



VOL.10
ISSUE.83

CENJOWS
ISSUE BRIEF

TECHNOLOGICAL SOVEREIGNTY: CHINA'S PURSUIT OF INNOVATION LEADERSHIP AND DIGITAL POWER

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www.cenjows.in



CENJOWS ISSUE BRIEF

Volume 10 Issue 83

OCT 2026



CENJOWS

(Established: 2007)

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CENJOWS was raised in 2007 as an independent think tank, registered under the Societies Registration Act, 1860. This aims to promote Jointness as a synergistic enabler for the growth of Comprehensive National Power and provide alternatives in all dimensions of its applications through focused research and debate.

Starting Year : 2017

Year of Publication : 2026

Frequency : Weekly

Language : English

Publisher : Maj Gen (Dr) Ashok Kumar, VSM (Retd) Director General,
CENJOWS

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Price: Rs 300/- INR

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**Technological Sovereignty:
China's Pursuit of Innovation
Leadership and Digital
Power**



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The Sharpest Terrain of Competition

The preceding chapter examined how the Chinese Communist Party manages the internal machinery of power and prosperity: the governance-development nexus through which household registration, information control, credit systems, and demographic policy are wielded to sustain a performance-based claim to legitimacy. This chapter turns outward to the domain in which that same claim is tested most visibly on the international stage. Since close to 2015, technology has displaced trade and even military posture as the terrain on which Washington and Beijing measure one another most anxiously. Semiconductors, artificial intelligence models, telecommunications equipment, electric vehicles, and the applications that sit on top of them are no longer treated as commercial products alone; they are treated as instruments of state power, and access to them is rationed, denied, and fought over accordingly.

The organising concept of this chapter is technological sovereignty: the ambition, articulated with increasing explicitness in Chinese industrial policy since the mid 2010s, to control the entire technology stack, from fundamental research and component fabrication through platforms, standards, and data, so that no external actor can interrupt it at will. Sovereignty in this sense is not a synonym for isolation. Huawei's¹ telecommunications equipment, DeepSeek's open-weight language models, and BYD's electric vehicles are all designed for maximal global diffusion. The sovereignty being sought is a sovereignty of control over one's own dependencies, paired with an ambition to make others dependent in turn. This is, in other words, an extension of political sovereignty by other means, and it draws on the same instruments of mobilisation, state banks, guidance funds, procurement mandates, and party-directed coordination across firms that the previous chapter identified in the domestic governance sphere.

What follows traces China's uneven passage from technology adopter to technology competitor across five arenas: telecommunications and computing hardware, embodied above all in Huawei; the semiconductor supply chain that underwrites all of the above; artificial intelligence, where DeepSeek's 2025 debut reordered global assumptions about cost and capability; electric vehicles, where BYD's export surge has made China the world's largest vehicle exporter; and the platform economy, where the prolonged fight over TikTok's American² operations has turned data governance and algorithmic control into questions of national security. A final section considers how the same surveillance and information-management infrastructure built for domestic governance is now being exported through the Digital Silk Road, extending the Party's model of technologically mediated control into partner states well beyond China's borders.

From Assembly Line to Innovation Frontier: The Policy Architecture

China's pivot from manufacturing intermediary to innovation contender did not emerge spontaneously from market forces; it was engineered. The 2015 "Made in China 2025" plan named ten strategic sectors, including next-generation information technology, robotics, aerospace, and new energy vehicles, in which the state committed to reducing reliance on foreign inputs and building indigenous champions. Barry Naughton has

described the resulting model as techno, nationalist industrial policy: a system in which the state does not simply subsidise favoured firms but actively directs capital, sets localisation targets, and coordinates research institutes, state banks, and enterprises toward specific technological objectives (Naughton 2021). Xi Jinping's more recent formulation of "new productive forces" (新质生产力) recasts this same ambition in the language of quality-driven growth, positioning frontier technology as the successor engine to the investment and export-led growth model examined in the previous chapter.

