MEMORANDUM

TO: National Security Council and the Office of Science and Technology Policy
FROM: Sidar Aslanoglu
DATE: May 1, 2026
RE: Securing American Technology Leadership in Artificial Intelligence and Quantum Technology

Executive Summary

Rapid advancements in Artificial Intelligence (AI) and Quantum Technology represent the most critical technological inflection point of the twenty-first century. They are foundational general-purpose technologies, and U.S. leadership in them will shape both the global economy and the international order for decades. The United States is locked in great-power competition with the People's Republic of China (PRC), and the post-Cold War unipolar environment is giving way to what Bremmer calls a technopolar paradigm, in which sovereign power flows from control over advanced compute and subatomic engineering.[i]

This memorandum applies the National Technology Strategy Framework (NTSF) to assess the U.S. competitive position, benchmarks current strategy against the PRC, the EU/UK, and Israel, draws lessons from three historical cases, and recommends a hybrid strategy for the USG. The central recommendations are: (i) establish a National Technology Coordination Office that consolidates and replaces existing coordination structures with authority over agency R&D priorities; (ii) deploy Advance Market Commitments for near-term quantum sensing and communications hardware, and create an ITRI-equivalent state research institute for quantum with explicit spinout authority; (iii) restructure high-skilled immigration as an instrument of strategic talent capture, supported by a parallel administrative track; and (iv) co-finance allied deep-tech joint ventures through an expanded Development Finance Corporation, paired with the existing outbound-investment screening as a single integrated instrument set.

I. The Strategic Landscape: An NTSF Assessment

A national technology strategy requires deliberate alignment of three pillars; the State sets direction and carries risk that markets will not, industry scales and commercializes, science discovers and innovates. The strategic landscape facing the United States today is defined by the nature of the technologies themselves, the country's dependency profile, and the time horizons available for action.

Nature of the Technologies

AI and Quantum Technology are apex general-purpose technologies.[ii] AI has moved from basic research to industrial deployment, driving major capability gains in areas from predictive modeling to autonomous systems. Scale is a dominant feature in the advancement of AI, it requires access to massive compute and large training datasets to develop, train and operate. Quantum Technology spans three distinct application domains. First, it aims to solve problems that are mathematically impossible or impractical for classical machines. Second, it offers alternative and potentially harder to breach cybersecurity measures through Quantum Key Distribution. Third, Quantum sensing enables far more accurate navigation, timing, and detection than current systems. AI is already deployed in a multitude of applications. Quantum computing remains largely a basic-research problem with early commercial activity, while sensing and communications are closer to fielded prototypes.

Dependency Profile

The United States faces significant supply-chain dependencies that threaten strategic autonomy. In AI, the bottleneck is hardware: the U.S. relies on foreign manufacturing, primarily Taiwan, for the advanced logic chips that train frontier models, and sources many of the critical minerals and rare earths through PRC-controlled supply routes. In quantum, the U.S. leads in research output and computing patents, but the supply chain for critical components, including cryogenic systems and specialized photonic equipment, is heavily globalized, with significant exposure to European and Asian suppliers.[iii]

Temporal Horizons

The AI horizon is immediate. Transformer-based AI architectures exist today, and the race is to scale them into economic and military applications before adversaries reach parity. The horizon for scalable, fault-tolerant quantum computing is seemingly much longer, and demands sustained generational investment in research. Quantum sensing and communications fall in between, with functional prototypes already in defense testing.[iv] Taken together, these horizons converge on a roughly three-to-five-year decision window. Three concrete events drive the timeline. The first is federal post-quantum cryptography migration under NSM-10 and CNSA 2.0, with priority systems required to begin transition by 2027 and broader deployment targets running into the early 2030s.[v] The second is the implementation phase of China's 15th Five-Year Plan, approved in March 2026, which elevates quantum for the first time from a research priority to a designated "future industry" with dedicated regional venture funds.[vi] The third is the maturation of allied semiconductor export-control regimes coordinated with the Netherlands and Japan. After this window, path-dependencies in standards adoption, supplier ecosystems, and allied coordination will significantly constrain U.S. options.[vii]

II. Critique of Current U.S. Techno-Industrial Strategy

U.S. innovation policy has historically been highly decentralized, relying on market-led dynamics in which consumer demand and venture capital drive innovation. Under the NTSF taxonomy, the U.S. primarily operates Model D (Commercial Dual-Use), in which technologies are commercially driven by private giants (Google, Microsoft, IBM, NVIDIA) but are strategically vital to the state. This approach has three structural weaknesses.

