, not designed to target U.S. companies. Meanwhile, Teresa Ribera, the European Commission's antitrust chief, urged the EU to stay firm, warning that weakening digital laws to appease the U.S. could jeopardize consumer protection values and regulatory autonomy, even suggesting the EU walk away from trade concessions if pressured.

**Source:** <https://www.reuters.com/technology/france-germany-reject-trumps-threats-eu-tech-legislation-2025-08-29/>

#### **4. U.S. States Advance AI Laws as Federal Preemption Fails**

30 August 2025

With a federal Republican-backed push for a 10-year moratorium on state-level AI laws falling apart, nearly half of U.S. states are now either considering or have passed their own AI regulations. This fragmented approach increases the compliance burden and litigation risk for major tech players like Meta, Alphabet, Amazon, and Microsoft, who had advocated for a uniform federal standard.

**Source:** <https://www.investopedia.com/state-by-state-ai-laws-and-your-tech-stock-investments-11776587>

#### **5. Debate Over Tech Giants' Power and Regulatory Challenges**

28 August 2025

An opinion piece highlights how tech giants now wield immense economic and political influence, outstripping traditional monopolies like Standard Oil. Unlike earlier monopolies, these companies operate in global digital spaces, evading national regulation and exploiting opaque tax systems. The debate explores possible remedies, from collective ownership to "data unions", while stressing the need for greater public awareness about the regulatory imbalance.

**Source:** <https://www.thetimes.co.uk/article/tech-titans-cant-be-tamed-as-robber-barons-were-dxxr5bvp6>

#### **6. US Puts GDP Data On The Blockchain In Trump Crypto Push**

28 August 2025

The U.S. government began releasing GDP data on public blockchains as part of President Trump's broader crypto push. The initiative, led by the Department of Commerce, adds blockchain distribution as an additional channel for official economic releases, rather than replacing traditional methods. Officials explained that this approach is intended to make U.S. economic data more immutable, globally accessible, and tamper-resistant. The GDP report was simultaneously published on nine blockchains. Looking ahead, the Commerce Department suggested it may expand this on-chain publication model to other macroeconomic indicators, marking the first step in reshaping how official data is disseminated.

**Source:** <https://www.bloomberg.com/news/articles/2025-08-28/us-puts-gdp-data-on-the-blockchain-in-trump-crypto-push>

## DETAILED INSIGHTS

### A.1. The Rise of Tech Diplomacy: Power in the Age of Technology

#### Control

In the 20th century, oil defined the levers of global influence; in the 21st, technology has taken its place. Today, the control of supply chains, standards, and strategic alliances forms the core of geopolitical power. Diplomacy is being reshaped into “tech diplomacy,” where export controls, regulatory frameworks, and the formation of coalitions are central to modern statecraft.

#### *From Traditional Power to Technopolitics*

For decades, national power was measured by economic scale, industrial capacity, and military might. Now, semiconductors, algorithms, data flows, quantum computing etc are defining the axis of power. Mastery over these resources determines both resilience in crisis and lasting influence on the global stage. Technology today is not simply a tool of power; it is power.

Unlike oil, advanced technologies cannot be collected and stored in reserve. They require years of research, enormous investment, and complex supply chains with chokepoints that are difficult to replace. The control of these critical nodes—like a single fabrication plant or a refining facility for rare minerals—offers outsized leverage, allowing those in control to shape global realities. Contemporary tech diplomacy pursues two parallel tracks: reinforcing domestic capabilities while building alliances to secure and diversify supply chains.

