

How Nations Shape the Future of their Technology Sovereignty

Technology sovereignty is crucial in today's geopolitical landscape, as countries face supply chain disruptions, cybersecurity threats and increasing competition in emerging technologies like artificial intelligence (AI), quantum computing and semiconductors. Ensuring technological sovereignty allows nations to safeguard their digital assets, drive innovation and maintain economic and national security. By anticipating future technological risks and opportunities, nations can craft long-term strategies for resilience and self-sufficiency, preparing for disruptions and strategically investing in critical technologies. Below are several countries' technology sovereignty initiatives and the key factors driving their actions.



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European Union

Pioneering Digital and AI Sovereignty with Proactive Initiatives



Twinning the green and digital transition in the new geopolitical context brings a forward-looking and comprehensive perspective on the interplay between the twin transitions towards 2050. Both transitions are at the top of the EU's political agenda and their interaction will have massive consequences for the future.



While they are different in nature and each subject to specific dynamics, their twinning – i.e., their capacity to reinforce each other – deserves closer scrutiny. Better understanding these interactions is key to maximising their synergies and minimising their tensions. This is essential in the current geopolitical context where the EU aims to accelerate both green and digital transformation, ultimately strengthening the EU's resilience and open strategic autonomy.

Technology Sovereignty Actions

Enactment of the EU Chips Act in 2023

The Chips Act is a unique opportunity for Europe to act jointly across all Member States, to benefit Europe as a whole.

1. For the medium term, the Chips Act will strengthen manufacturing activities in the Union and support the scale-up and innovation of the whole value chain, addressing security of supply and a more resilient ecosystem.
2. For the long-term, it will maintain Europe's technological leadership while preparing the required technological capabilities that would support the transfer of knowledge from the lab to the fab and position Europe as a technology leader in innovative downstream markets.

Gaia-X Project

Building a secure and federated data infrastructure that promotes interoperability and data sovereignty across Europe, aims to enhance Europe's digital independence by creating a trusted data ecosystem that supports innovation, competitiveness and the responsible use of data. Doing so ensures that European businesses and individuals retain control over their digital assets.

AI Act

The EU's "AI Act" is a comprehensive legal framework designed to regulate the development and use of AI within the EU. This act aims to ensure that AI aligns with European values like privacy, fairness and human agency. It also promotes digital independence by establishing strict standards for AI systems deployed within the bloc, effectively creating a "trustworthy AI" environment within the EU market; this means that AI systems used in Europe must be developed and deployed in a way that safeguards fundamental rights and protects citizens from potential harm associated with AI technology.



China

Strategically Planning for Long-Term Tech Independence



China's Five-Year Plans outline economic and technological development goals, emphasising significant investments in semiconductor research and development, aiming to reduce reliance on other countries by 2035. In addition, China aims to become a global leader in artificial intelligence by 2030, as detailed in its national AI development plans.



To achieve technological self-sufficiency and reduce dependence on foreign technology.

Technology Sovereignty Actions

Made in China 2025

focuses on reducing dependence on foreign technology in critical sectors, including semiconductors, artificial intelligence and telecommunications. The initiative aims to enhance domestic manufacturing capabilities and foster innovation.

Cyber Sovereignty

Building a secure and federated data infrastructure that promotes interoperability and data sovereignty across Europe, aims to enhance Europe's digital independence by creating a trusted data ecosystem that supports innovation, competitiveness and the responsible use of data. Doing so ensures that European businesses and individuals retain control over their digital assets.

Investment in Future Tech

The Chinese government is investing heavily in emerging fields like quantum computing and AI, recognising their potential to drive global innovation and economic growth. China has increased government spending on quantum technology development to approximately USD 15 billion and now publishes more quantum-related research papers annually than any other country.



India

Fostering Comprehensive Digital Public Infrastructure for Sovereignty



A comprehensive plan, "Vision India@2047," aims to position the nation as a leader in technology and governance by its centennial of independence .



- Economic and National Security: By investing in homegrown tech solutions, India enhances cybersecurity, data privacy and resilience against external threats critical in an era of geopolitical tech rivalries.
- Global Leadership in Emerging Tech: The initiative fosters India's leadership in AI, blockchain and 5G/6G, positioning it as a global hub for technology exports rather than just a consumer of foreign tech.