First, the scale-up gap. The U.S. system excels at basic discovery (NSF, NIH) and late-stage commercialization, but routinely fails at the intermediate scale-up phase. Venture capital demands rapid returns and is structurally hostile to the multi-billion-dollar capital expenditures required to build deep-tech industrial commons such as domestic semiconductor fabrication, advanced quantum foundries, or alternative compute architectures.

Second, fragmented directional setting. Unlike adversaries with centralized planning, the U.S. interagency process lacks unified directional capability. The National Quantum Initiative Act of 2018 authorized $1.2 billion across its initial five-year window (FY2019–2023), and subsequent appropriations have brought cumulative federal quantum spending to approximately $3.7 billion through FY2024, but funding remains divided within specific agencies rather than integrated into a comprehensive national industrial policy.[viii]

Third, outsourced risk absorption. The state has often left the riskiest, longest-horizon technology bets to private markets. By expecting venture capital and corporate R&D to build national security infrastructure on their own, the U.S. has held onto intellectual property while losing the industrial commons such as supplier networks and skilled trades that turns IP into end-product.

Recognizing these deficits, the United States is currently attempting to pivot toward a Hybrid model, evidenced by the CHIPS and Science Act. The transition is incomplete, and execution remains reactive rather than proactive.

Sematech is the most relevant prior U.S. attempt to address these deficits. The federal-industry semiconductor consortium received DARPA funding from 1987 to 1996 and produced useful research, but it did not generate national champions and did not close the scale-up gap. Two of the three NTSF deficits identified above were present in Sematech's structure: it had no direction setting authority above the consortium level, and it had no mechanism for spinning out privatized firms once technical risk had been mitigated. A serious Hybrid pivot must learn from that failure directly.[ix]

III. Comparative Country Approaches

People's Republic of China: The Engineering State

China operates a coordinated, state-led techno-industrial strategy, deploying the National Champion and Consortium models to achieve catch-up modernization and market dominance.

State as architect. The CCP applies an Engineering State logic, setting hundreds of measurable technological targets through Five-Year Plans that signal priorities to state-owned banks and guidance funds and steer capital toward strategic sectors. Estimates of Chinese government quantum spending vary widely. McKinsey's widely cited $15.3 billion figure rests on partial data, and independent analysts typically apply effectiveness discounts of around 60 percent. Even on the discounted figure, announced Chinese public investment substantially exceeds U.S. federal quantum spending of roughly $3.7 billion through FY2024.[x]

Scale as strategy. In AI, China leverages population scale for data extraction through surveillance networks such as Huawei Safe City. The Military-Civil Fusion doctrine is intended to channel commercial AI breakthroughs to the People's Liberation Army. In quantum, China operates a hyper-centralized research model: the Hefei National Laboratory accounts for an outsized share of national quantum output.[xi]

Vulnerabilities. China's system excels at diffusion and scaling, but it struggles with interdisciplinary discovery required by frontier scientific research. Top down mandates can result in inefficient allocation of capital and overcapacity, while political constraints limit foundational breakthrough capacity. An important caveat to the China model is that the most successful application of Engineering-State logic to frontier semiconductor technology happened not in the PRC but in Taiwan, whose ITRI-TSMC system is examined in Section IV. Taiwan in the 1970s and 1980s was itself an authoritarian developmental state under KMT one-party rule. Democratization only began with the lifting of martial law in 1987, the same year TSMC was founded. Therefore, the right comparison is between two versions of state-led catch-up rather than between authoritarianism and democracy. What sets the Taiwanese variant apart is its institutional architecture: a research institute (ITRI) with authority to absorb risk and spin out privatized champions, embedded in a market economy that disciplined those firms through global competition. The

PRC combines direction-setting with state ownership in ways that suppress the disciplining function. The lesson for the United States is about institutional design, which is reproducible, rather than regime type, which is not.