Western economists have tended to read this apparatus through the lens of overcapacity and subsidy distortion, the same critique long levelled at Chinese steel, solar panels, and now electric vehicles and batteries. Chinese officials, by contrast, describe it as a "whole-nation system" (举国体制), an updated version of the mobilisation capacity that built the country's nuclear and space programs, now redirected at commercial technology. Both readings are correct in different registers: the model has produced genuine capability gains in several sectors even as it has generated persistent overproduction, price wars, and diplomatic friction with trading partners. The remainder of this chapter examines where that model has delivered a credible claim to innovation leadership and where it continues to run into hard technical and geopolitical limits.

Huawei: From National Champion to Sanctions Target to Sovereign Chipmaker

No firm illustrates the arc of this chapter more completely than Huawei Technologies. Having built global leadership in 5G radio access equipment through the 2010s, Huawei was placed on the United States Entity List in 2019, cutting it off from American semiconductor design tools and, critically, from Taiwan Semiconductor Manufacturing Company's advanced foundry services. The company's response over the following six years has become the clearest case study of China's attempt to substitute domestic capacity for a severed foreign supply chain.

That substitution has been only partially successful, and the gap between ambition and achievement is instructive. Huawei's Ascend line of AI accelerators, produced in cooperation with Semiconductor Manufacturing International Corporation (SMIC), was

reported in early 2026 to be scaling toward roughly 1.6 million dies for the year, supported by SMIC's progress toward volume production of an N+3, 5-nanometre-class node achieved through repeated deep ultraviolet multi-patterning rather than the extreme ultraviolet lithography tools that Dutch and Japanese export controls continue to deny Chinese fabs. Industry analysts estimate SMIC's yields on this node at roughly thirty to forty percent, well below the eighty percent, plus yields TSMC achieves at comparable nodes, a gap the Chinese state has chosen to subsidise as a matter of strategic necessity rather than short-term commercial logic. A newer chipset, the Ascend 950 series, narrows the practical gap with Nvidia's Blackwell architecture for many Chinese hyperscale workloads by pairing a monolithic die design with Huawei's own high-bandwidth memory interconnect and its CANN software stack, an approach that avoids dependence on TSMC's advanced packaging technology even as it still relies on high-bandwidth memory production that remains a bottleneck for domestic suppliers such as CXMT.

This progress has come alongside a sobering reminder of how porous supply chain sovereignty still is. Technical teardowns established that Huawei's earlier Ascend 910B and 910C chips were built substantially from TSMC, fabricated seven-nanometre dies acquired through Sophgo, a Cayman Islands-registered intermediary, in a scheme that United States authorities determined violated export controls and for which TSMC paid a fine of roughly one billion dollars. Washington, for its part, extended its restrictions from components to end use, issuing guidance in 2025 that the deployment of Huawei's Ascend processors anywhere in the world, not merely their export from the United States, could constitute a violation of American export law, because the chips almost certainly incorporate or were fabricated using American-origin technology. The result, by early 2026, is a bifurcated market: Nvidia's share of AI accelerator sales inside China has fallen from over ninety percent to roughly half, even as its most advanced chips remain formally unavailable there, while Huawei's domestic alternative is real but costlier, less efficient, and still dependent on components China cannot yet manufacture at scale. Huawei's trajectory therefore complicates any simple narrative of Chinese self-sufficiency: it demonstrates genuine, state-subsidised capability acquisition operating in permanent

tension with chokepoints - extreme ultraviolet lithography, advanced memory and packaging - that remain outside Chinese control.

