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Policy Brief

Task Force 1: Transformative Technologies — AI and Quantum

Enabling Quantum Technology Cooperation: A Strategic Priority for the G7 Ecosystem in the Global Race

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Key Points

- The G7 has a unique opportunity to shape quantum technology development through coordinated action before disparate national approaches create entrenched challenges and hinder fruitful cross-border collaborations.

- Current export controls among G7 nations lack harmonization, creating competitive imbalances and hindering innovation while potentially failing to adequately address fundamental security concerns.

- The G7 governments should commit to adopt a risk-based regulatory framework that balances security needs with innovation and cross-border collaboration within trusted partnerships.

- The G7 should establish a Quantum Technology Point of Contact Group to provide critical coordination mechanisms to secure supply chains, align trade measures, and accelerate quantum market growth.

Introduction

As we celebrate the United Nations International Year of Quantum Science and Technology (UNESCO 2025), quantum technologies are moving rapidly from theory to commercial reality. These technologies are no longer a distant frontier—they are already reshaping economic prosperity, global security, and technological leadership.

Quantum technologies represent a technological paradigm shift comparable to the digital revolution, but with potentially greater transformative power. Harnessing the counterintuitive phenomena of quantum mechanics, these technologies will fundamentally transform computing, communications, and sensing capabilities in ways that will disrupt entire industries and create new ones.

Quantum technologies encompass three main categories:

- Quantum computing leverages quantum mechanics to solve complex problems that are impossible for conventional computers, promising breakthroughs in materials science, drug discovery, optimization problems, and artificial intelligence. Quantum annealing systems, hybrid quantum approaches, and prototype gate-based quantum computers are already being deployed for specific applications.

- Quantum communications enable the secure transfer of information using quantum principles, providing theoretically unbreakable encryption even against quantum computer attacks. Commercial quantum key distribution systems are in use, with more advanced quantum networks in development.

- Quantum sensing delivers unprecedented measurement precision of physical properties like time, gravity, and electromagnetic fields, enabling applications from medical diagnostics to navigation systems that don't rely on GPS. Early commercial quantum sensors are being deployed, with significant advancements in development.

Uniquely, the quantum technology ecosystem benefits from an unprecedented early mobilization of industry, government, and academia. Industry consortia like Quantum Industry Canada (QIC), the Quantum Economic Development Consortium (QED-C), the European Quantum Industry Consortium (QuIC), the Quantum Strategic Industry Alliance for Revolution (Q-STAR), and UKQuantum are already actively collaborating and coordinating strategy and policy approaches to support the development of the global industry, including through the International Council of Quantum Industry Associations (ICQIA 2023) uniting industry associations from G7 regions. On the research side, G7 countries have supported cross-border fundamental and applied research collaborations, with specific funding streams between e.g., the USA with the United Kingdom (2021) or Japan (White House 2024), or Canada with the UK (NSERC 2025) or France (NSERC 2023), even launching with the later CAFQA (CNRS 2023), a transatlantic research collaboration network.

This level of organized collaboration at such an early stage of technology development is unprecedented—we did not see similar coordination for artificial intelligence, semiconductors, or other emerging technologies. This early mobilization creates a distinct opportunity for the G7 to build on existing collaborative frameworks to address key challenges while shaping quantum development in alignment with shared values.

The global race to master these technologies is intensifying, with major investments from both G7 nations and large competitors like China (QURECA 2025), and amidst shifting geopolitics. Unlike previous technological revolutions, the G7 has a unique opportunity to shape quantum development from its earliest stages through coordinated policy approaches.

Quantum technologies are inherently dual use in nature, presenting both transformative benefits and significant security challenges. Their development requires a careful balance between democratization for innovation and preservation of national security interests. Unrestricted access to quantum capabilities could enable malicious actors to exploit these technologies in ways that threaten critical infrastructure, encryption systems, and defence capabilities. This reality necessitates thoughtful and coordinated governance frameworks that prevent misuse while enabling beneficial applications.