#### *Key Emerging Trends*

- a. Semiconductor foundries have become the most influential chokepoints of the digital era. As of Q1 2025, Taiwan's TSMC commands 67.6% of the global pure-play wafer foundry market, far outpacing the competition. The Netherlands' ASML maintains a near-total monopoly as the world's sole supplier of extreme ultraviolet (EUV) lithography equipment essential for cutting-edge chip manufacturing. In memory chips, South Korea's Samsung and SK Hynix together account for more than 60% of global production.
- b. Strategic Leverage: Recent U.S. export controls on semiconductor manufacturing equipment and high-performance memory, aimed at China, illustrate how these chokepoints are used to limit rivals' technological advancement. The Netherlands' decision to assert greater autonomy over ASML export licenses also highlights how allies balance sovereignty over key technology assets.
- c. Vulnerability: These bottlenecks underpin all advanced digital technologies—from artificial intelligence and quantum computing to 5G and space systems. Their extreme concentration in only a few locations means that geopolitical shocks, whether through conflict or sanctions, can paralyze entire technological ecosystems. As observers put it: “Control chips, control everything.”
- d. Critical Minerals: China refines nearly 90% of the world's rare earths, processes about 70% of lithium, and dominates 60% of global cobalt supply chains. Its combination of export restrictions (on gallium, germanium, antimony in 2024) and selective tech sharing (with Malaysia, for instance) demonstrates sophisticated supply chain management. In response, the U.S. and partners such as Ukraine, Australia, and Japan are investing in alternative supply chains, though overcoming China's two-decade lead will take time.
- e. Space Systems: The race extends to orbit. China's Qianfan satellite megaconstellation envisions 14,000 satellites by 2030—rivalling SpaceX's Starlink. The EU's IRIS<sup>2</sup> initiative targets secure continental connectivity, while ESA's SOLARIS project explores orbital solar power. Whichever coalition achieves operational dominance in low-latency broadband or orbital energy will secure new forms of diplomatic leverage.

- 2. Regulation and Governance as Geopolitical Tools:** Regulatory frameworks are beginning to shape the “rules of the road” for cutting-edge fields: The 2025 U.S. AI Action Plan combines research funding, export controls, and talent incentives to reinforce U.S. leadership in artificial intelligence. The EU’s AI Act imposes strict, risk-based compliance requirements, setting global norms enforced through market access. China, meanwhile, pours state resources into domestic champions shielded by supportive regulation.
- 3. Digital Infrastructure Dependence:** Over 140 countries are now connected via more than 1,300 Chinese-backed digital infrastructure projects. Huawei technologies support 70% of Africa’s 4G networks and lead 5G deployment in emerging markets. Such engagements generate deep, persistent dependencies—making long-term supplier diversification and interoperability with non-Chinese platforms extremely difficult. For recipient nations, economic incentives to adopt low-cost Chinese technology often obscure long-term vulnerabilities: loss of data sovereignty, restricted diversification of suppliers, and difficulty integrating with non-Chinese platforms.
- 4. Standards Leadership:** China’s influence in international standards organizations has grown through strategic personnel placement and systematic proposal submission. The Made in China 2025 and China Standards 2035 strategies explicitly target global technology standards in 5G, IoT, and AI, as a route to worldwide influence.
- 5. The Rise of Tech Alliances:** Beyond Traditional Blocs: U.S. and Partners: The Chip 4 Alliance—linking the U.S., Taiwan, Japan, and South Korea—now controls the entire advanced semiconductor value chain: from U.S. fabless design (62% of global revenues) to Taiwan’s manufacturing, Japan’s equipment (35% market share), and Korea’s memory chip leadership. Alliances such as AUKUS have expanded to cover quantum, AI, and hypersonic systems. The Quad’s new working groups and investment networks further deepen technological ties among like-minded democracies.

### The Next Frontier of Tech Diplomacy: Biotechnology

Biotechnology represents an underexplored but critical dimension of technological control with profound national security implications. The US leads in synthetic biology and CRISPR applications, while China operates the world’s largest genomic databases and has achieved significant advances in AI-driven drug discovery.

The COVID-19 pandemic revealed how health technologies become geopolitical capital, with vaccine diplomacy influencing major infrastructure decisions like Brazil’s reversal on Huawei 5G participation. The intersection of AI and biotechnology creates new forms of biological technology dependency, while advances in synthetic biology raise concerns about dual-use applications.

China’s genomic database dominance, combined with AI capabilities, creates potential chokepoints in personalized medicine and biological research. The US response includes restrictions on biotechnology exports and investment screening for biological data collection, recognizing biotechnology as a domain of strategic competition equivalent to semiconductors.