United Kingdom and European Union: Regulatory Ambition vs. Industrial Capacity

The European approach is a cautionary tale on the limits of standard-setting without industrial dominance. The UK has leveraged its post-Brexit regulatory flexibility and the AI Safety Institute, established after the 2023 Bletchley Summit and refined through the 2024 Seoul and 2025 Paris follow-ups, to lead governance discussions. But thinking fast cannot overcome a lack of economic heft: without the domestic market or capital depth of the U.S. or China, the UK struggles to prevent its deep-tech startups from being acquired by foreign giants or relocating offshore.

The EU relies on the “Brussels Effect,” attempting to shape global technology by establishing stringent rules (the AI Act, GDPR). While effective at shaping global corporate compliance, the EU’s shallow venture capital and fragmented internal market have severely undermined the creation of homegrown AI or quantum national champions.[xii] A strategy based purely on regulation leads to technological stagnation.

Israel: The Ecosystem and Entrepreneurial State

Israel shows how a small state can punch above its weight in tech through an integrated ecosystem. The Israeli state (through the Israel Innovation Authority) directly absorbs the early-stage technical risk of deep-tech that private capital avoids. Through grants, incubators, and deep integration between the military (Unit 8200), academia, and civilian startups, Israel has effectively closed its Valley of Death. The state sets direction for emerging technologies and then crowds in foreign private capital once technical risk has come down, demonstrating that aggressive state intervention can complement a thriving private market. The Israeli model has real limits when applied elsewhere. It depends heavily on diaspora capital flows, particularly from U.S. venture funds, and is structurally exposed to talent emigration to higher-paying U.S. labor markets. The U.S. is the recipient of those flows, so the model does not transfer directly.[xiii]

IV. Historic Lessons in Techno-Industrial Strategy

1. The Manhattan Project (Model C: The State Project)

The Manhattan Project, driven by an existential wartime threat, is the canonical example of the state acting as sole architect, funder, and customer. It absorbed 100 percent of the financial risk and coordinated a workforce that ranged from academic physicists to assembly-line workers, turning theoretical physics into a deployable weapon in roughly three years at a cost of about $2 billion in 1945 dollars. The state pursued three parallel enrichment pathways simultaneously: gaseous diffusion, electromagnetic separation, and thermal diffusion. Redundancy was deliberate, because speed mattered more than cost.[xiv]

2. Meiji Japan (Catch-Up Modernization and National Champions)

In the late nineteenth century, fearing Western imperial domination, Japan executed a radical state-led technological transformation. The Meiji government recognized that pure market forces would leave Japan permanently behind. The state established heavy industries, imported foreign engineers under the oyatoi gaikokujin system, and heavily subsidized acquisition of Western technology. Once industries were technologically viable, the state privatized them into massive conglomerates (the zaibatsu), creating National Champions.[xv]

3. Taiwan's ITRI–TSMC Sequence (Models A and B in Frontier Technology)

Taiwan established the Industrial Technology Research Institute (ITRI) under the Ministry of Economic Affairs in 1973, in the wake of the 1973 oil crisis and Taipei's 1971 expulsion from the United Nations. ITRI was Engineering-State logic applied to technological catch-up: a state-funded research institute responsible for carrying the technical risk of frontier technology development for an economy that lacked the private capital and the industrial commons to do that work on its own.[xvi]

In 1976, ITRI licensed an outdated 7-micron CMOS process from a withdrawing RCA for several million dollars and sent engineers across four RCA facilities in the United States. Their assignment was to absorb the tacit knowledge of semiconductor process engineering and quality verification. Within six months, the Taiwanese pilot line was hitting roughly 80 percent yield, matching RCA's own production lines. This is a textbook demonstration that in mature manufacturing technologies, the scaling and reliability problem is at least as decisive as the discovery problem.[xvii]