Yet the policy dialogue often oscillates between promoting quantum as a democratized technology and treating it as a national security asset. These positions appear contradictory: how can nations simultaneously win the "quantum race" while promoting open access and collaboration? Resolving this tension through coordinated G7 policy approaches is essential.

As these technologies mature, the global competitive landscape is evolving rapidly. In 2024, G7 nations implemented export controls on quantum technologies with varying approaches to implementation and exemptions. Meanwhile, the complexity of quantum supply chains—spanning critical minerals, specialized components, and integrated systems—requires unprecedented coordination among trusted partners. No single nation possesses all the necessary capabilities to lead across this entire spectrum.

These emerging challenges present the G7 with a crucial opportunity. Unlike previous technological waves where coordination came after vulnerabilities became evident, quantum supply chains and regulatory frameworks remain nascent and malleable. This allows for proactive, coordinated approaches that balance security imperatives with innovation needs while building on the global momentum already established by industry consortia and other collaborative initiatives.

Trade Measures Do Not Account for Actual Capabilities and Risks, and Hinder Necessary Cross-Border Collaboration

Building on the emerging dual-use concerns described in the introduction, G7 nations have been introducing export controls related to quantum technologies in recent years. While it makes sense to classify quantum technologies as dual-use strategic technologies to control their development, export, commercialization and use, ill-drafted regulation could have the effect of a ban by disincentivizing exports entirely. This approach would stifle innovation and prevent society from leveraging the benefits of quantum technologies—a concerning outcome given that historically, defence technology development has had profound implications for civilian life, from aviation advancements to the Internet and countless other innovations.

While these controls share substantially similar technical specifications—such as controls on quantum processors based on thresholds of "fully controlled, connected and working physical qubits" with specific error rate limits—their implementation approaches vary significantly across the G7. This variation in approaches has created a fragmented regulatory landscape that introduces collaborative friction while potentially failing to achieve shared security objectives.

These new export controls were first implemented in Spain in May 2023[1] before substantively similar or identical export controls were then rolled out by some G7 nations in

[1] Spain, *Orden ICT/534/2023 de 26 de mayo 2023*, BOE no 129, 31.05.2023, p 75043, BOE-A-2023-12785, online: https://www.boe.es/buscar/doc.php?id=BOE-A-2023-12785.

2024, beginning with France,[2] followed by the United Kingdom,[3] Canada,[4] Italy,[5] Japan,[6] and the US[7] over the course of the year, as well as other "like-minded" countries beyond the G7.[8] However, some countries provide exceptions or licenses to other countries that implement substantially similar controls, but the implementation of such licenses is not uniform among G7 nations.

This plurilateral approach aligns with the "Wassenaar minus one" strategy under which, following geopolitical tensions with Russia, state members of the Wassenaar Arrangement[9] began implementing their own controls on critical technologies outside the framework requiring consensus from all 42 member states. Some export controls related to quantum technology have successfully been implemented under the Arrangement, for example, relating to quantum sensing and quantum-resistant cryptography.[10] However, the future of export control coordination under the Arrangement for strategic technologies like quantum remains uncertain in the context of shifting geopolitics.

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[2] France, *Arrêté du 2 février 2024 relatif aux exportations vers les pays tiers de biens et technologies associés à l'ordinateur quantique et à ses technologies,* JORF 2024/34, ECOI2401482A, online: https://www.legifrance.gouv.fr/jorf/id/JORFTEXT000049120866.

[3] United Kingdom, *The Export Control (Amendment) Regulations 2024*, SI 2024 No. 346, online: https://www.legislation.gov.uk/uksi/2024/346/.

[4] Canada, Order Amending the Export Control List, SOR/2024-112 (2024), C Gaz II, 2022, online: https://canadagazette.gc.ca/rp-pr/p2/2024/2024-06-19/html/sor-dors112-eng.html.

[5] Italy, *Decreto del Vice Ministro degli Affari Esteri e della Cooperazione Internazionale n. 1325/BIS/371 del 1 Luglio 2024*, Allegato A, online: https://www.esteri.it/wp-content/uploads/2024/07/allegato-A.pdf.