The Semiconductor Supply Chain Contest

Huawei's experience is a microcosm of a broader contest over the semiconductor supply chain that now structures much of the US-China technology relationship. Washington's strategy has layered export control instruments, the Entity List, the Foreign Direct Product Rule, and coordinated restrictions negotiated with the Netherlands and Japan over ASML's extreme ultraviolet lithography systems and Tokyo Electron's deposition and etching tools, to deny China access to the equipment needed for leading-edge logic fabrication, even as American firms continue to sell older-generation chips into the Chinese market under licence. Beijing has answered asymmetrically rather than symmetrically: rather than attempting to match every American restriction chip for chip, it has leveraged its dominance of rare-earth processing and legacy-node chip production as counter-leverage, while funnelling state investment into domestic lithography and etching equipment champions such as SMEE, AMEC, and Naura in an effort to close the equipment gap altogether eventually.

The practical result, evident in the Huawei³ case, is that Chinese firms can now build workable, if not competitive at the frontier, logic and memory devices domestically, at costs and yields that would be commercially uncompetitive without state subsidy. This is a meaningful achievement relative to where Chinese semiconductor manufacturing stood in 2019. Still, it falls well short of the parity with TSMC or Samsung that would be required for genuine technological sovereignty in the sector. The contest has increasingly come to resemble what several analysts have termed a condition of mutually assured technological disruption: the United States can deny China the frontier, but China can now impose real costs on American and allied firms through rare-earth export licensing and market access retaliation, producing an uneasy equilibrium in which neither side can force full capitulation from the other.

DeepSeek and the Artificial Intelligence Sovereignty Shock

If semiconductors illustrate the limits of Chinese technological sovereignty, artificial intelligence illustrates how quickly those limits can be reinterpreted. In January 2025, the Hangzhou-based startup DeepSeek released its R1 reasoning model, claiming performance competitive with leading American systems at a fraction of the reported training cost. The announcement briefly rattled American technology equity markets and forced a broader reassessment, inside and outside China, of the assumption that frontier artificial intelligence necessarily required the largest compute budgets and the most advanced chips.

By 2026, the shock of R1 had given way to a more crowded and, in some respects, more consequential landscape. DeepSeek released a preview of its next major model, V4, in April 2026,⁴ emphasising improved reasoning and greater agentic capability, the ability to act autonomously on tasks such as writing and executing code, while explicitly designing the model to run on domestic accelerators rather than depending solely on Nvidia hardware. Analysts at the Council on Foreign Relations noted that V4⁵ itself trailed the leading American proprietary systems on standard benchmarks, a marked difference from the alarm R1 had generated a year earlier; its significance lay less in raw capability than in its confirmation that China's AI ecosystem no longer depended on any single firm. By mid-2026, Alibaba's Qwen, Moonshot AI's Kimi, ByteDance's Doubao, Zhipu's GLM, and Baidu's ERNIE were all competing for leadership across different benchmarks and use cases, turning what had briefly looked like a DeepSeek story into a story about the depth of China's open model ecosystem as a whole.

The strategic logic of that ecosystem deserves particular attention. Unlike the leading American laboratories, which have generally kept their most capable models closed, DeepSeek and most of its Chinese peers have released their models openly, allowing developers anywhere to download, modify, and deploy them without licensing constraints. This is best understood not as an act of altruism but as a deliberate instrument of statecraft: open-weight distribution accelerates global adoption of Chinese-designed model architectures in exactly the way that low-cost telecommunications equipment once

accelerated global adoption of Huawei's network standards, embedding Chinese technical choices into downstream applications, robotics, e-commerce automation, and enterprise software, across markets the United States has been slower to reach. Sovereignty, in the artificial intelligence domain, in other words, is being pursued less through matching the compute of the frontier than through shaping the terms on which the rest of the world builds on top of it.

BYD and the Reindustrialisation of Global Mobility

Electric vehicles present the clearest case in this chapter of China converting state-guided industrial policy into uncontested global leadership rather than contested parity. BYD,⁶ once a battery manufacturer that diversified into vehicle assembly, surpassed Tesla as the world's largest seller of fully electric passenger vehicles in 2025 and extended that lead through the first half of 2026, delivering roughly 867,000 battery-electric vehicles against Tesla's 838,000⁷ over the same period, with a widening quarterly gap by the second quarter of the year. Unlike the semiconductor and artificial intelligence cases, where Chinese firms remain the challengers to an established American frontier, BYD's⁸ position in electric and hybrid vehicles is now closer to that of an incumbent competitor elsewhere that it must respond to.