Once the technical risk of a generation had been retired inside the institute, the state systematically spun out privatized national champions: United Microelectronics Corporation (UMC) in 1980, and Taiwan Semiconductor Manufacturing Company (TSMC) in 1987. TSMC was capitalized as a joint venture. The Taiwanese state, through the National Development Fund, held the largest block at roughly 48 percent. Philips contributed $58 million plus VLSI technology transfer for a 27.6 percent stake. ITRI transferred fabs, equipment, intellectual property, and ninety-eight professionals to the new company. Notably, the Taiwanese state had been turned down by both Texas Instruments and Intel before Philips agreed. Private capital alone could not have funded TSMC. What made TSMC stand out was that the company manufactured chips designed by other firms instead of competing with them. The model created an entirely new layer of the global semiconductor industry and seeded a dense ecosystem of Taiwanese fabless design houses, MediaTek among them, populated largely by the original RCA-trained cohort.[xviii]

V. Exploiting Technology for Statecraft and Power Projection

Technology is a tool of statecraft used to project power, coerce adversaries, and shape the international system. The United States must actively exploit AI and Quantum Technology across four vectors.

Norms and standards. The nation that builds the first commercially viable quantum-communication infrastructure will write the cryptographic protocols of the twenty-first century. The U.S. must dominate standard-setting bodies, most importantly NIST's post-quantum cryptography process, which finalized its first three standards in August 2024, to ensure that global financial and communications infrastructure relies on American-designed architectures.[xix]

Coercion and chokepoint control. Control over critical nodes in the AI and quantum supply chains, including advanced lithography, EDA software, high-bandwidth memory, and specialized cryogenic components, creates leverage like control over oil and shipping lanes provided in the twentieth century. The October 2022 U.S. semiconductor export controls and their subsequent expansions put this leverage to work, and their effectiveness depends on allied harmonization, particularly with the Netherlands (ASML) and Japan (Tokyo Electron), whose firms hold complementary chokepoint positions. The U.S. should institutionalize a permanent multilateral export-control coordination mechanism for emerging technologies. The mechanism should be modeled on the legacy Wassenaar Arrangement but distinct from it, designed to prevent backfilling and to spread the political costs of restriction across the alliance.

Alliance architecture. Technology partnerships are instruments of coalition-building. Quad-aligned semiconductor cooperation and Trade and Technology Council deliverables play a role similar to the Marshall Plan: they build allied capacity and tie that capacity to U.S. strategic direction. AI and quantum partnership instruments should be treated as part of a coalition strategy. Resource distribution decisions about them should be made with coalition-building in mind.

Prestige and soft power. Just as the Apollo Program served as a display of the superiority of the American democratic-capitalist model, achieving the milestone of a fault-tolerant, million-qubit quantum computer would demonstrate the effectiveness of the American open-innovation ecosystem and counter the PRC's narrative of authoritarian efficiency.[xx]

VI. Recommendations

The United States must move beyond the market-led model and fully build out a Phase 3 Hybrid strategy. The analysis in Sections I-IV points to a specific institutional combination. AI and quantum are general-purpose technologies on partly overlapping time horizons, embedded in supply chains where the United States depends on both allied and adversary nodes. The historical evidence shows that pure Model C state projects work for existential single-purpose programs but do not suit dual-use commercial technologies, while pure Model D market-led approaches systematically fail at the scale-up gap. The right response pairs Model A consortium logic for pre-competitive coordination with Model B national-champion logic for spinning out frontier-capable firms. This is the combination that produced TSMC. The four recommendations below put this combination into practice across the three NTSF pillars and the alliance dimension. Each addresses one of the structural weaknesses identified in Section II.