[6] Japan, Order No. 25 of 2023 of the Ministry of Economy, Trade and Industry (May 25, 2023), online: https://www.meti.go.jp/policy/anpo/law_document/shourei/20230523_syourei.pdf.

[7] United States, *Commerce Control List Additions and Revisions; Implementation of Controls on Advanced Technologies Consistent with Controls Implemented by International Partners*, 89 Fed Reg 72926 (2024), https://www.federalregister.gov/documents/2024/09/06/2024-19633/commerce-control-list-additions-and-revisions-implementation-of-controls-on-advanced-technologies.

[8] including Australia, the Netherlands, Finland, and Norway.

[9] *Wassenaar Arrangement on Export Controls for Conventional Arms and Dual-Use Goods and Technologies*, 12 July 1996 (as amended in January 2015), online: https://www.wassenaar.org/app/uploads/2015/07/WA-DOC-15-SEC-001-Basic-Documents-2015-January.pdf

[10] *List of Dual-Use Goods and Technologies and Munitions List (December 2022), Wassenaar Arrangement on Export Controls for Conventional Arms and Dual Use Goods and Technologies*, Volume II, WA-LIST (22) 1, online: https://www.wassenaar.org/app/uploads/2022/12/List-of-Dual-Use-Goods-and-Technologies-Munitions-List-Dec-2022.pdf.

The implementation disparities across export control regimes together with related national research security measures pose significant challenges for quantum firms and researchers needing to collaborate across borders, particularly for startups and SMEs that form the backbone of innovation in the sector. The administrative burden—which is expected to increase as more controls are introduced—can be substantial, including:

- development and maintenance of compliance programs;
- staff training and specialized hiring for regulatory compliance;
- legal consultation and ongoing compliance monitoring;
- team restructuring to accommodate regulatory requirements; and
- lost business opportunities due to permitting delays.

Beyond the administrative burden, the current list-based controls focusing on specific quantum computing components and architectures may inadvertently create barriers to investment and innovation in certain quantum technologies while steering developers and investors toward alternative approaches not covered by the controls. This approach fails to address the fundamental security concerns while potentially creating market distortions in this rapidly evolving field.

These export controls operate along a parallel strategy from G7 nations to reinforce related research security measures. For example, in 2024, the Government of Canada published a new Policy on Sensitive Technology Research and Affiliations of Concern (Canada 2024a) with a corresponding list of Sensitive Technology Research Areas, which includes quantum science and technology (Canada 2024b), and a list of Named Research Organizations (Canada 2024c) that are considered to pose a risk to Canada's national security.

Meanwhile, China continues to take a national approach to develop its own domestic quantum capabilities despite these controls, for example, by leveraging public funding and its geoeconomic power (Groenewegen and Hmaidi 2024; QURECA 2025). Without better coordination, current export control regimes risk undermining the collaborative research and industry partnerships needed for G7 countries to maintain their quantum leadership position and accelerate development. Given that integration into global quantum supply chains is critical for the long-term success and competitiveness of G7 nations' quantum sectors, a more coordinated approach is essential.

With the developing nature of global supply chains for quantum technologies, international collaboration and knowledge exchange among trusted partners are essential for technological advancement and commercialization. The proposed controls should recognize this distinction and incorporate appropriate flexibility for partnerships and supply chain development while maintaining security standards.

G7 Governments Should Adopt Risk-Based Regulatory Frameworks and Exemptions

The adoption of a risk-based framework to regulate the import, export and use of quantum technologies would more readily promote a responsible and safe quantum ecosystem, while supporting a resilient and collaborative ecosystem.

The G7 governments should commit to develop and implement a coordinated risk-based framework for regulating quantum technologies that balances security imperatives with innovation needs (Dekker and Martin-Bariteau 2023). The risks of a technology should be assessed holistically against key factors such as:

- the rights of individuals or communities;
- the physical safety and health of people;
- the security of physical and digital infrastructures;
- the economic interests of individuals, entities, or communities;
- the ecological and environmental security; and
- the ongoing sustainability of the ecosystem.