Technology Sovereignty Actions

Aatmanirbhar Bharat (Self-Reliant India)

Focuses on boosting local manufacturing across sectors, including electronics and semiconductors, to reduce dependence on imports .

India Stack

A pioneering digital infrastructure comprising components like Aadhaar (unique identity system), Unified Payments Interface (UPI) and DigiLocker, facilitating secure and efficient digital services.

India Semiconductor Mission

Dedicated to building a robust semiconductor and display ecosystem, aiming to establish India as a global electronics manufacturing and design hub.



Singapore

Smart Nation Strategy and Foresight Planning



Singapore develops long-term technological scenarios to inform policy-making and prepare for future challenges.



- **Policy Agility and Competitive Edge:** By preparing for multiple future tech scenarios, Singapore can adapt quickly to global shifts – whether it's AI governance, data sovereignty regulations, or next-gen cybersecurity threats. This gives the nation a competitive edge in shaping global digital norms rather than just following them.
- **Strategic Independence:** Enables Singapore to chart its technological course rather than being reactive to external pressures. The government can craft policies that bolster national resilience and digital autonomy by forecasting potential supply chain risks, cyber threats, and global tech shifts.
- **Ensuring National Security and Digital Resilience:** Emerging technologies, such as cyber warfare, AI ethics and quantum threats, pose risks that could compromise national security. Long-term scenario planning ensures Singapore's policies stay ahead of threats, securing its cyber borders and digital sovereignty.

Technology Sovereignty Actions

Digital Economy Framework

Central to Singapore's strategy is the Smart Nation Initiative, which unites businesses, government, communities and citizens to drive the nation's digital transformation. The Digital Enterprise Blueprint (2024) focuses on harnessing AI, integrating digital solutions, enhancing cyber resilience and upskilling workers, thereby encouraging homegrown startups and promoting sovereign cloud computing.

Cybersecurity Strategy

GovTech's Cyber Security Group leads the nation's cybersecurity efforts by monitoring, detecting and responding to cyber incidents across the government, ensuring digital resilience and independent data protection.

GovTech Agency

As the lead agency for Singapore's digital transformation, GovTech develops and implements innovative public sector AI solutions and digital services, enhancing the nation's technological self-reliance.



Estonia

Smart Nation Strategy and Foresight Planning


 What is it?

Estonia secures its technology sovereignty through cybersecurity, digital identity, decentralised data storage and homegrown innovation. By leveraging blockchain, AI and digital infrastructure, Estonia has built one of the world's most digitally advanced and cyber-resilient nations.


 Why does it matter?

Estonia reduces reliance on foreign technology by developing homegrown tech solutions and promoting open-source innovation. Its digital-first economy supports entrepreneurship, fintech and AI, making it a key hub for tech startups and digital transformation.

Technology Sovereignty Actions


e-Estonia Initiative:

Estonia's comprehensive digital transformation, known as e-Estonia, provides citizens with secure digital identities, enabling access to a wide range of e-services.


Data Embassy Programme:

To safeguard critical data, Estonia has established data embassies – servers in foreign countries that store essential government information. This ensures continuity of services even in the event of domestic infrastructure disruptions.


European Digital Sovereignty Collaboration:

Estonia collaborates with European nations to promote digital sovereignty, focusing on key technologies and the free flow of data within the EU.


Integration into European Power Grids:

In a significant move to reduce reliance on Russian energy systems, Estonia, along with Latvia and Lithuania, successfully transitioned from the Russian electricity grid to the European Union's system in February 2025. This shift enhances energy security and aligns with broader technological sovereignty goals.

In a rapidly shifting world, technology sovereignty is more crucial than ever, enabling nations to anticipate disruptions, secure critical digital assets, and drive innovation. The most successful countries combine long-term vision with strategic investments, ensuring resilience in key sectors such as AI, semiconductors and cybersecurity. As technology continues to evolve, the global landscape will be shaped by the choices nations make today. Will they collaborate to build a shared digital future, or will they double down on digital independence in pursuit of self-reliance?

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