The export dimension of this success is central to its geopolitical significance. BYD's overseas sales rose from less than ten percent of its total volume in 2024 to roughly twenty percent by 2026, supported by manufacturing footholds already operating or under construction in Hungary, Turkey, Brazil, and Thailand, and by a stated ambition to exceed 1.5 million overseas deliveries in 2026 alone. This scale is underwritten by the same vertically integrated, state-subsidised model examined earlier in the chapter: BYD's control of its own blade battery chemistry and production, achieved with substantial policy support over the preceding decade, now allows it to undercut competitors on cost even as it approaches technical parity or better on range and charging performance in key market segments. The same success has generated the same diplomatic friction that Chinese industrial policy tends to produce elsewhere: the European Union has imposed countervailing tariffs on Chinese-made electric vehicles on overcapacity and subsidy

grounds, even as European consumers continue to purchase them in growing numbers, illustrating the tension between the political appetite to de-risk from Chinese manufacturing and the market reality of Chinese cost leadership.

TikTok: Platforms, Data, and the Politics of the Algorithm

Where Huawei and the semiconductor contest concern hardware, and DeepSeek and BYD concern models and manufactured goods, the prolonged fight over TikTok concerns something less tangible but no less contested: control over data and the recommendation algorithm that determines what more than one hundred million American users see. The Protecting Americans from Foreign Adversary Controlled Applications Act, passed with bipartisan support in 2024, required ByteDance to divest⁹ TikTok's American operations or face an effective ban, because Chinese ownership created an unacceptable risk of data access and algorithmic influence by the Chinese state. Enforcement of that law was repeatedly delayed by executive order over the following two years even as the underlying statute remained in force.

A resolution of sorts arrived in stages. President Trump announced in September 2025 that a divestiture framework had been agreed with Beijing; the parties signed transaction paperwork in December 2025; and the deal formally closed on January 22, 2026, with the establishment of TikTok USDS Joint Venture LLC, controlled by a consortium of American and allied investors including Oracle, Silver Lake, and the Emirati fund MGX, with ByteDance's remaining stake reduced to a minority position. Oracle assumed the role of designated security partner, tasked with overseeing data governance and retraining the recommendation algorithm on American user data under American jurisdiction, a technical process that industry analysts expect will perceptibly change the platform's feed even if its outward appearance remains familiar to users.

The closure of the deal did not fully resolve the sovereignty question at its core. Members of Congress,¹⁰ including Senator Mark Warner, argued during negotiations that any arrangement preserving ByteDance equity and an ongoing technical relationship would fail to eliminate the influence the 2024 law was designed to end, and advocacy groups

continued to press for fuller public disclosure of the transaction's governance terms even after closing. The TikTok saga¹¹ is worth treating alongside Huawei and semiconductors¹² precisely because it demonstrates that technological sovereignty contests are no longer confined to physical infrastructure; the same anxieties about foreign leverage that animate export controls on lithography equipment now animate disputes over who trains an algorithm and where user data physically resides.

Exporting the Model: The Digital Silk Road and the Globalisation of Surveillance

The preceding chapter described how the Chinese Communist Party (CCP) has built an extensive domestic apparatus of information control and algorithmic social management, the Great Firewall, the Social Credit System, and an expanding network of urban surveillance, as instruments of governance. This chapter's final argument is that the same technologies, and often the same firms, are now being exported abroad through the Digital Silk Road,¹³ the technological arm of the Belt and Road Initiative launched in 2015 to finance submarine cables, 5G networks, data centres, and satellite infrastructure across partner countries. By 2025, Chinese vendors, chiefly Huawei, ZTE, Hikvision, Dahua, and the facial recognition specialist CloudWalk, had exported smart city and "Safe City" surveillance systems to more than one hundred countries across Asia, Europe, Africa, and Latin America.