1. Centralize Strategic Direction and Foresight (State)

Establish a National Technology Coordination Office (NTCO) within the Executive Office of the President. The existing institutions are numerous but uncoordinated. OSTP holds convening authority without budget authority, the NSTC Subcommittee on Quantum Information Science and the Select Committee on AI share information across agencies but sit downstream of agency budget formulation, the National Quantum Coordination Office, coordinates quantum specifically but has no AI portfolio and no statutory authority over the AI-quantum convergence, the NSC technology directorate operates from the national-security side without economic authority. None of these bodies can direct R&D priorities that agencies must follow. The NTCO should therefore be created with three authorities held in combination by no current body: directive authority over AI and quantum R&D priorities at DoD, DOE, NSF, NIST, and Commerce, with agency requests certified for strategic alignment before OMB submission; statutory subsumption of the NQCO and the relevant NSTC subcommittees, with their staff and authorities transferred to consolidate rather than layer coordination; and the analytic capacity to benchmark U.S. position against PRC and allied competitors on a quarterly basis. The closer institutional example is the Office of the National Cyber Director, established by statute in 2021, which now offers five years of evidence on the limits of EOP coordinator models, particularly the principal–agent challenges that arise when a White House office attempts to direct cabinet departments with their own statutory missions and congressional appropriators. The NTCO should be designed against ONCD's experience. Statutory pre-OMB certification authority should be built in from the start so the office is not reduced to persuasion, and the new office should consolidate existing coordinating bodies into itself rather than sit alongside them.[xxi]

2. Aggressively Absorb Risk to Bridge the Scale-Up Gap (Industry)

Deploy Advance Market Commitments for near-term quantum applications. Private capital will not fund the multi-billion-dollar capital expenditures required for quantum hardware manufacturing if end-market demand is uncertain. The question is what an AMC adds beyond existing DoD instruments such as Other Transaction Authority agreements, Defense Innovation Unit contracts, and programmed procurement of record. The answer is contractual durability: programmed procurement gets re-baselined annually and can be cut at any budget cycle, whereas a properly structured AMC commits to purchase a specified product at a specified price contingent only on technical performance, and that commitment is hard to renege on. This is precisely the property private capital needs to underwrite long-duration capital expenditure, and it is the property the pneumococcal-vaccine AMC demonstrated at scale. AMCs work only when the buyer can specify the product, so DoD should deploy them first against the near-horizon quantum applications identified in Section I such as quantum magnetometers for anti-submarine warfare. On the civilian side, the Department of Energy and the Department of Commerce should parallel this approach for AI inference systems on alternative chip architectures (specifically, non-NVIDIA accelerators where supply concentration creates strategic risk), with DOE's national laboratory compute procurement and NIST's reference-system purchases as the natural anchor demand. Initial pilot AMCs of moderate scale would test the instrument before general deployment.[xxii]

Establish a federal ITRI-equivalent for quantum, with explicit spinout authority. The U.S. should create a mission-directed state research institute, modeled on Taiwan's Industrial Technology Research Institute, with statutory authority to absorb early-stage technical risk, train engineers in tacit process knowledge, and spin out privatized national champions on a defined schedule. The state should absorb infrastructure CapEx while private industry runs operational expenditures. The proposal must address the Sematech precedent directly, the 1987-1996 federal-industry semiconductor consortium produced useful pre-competitive research but did not generate national champions on the scale of TSMC, in significant part because it lacked a statutory spinout mandate, a training model that rotated engineers through frontier foreign facilities, and the political authority to recruit foundational leadership from outside the U.S. ecosystem. However, two issues need to be addressed. First, the original ITRI-RCA deal worked because RCA was exiting semiconductors and an incentive to license its CMOS process for cash. No exit dynamic exists in quantum today, Pasqal, IQM, Quantinuum, and Riken-affiliated programs are competing for the same global market a U.S. institute would enter, and have no obvious incentive to license core IP to a future competitor. The institute's licensing authority should therefore be framed around adjacent and complementary technologies such as cryogenic subsystems and specialized fabrication processes. The logic of the ITRI-RCA deal can be replicated only if the partner gains something concrete from the transaction. Second, federal entities cannot administratively privatize themselves and capitalize private firms; TVA, Amtrak, ConRail, and USPS each required congressional charters with distinct governance structures. The institute's spinout authority must therefore be granted by enabling legislation that specifies the equity structure, the board composition during incubation, the conditions for spinout, and the disposition of state equity post-spinout. Without a custom charter, the spinout authority is a policy preference rather than a legal capability.[xxiii]