### Strategic Imperatives for Tech Diplomacy

- 1. Institutionalize Multilateral Tech Coalitions:** Create enduring bodies that integrate governments, leading technology firms, and research institutions to synchronize standards, supply-chain security, and investment across critical technology domains.
- 2. Proactive Critical Technology Assessment:** Establish agile mechanisms to identify emerging chokepoints— AI-biotech, quantum-cyber, space-energy intersections—and coordinate early-stage investments and policy safeguards before dependencies ossify.

- 3. Regulatory Harmonization and Standards Leadership:** Democracies must harmonize AI, data, and telecom regulations to prevent fragmentation and ensure a level playing field. Coordinated standard-setting will preempt authoritarian alternatives that exploit regulatory divergence.
- 4. Sovereign Capability Development:** Launch targeted public-private ventures—chip fabs, quantum testbeds, biotech hubs, satellite constellations—to reduce reliance on external providers and signal credible deterrence against supply-chain disruptions.
- 5. Elevate Tech Diplomacy in Foreign Policy:** Embed dedicated tech envoys within diplomatic missions, negotiate technology components in trade agreements, and convene regular high-level dialogues on emerging tech risks and opportunities.

### Conclusion: Navigating the Technopolitical Century

As the lines on tomorrow's geopolitical map shift from oil pipelines and troop deployments to networks of semiconductors, satellites, and data streams, nations must adapt their diplomatic playbooks. Technology control has evolved from an ancillary aspect of national power to its very foundation: those who master ecosystem sovereignty, forge resilient alliances, and shape global standards will emerge as the great powers of the 21st century. Passive adoption of foreign technologies invites erosion of sovereignty; decisive action to build, govern, and defend sovereign technology stacks will secure strategic autonomy in the age of "technopolitics."

## A. 2. The US–EU Trade Agreement

### Overview

Following the 28 July 2025 trade deal announcement between the United States (US) and the European Union (EU), this article highlights key developments arising from the joint agreement framework statement issued by both parties on 21 August 2025, which is political in nature and not yet legally binding.

As such, the statement provides clarity on the trade agreement framework and the directions for future economic integration and strategic coordination between the transatlantic parties.

### Key Aspects In The Framework on the Agreement on Reciprocal, Fair, and Balanced Trade

**a. Energy and AI Cooperation (Clause 5 of the Framework):** US & EU have committed to enhancing collaboration around secure, reliable, and diversified energy supplies and technological advancement, specifically involving AI.

As such, the clause specified that:

- i. EU will purchase \$750 billion in US energy, including liquefied natural gas, oil, and nuclear products, through 2028. Additionally, the EU intends to procure at least \$40 billion in US AI chips for its computing centres over the same period. These acquisitions aim to upgrade European digital and energy infrastructure, while supporting US innovation and manufacturing.
- ii. Both parties will address non-tariff barriers that may limit bilateral energy trade and pledge to harmonise technology security requirements to avoid technology leakage to undefined “destinations of concern” and ensure alignment with American controls. The US will facilitate exports once such security requirements are confirmed, reflecting a joint effort to bolster supply-chain resilience and innovation, especially in critical sectors like energy and AI.

**b. Tariff Structure & Market Access (Clause 1-4 of the Framework):**

- i. A uniform 15% tariff rate will be applied to the vast majority of EU exports to the US, including semiconductors, marking a reduction from previous or proposed higher rates (up to 30%). This ceiling will prevent further tariff escalation.
- ii. Select “strategic goods” identified by the EU will enjoy zero tariffs or special treatment, with both sides recognising mutual standards for automotive and industrial products.
- iii. A rules-of-origin mechanism will be established to ensure benefits are shared equitably between the US and EU.

**c. Strategic Investments (Clause 6 of the Framework):** EU companies will invest \$600 billion in strategic US sectors (energy, AI, manufacturing, etc.) by 2028, deepening transatlantic economic ties and strengthening commitments to mutual growth. The agreement signals increased European participation in the US economy, especially in critical and innovative domains.