The framework would vary rules depending on the level and type of harm. Technologies posing lower risks would benefit from greater openness and collaboration. Where higher risks exist, appropriate oversight would be implemented proportionate to the specific threat. In cases of severe risk, prohibitions could be applied.

This risk-based framework should include:

- common exemptions for both research and industry collaboration among G7 and like-minded partners;

- a “trusted partner country” principle that streamlines approvals for trade between nations with equivalent controls;

- technology-neutral approaches that regulate based on capabilities and end-use rather than specific technical implementations; and

- harmonized technical specifications that evolve with technological development.

These measures would enable the necessary cross-border collaboration among governments, industry, and researchers, strengthening the G7 quantum ecosystem while ensuring security protections where truly necessary. This approach enables both academic and commercial partnerships to flourish within a trusted network.

Lack of Strategic Collaboration Puts Development of Resilient Quantum Supply Chains at Risk

The quantum technology ecosystem is extraordinarily complex, requiring specialized expertise across multiple disciplines including materials science, cryogenics, photonics, microelectronics, software development, and even critical minerals extraction and processing. This value chain extends from raw materials to specialized components to fully integrated systems. No single nation possesses all the necessary capabilities to lead across this entire spectrum.

The current nascent and malleable nature of quantum supply chains creates a unique opportunity for G7 nations to proactively build diverse, resilient supply networks before risky dependencies become entrenched. These supply chains span multiple quantum technologies—from computing to sensing to communications—each with distinct requirements yet interdependent components.

The G7 has a critical opportunity to coordinate efforts to build the industrialization capabilities needed to move quantum technologies beyond the prototype stage. Each member country brings unique industrial strengths—from Canada's expertise in photonics, to Japan's materials science capabilities, to Germany's precision engineering. By strategically aligning these complementary strengths, the G7 can develop a robust manufacturing ecosystem that no single nation could achieve alone.

To ensure quantum supply chains are truly sustainable and resilient, G7 nations must also focus on environmental processes, social practices, and economic factors throughout the value chain. Environmentally, this means developing quantum technologies with reduced energy consumption, sustainable material sourcing, and minimal waste. Socially, it requires ethical labour practices, community engagement, and inclusive workforce development. Economically, supply chains must be structured to ensure fair distribution of benefits, competitive market access for businesses of all sizes, and long-term viability beyond initial government investments.

The scale and complexity of quantum supply chains exceed any single nation's capabilities among the G7. Success demands unprecedented coordination among trusted partners sharing democratic values and commitment to responsible innovation. In the context of the global quantum market, a more permissive trade regime may permit domestic quantum technology firms to proliferate their technology and services to like-minded nations and access the global quantum research community to advance their product development. Conversely, a less permissive export regime may have the opposite effect of limiting the growth of domestic quantum technology producers by forcing them to rely more on domestic outlets to establish and advance product development.

In 2024, the G7 established a Semiconductors Point of Contact Group "dedicated to facilitating information exchange and sharing best practises among G7 members." (G7 Italia 2024) In the same ministerial brief, the G7 ministers acknowledged the growing importance of quantum technologies. While some aspects of quantum technology development intersect with the semiconductor supply chain, the scope of the potential impact of quantum technology requires a dedicated focus from G7 nations. In a manner similar to semiconductors, applications and potential impacts of quantum technology range from new sensing regimes, quantum-secure communication, advanced materials, and new computing capabilities.

The strategic importance of quantum technology is well documented (Department of National Defence 2023; European Commission 2023; NATO 2024; The White House 2022; Center for Strategic and International Studies 2025), and a dedicated G7 task force addressing the challenges and opportunities of quantum technology is essential.

It is critical to ensure that the global quantum ecosystem enables innovation to flourish while building sustainable supply chains. Without coordinated policies that enable these innovation ecosystems to thrive, the G7 risks losing ground to competitors pursuing centralized, state-driven approaches.