3. Protect and Expand the Scientific Commons (Science)

Restructure high-skilled immigration as an instrument of strategic talent capture. The U.S. cannot match China in raw STEM volume. CSET's 2021 analysis projected that China is on track to graduate roughly twice as many STEM PhDs as the United States by the mid-2020s, and the U.S. advantage at the doctoral level is concentrated in international students. The asymmetric U.S. advantage is that the world's elite researchers prefer to work in a free society with deep capital markets, and the role of immigration policy is to keep them here once they arrive. Congress should: (a) exempt holders of STEM doctorates from accredited U.S. institutions from green-card caps; (b) expand O-1 and EB-1 pathways with explicit adjudication guidance for AI and quantum research credentials; (c) establish a dedicated startup visa with deep-tech eligibility criteria; and (d) grant automatic work authorization to dependents of high-skilled visa holders to eliminate the spousal-employment penalty that currently drives talent to Canada and the UK. Because comprehensive immigration legislation has repeatedly stalled, the executive branch should pursue a parallel administrative track that does not require new statutory authority: USCIS adjudication guidance reweighting O-1 and EB-1 criteria for AI and quantum credentials, reinstatement and expansion of the International Entrepreneur Rule for deep-tech founders, expanded use of national-interest waivers for the EB-2 category, and bilateral STEM mobility agreements operating within existing visa categories.

4. Multilateralize the Techno-Industrial Base (Alliances)

Co-finance allied deep-tech joint ventures through an expanded Development Finance Corporation, paired with outbound-investment screening. The U.S. needs a cross-border project-financing vehicle for allied deep-tech that the existing toolkit does not provide. The EU's Important Project of Common European Interest mechanism is not a clean template. IPCEI is fundamentally a state-aid exemption that allows EU member states to subsidize specific projects without violating single-market competition rules, and the United States does not need to grant itself any such exemption. What the U.S. should adapt from IPCEI is the underlying logic of multi-country co-financing for strategic projects, not the legal mechanism. The Development Finance Corporation is the right anchor vehicle on the U.S. side, given its existing equity authority and allied-coordination mandate, but DFC's current statutory limits constrain this role: a $60 billion portfolio cap, restrictions on majority equity stakes, and a mandate historically focused on emerging markets rather than allied developed economies. The reauthorization of the BUILD Act, now extended into the next congressional cycle, should expand DFC's portfolio cap, broaden the geographic scope to include allied advanced economies for strategic deep-tech projects, and clarify equity authority for project-finance use cases. Priority projects should include quantum-component manufacturing in the supply-chain segments identified in Section I; co-financed data-center buildouts in Australia, Japan, and selected European partners, alongside allied access to leading-edge accelerator supply and joint sovereign cloud infrastructure; and post-quantum cryptography deployment infrastructure. This recommendation is the constructive counterpart to existing restrictive instruments. The August 2023 outbound-investment executive order and subsequent Treasury rules restrict U.S. capital flows to Chinese deep-tech in semiconductors, AI, and quantum. The recommendation here channels U.S. and allied capital into the equivalent allied capacity. Outbound-investment screening and IPCEI-logic co-financing function as paired sticks and carrots for an integrated allied technology bloc, and they should be designed and resourced together rather than on parallel tracks.[xxiv]

VII. Conclusion

The window to secure American technopolar leadership is finite. The next three to five years will determine whether allied semiconductor and quantum-component controls hold or fragment and whether a U.S. quantum industrial commons begins to form or atrophies. The strategy outlined here combines state coordination, large-scale risk absorption, and private-sector dynamism, and it requires the United States to build a federal institutional capacity comparable to ITRI for the first time, with the Sematech experience treated as a cautionary tale. If the U.S. moves quickly on this agenda, it can shape the architecture of the twenty-first-century digital order around democratic institutions. If it delays, the same architecture will be shaped by others.

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