Africa has become the most closely studied theatre of this diffusion. A 2017 agreement between China and Djibouti financed the installation of several hundred networked CCTV cameras with facial recognition capability across the country's capital, an early template for what followed. Research mapping surveillance deployments across eleven African countries¹⁴ in 2025 and 2026 found Chinese-supplied equipment present in every country surveyed, including Kenya, Nigeria, and Egypt, financed substantially through Chinese policy bank lending that reduces upfront budgetary pressure on recipient governments while creating durable dependence on Chinese vendors for maintenance, upgrades, and training. One accounting found Chinese-supplied technology installed in two dozen presidential residences, more than two dozen parliamentary offices, and over thirty police

or military installations across the surveyed countries, embedding Chinese hardware directly within the security apparatus of partner states.

Two features of this diffusion are worth emphasising. First, the framing has shifted over time in ways that mirror the domestic legitimisation strategies discussed in the previous chapter: a 2025 handover of surveillance equipment to the Sierra Leone Police was explicitly described by Chinese officials as an implementation of the Global Security Initiative rather than simply a Digital Silk Road¹⁵ infrastructure project, folding what had been a commercial and developmental narrative into an explicitly security-oriented foreign policy doctrine. Second, researchers examining these deployments consistently find that the systems function less as instruments of ordinary crime prevention than as tools available to monitor political opposition and civil society, with little independent oversight or redress available to affected citizens, the same asymmetry of information control, transplanted from the domestic to the international setting, that the previous chapter identified as central to the Party's own governance model.

It bears noting that China is not alone in exporting surveillance capability; American, European, Russian, and Israeli firms all supply comparable tools to governments around the world. What distinguishes the Digital Silk Road is its scale, its bundling with financing that many recipient governments could not otherwise afford, and its origin in a state that has already demonstrated, at home, precisely how such infrastructure can be used to monitor, categorise, and constrain a population. The export of Chinese surveillance¹⁶ technology is therefore best understood not as an isolated commercial phenomenon but as the external face of the governance, development nexus examined in the previous chapter, the same fusion of infrastructure, information control, and political legitimisation, now offered as a package to governments beyond China's borders.

Conclusion: Sovereignty as an Unfinished Project

Taken together, the cases in this chapter resist a single verdict on whether China has become a genuine innovation leader or remains, at bottom, a sophisticated adopter operating under external constraint. The honest answer is that China now occupies both

positions simultaneously, and the distinction runs along a fairly consistent line: in domains where competitiveness depends on manufacturing scale, vertical integration, and the diffusion of good, enough technology at low cost – electric vehicles, telecommunications equipment, and open-weight artificial intelligence models – Chinese firms have achieved genuine, in some cases uncontested, global leadership. In domains that depend on frontier scientific and industrial capability concentrated in a small number of firms outside China's control – extreme ultraviolet lithography, the most advanced logic nodes, high-bandwidth memory, electronic design automation software – China remains a determined but structurally constrained challenger, capable of substituting but not yet of matching.

This unevenness is itself a continuation of the governance logic examined in the previous chapter. The state's capacity for mobilisation, directing capital, coordinating firms, absorbing short-term losses in pursuit of long-term strategic position, is the same capacity that built the domestic surveillance and social management architecture discussed earlier, and it is now the capacity being deployed, with mixed but real success, to build technological sovereignty abroad. Whether that project ultimately closes the remaining gaps in frontier hardware or whether the compounding effect of export controls proves durable enough to hold China at the technological frontier's edge indefinitely is likely to be the single most consequential open question in the US-China relationship for the remainder of this decade, and it is a question this book returns to in the chapters that follow.

Declaration

I declare that this manuscript is being submitted exclusively to CENJOWS for publication consideration, is original, and has not been published or submitted elsewhere. I further certify that it contains no classified, restricted, or sensitive information and is based entirely on open-source material suitable for publication in the public domain.

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