G7 Should Establish a Quantum Point-of-Contact Group to Support Coordination and Alignment on Supply Chain Needs

Building on the success of the Semiconductors Point of Contact Group established in 2024, the G7 should create a dedicated Quantum Technology Point of Contact Group to coordinate policy approaches across the quantum ecosystem.

This multistakeholder body would:

- provide practical guidance for harmonizing export control implementation to accelerate innovation among trusted allies while safeguarding sensitive technologies;
- provide input into template regulatory frameworks and model exemption processes that countries can adapt to their legal systems while maintaining interoperability;
- leverage and build upon existing supply chain mapping initiatives to identify critical vulnerabilities and coordinate targeted strategic investments;
- coordinate the development of common technical benchmarks, testing protocols, and interoperability standards to reduce market fragmentation;
- support workforce development initiatives across borders;
- define and track key performance indicators for quantum ecosystem health and resilience; and
- deliver actionable, timely recommendations directly to G7 leadership.

Crucially, this group must include industry representatives—with dedicated participation from startups, SMEs, and industry consortia—alongside government officials, researchers, and civil society representatives to provide a responsible and inclusive forum. The group should liaise with existing quantum initiatives such as the OECD Global Forum on Technology, the NATO Transatlantic Quantum Community, and other international forums to prevent duplication of efforts.

The G7 Quantum Technology Point of Contact Group would establish metrics to track progress toward resilient, innovative quantum ecosystems, and be able to report directly to G7 leadership with concrete recommendations as identified by working groups. By establishing this dedicated coordination mechanism, the G7 can provide clarity and confidence to industry while securing critical supply chains.

Conclusion: A Coordinated Approach for Quantum Leadership

G7 nations have an opportunity to determine whether quantum technologies develop in a fragmented environment that privileges security over innovation, or within a cooperative ecosystem that balances both imperatives effectively. The unprecedented early mobilization of the quantum ecosystem provides G7 countries with a unique opportunity to establish a new model for governing emerging technologies.

By committing to coordinated risk-based regulatory frameworks and establishing formal coordination mechanisms, the G7 can:

- accelerate quantum technology development through strategic collaboration
- build resilient supply chains distributed across trusted partners;
- foster a vibrant startup ecosystem alongside established players;
- implement balanced security approaches that protect strategic interests without unnecessarily impeding collaboration; and
- ensure quantum technologies address real-world challenges that benefit citizens.

A proactive, G7 collaborative approach would enhance collective technological sovereignty while cultivating productive and mutually beneficial interdependence among trusted partners. Beyond securing critical supply chains, coordinated development would accelerate quantum market growth by providing clarity and confidence to industry. This clarity is essential for attracting investment, supporting commercialization efforts, and enabling long-term strategic planning across the quantum ecosystem.

The coordinated approach outlined in this paper leverages the unique advantage of an already mobilized quantum community ready to partner with governments in responsible technology development. Success here could serve as a model for governing other emerging technologies where nations must balance autonomy with alliances—redefining how the G7 approaches technological development in an era of strategic competition.

The quantum future offers unprecedented opportunities for scientific advancement, economic growth, and solutions to pressing global challenges. Through thoughtful coordination, G7 governments can lead this technological transformation while ensuring these powerful technologies develop in alignment with democratic values and shared prosperity.

Author Biographies

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Tina Dekker is a research fellow for Quantum & Society at the University Research Chair in Technology and Society at the University of Ottawa where she's pursuing a master's degree in law. Having graduated from the University of Waterloo in nanotechnology and quantum devices, she has a unique dual background that she leverages as technology lawyer at BLG with a practice focusing on patents and intellectual property strategy.

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Works Cited

Canada, Department of National Defence. 2023. Quantum 2030: Quantum Science and Technology Strategy Implementation Plan. https://www.canada.ca/en/department-national-defence/corporate/reports-publications/overview-quantum-2030.html.

Canada, Innovation, Science and Economic Development Canada (ISED). 2024a. Policy on Sensitive Technology Research and Affiliations of Concern. https://science.gc.ca/site/science/sites/default/files/documents/2024-01/1154-policy-strac-en-final-09Jan2024.pdf.