**d. Defense Procurement and NATO Interoperability (Clause 7 of the Framework)** The EU has indicated that they will increase defence procurements from US firms, enhancing NATO alignment and defence tech cooperation.

**e. Regulatory Alignment (Clause 8-13, 15, & 17 of the Framework):** Both parties have agreed to cooperate on removing non-tariff trade barriers and aligning regulatory standards in areas like digital transmissions and mutual recognition of product certifications. In particular:

- i. Parties will mutually recognise each other’s automobile standards and enhance technical cooperation on industrial conformity assessments;
- ii. Both parties will work to streamline sanitary certificate requirements;
- iii. Parties have committed to negotiating a mutual recognition agreement on cybersecurity;

- e. Critical Minerals and Export Controls (Clause 14 of the Framework):** The US and EU have committed to coordinating actions related to the imposition of export restrictions on critical minerals and other similar resources by third countries.
- f. Economic Security and Supply Chains (Clause 19 of the Framework):** Broad cooperation on investment screening, export controls, anti-evasion, and procurement reciprocity to counter non-market practices and ensure resilient supply chains.

### Impact of US-EU Trade Framework on AI, Energy, Tech Access & Supply Chains

As previously stated, the renewed terms of this transatlantic trade agreement will have a lasting impact on AI, energy, tech access & supply chains, with major implications for third countries, including India.

**The Threat of Transatlantic Gatekeeping:** The US-EU commitment to harmonise technology security standards and enforce coordinated export controls effectively consolidates a transatlantic zone of innovation. This includes preferential access to the latest chips, secure cloud infrastructures, and strategic supply chains. The undefined and potentially discretionary application of “destinations of concern” criteria introduces ambiguity, raising the risk of arbitrary denial of technology access to third countries. Simultaneously, the alignment of cybersecurity benchmarks, IP enforcement, and mutual standards may result in reinforced Western control over critical digital and digital adjacent infrastructure, pushing toward dependency on other, often problematic and less advanced, suppliers.

**Strategic Exclusion through Standards & Origin Rules:** By institutionalising rules of origin and mutual recognition of technical standards, the US and EU are laying the groundwork for an exclusive economic bloc with seamless intra-zone trade in goods, services, and emerging technologies. While not explicitly exclusionary, the framework may “de facto” marginalise third-country manufacturers, service providers, and energy exporters, particularly those unable or unwilling to conform to the bloc’s evolving regulatory regime.

**Energy-Tech Coupling as a Geoeconomic Lever:** The EU’s \$750 billion energy procurement from the US, tied to AI and chip cooperation, significantly diminishes the bargaining power of non-aligned energy producers, especially when viewed with respect to the other energy deals brokered with Middle Eastern countries by the US. Similarly, joint efforts to harmonise supply chain policies, including investment screening, export controls on critical minerals, may further expose countries like India to supply-side vulnerabilities.

**Way Forward:** The US-EU framework marks a new phase of transatlantic gatekeeping, one that could redefine global value chains and standard-setting authority. For India, this signals the need for calibrated responses:

- Domestically, for the long run, by accelerating indigenous capabilities; and
- Diplomatically, for the short run, by forging diversified partnerships.

**Source:** White House & EU Statement/ Q&A:

<https://www.whitehouse.gov/briefingsstatements/2025/08/joint-statement-on-a-united-states-european-union-framework-on-an-agreement-on-reciprocal-fair-and-balanced-trade/> ;  
[https://policy.trade.ec.europa.eu/news/joint-statement-united-states-european-union-framework-agreement-reciprocal-fair-and-balanced-trade-2025-08-21\\_en](https://policy.trade.ec.europa.eu/news/joint-statement-united-states-european-union-framework-agreement-reciprocal-fair-and-balanced-trade-2025-08-21_en); and  
[https://ec.europa.eu/commission/presscorner/detail/en/speech\\_25\\_1977](https://ec.europa.eu/commission/presscorner/detail/en/speech_25_1977) ;  
[https://ec.europa.eu/commission/presscorner/detail/en/qanda\\_25\\_1974](https://ec.europa.eu/commission/presscorner/detail/en/qanda_25_1974) (dated 21 August 2025)