Canada, Innovation, Science and Economic Development Canada (ISED). 2024b. Sensitive Technology Research Areas. https://science.gc.ca/site/science/sites/default/files/documents/2024-01/1081-sensitive-technology-research-areas-09Jan2024.pdf.

Canada, Innovation, Science and Economic Development Canada (ISED). 2024c. Named Research Organizations. https://science.gc.ca/site/science/sites/default/files/documents/2024-01/1082-named-research-organizations-list-09Jan2024.pdf.

Natural Sciences and Engineering Research Council of Canada (NSERC). 2023. NSERC-French Agence nationale de la recherche (ANR) call for proposals on quantum technologies. https://www.nserc-crsng.gc.ca/Innovate-Innover/ANR-ANR/index_eng.asp.

Natural Sciences and Engineering Research Council of Canada (NSERC). 2025. $11.3M boost for innovative quantum projects in UK and Canada. https://www.nserc-crsng.gc.ca/NewsDetail-DetailNouvelles_eng.asp?ID=1515.

Center for Strategic and International Studies. 2025. "CSIS Commission on U.S. Quantum Leadership." https://www.csis.org/analysis/csis-commission-us-quantum-leadership

Dekker, Tina and Florian Martin-Bariteau. 2023. "Regulating Uncertain States: A Risk-Based Policy Agenda for Quantum Technologies." 20:2 Can. J. Law & Technology 179. https://digitalcommons.schulichlaw.dal.ca/cjlt/vol20/iss2/3/.

European Commission. 2023. European Declaration on Quantum Technologies. https://digital-strategy.ec.europa.eu/en/library/european-declaration-quantum-technologies.

Conseil national de recherche scientifique (CNRS). 2023. Premier atelier de l'Alliance quantique Canada-France (CAFQA). https://international.cnrs.fr/actualite/premier-atelier-reseau-quantique-cafqa/.

G7 Italia, Industry, Technology and Digital Ministerial Meeting. 2024. Ministerial Declaration. March, 14–15. https://www.g7italy.it/wp-content/uploads/G7-Industry-Tech-and-Digital-Ministerial-Declaration-Annexes-1.pdf.

Groenewegen, Jeroen and Antonia Hmaidi. 2024. "China's Long View on Quantum Tech Has the US and EU Playing Catch-Up." Merics. https://merics.org/en/report/chinas-long-view-quantum-tech-has-us-and-eu-playing-catch.

International Council of Quantum Industry Associations (ICQIA). 2023. "Quantum Consortia QIC, QED-C, Q-STAR and QuIC Form International Council to Enable and Grow the Global Quantum Industry." January 31. https://www.businesswire.com/news/home/20230131005218/en/Quantum-Consortia-QIC-QED-C-Q-STAR-and-QuIC-Form-International-Council-to-Enable-and-Grow-the-Global-Quantum-Industry.

QURECA. 2025. "Quantum Initiatives Worldwide 2025." March 7. https://www.qureca.com/quantum-initiatives-worldwide/.

North Atlantic Treaty Organization (NATO). 2024. "NATO Releases First Ever Quantum Strategy." January 17. https://www.nato.int/cps/en/natohq/news_221601.htm.

United Kingdom, Department for Business, Energy & Industrial Strategy. 2021. New joint statement between UK and US to strengthen quantum collaboration.

https://www.gov.uk/government/news/new-joint-statement-between-uk-and-us-to-strengthen-quantum-collaboration.

United Nations Educational, Scientific and Cultural Organization (UNESCO). 2025. “2025 International Year of Quantum Science and Technology.” https://quantum2025.org/.

United States, The White House. 2022. National Security Memorandum on Promoting United States Leadership in Quantum Computing While Mitigating Risks to Vulnerable Cryptographic Systems. https://bidenwhitehouse.archives.gov/briefing-room/statements-releases/2022/05/04/national-security-memorandum-on-promoting-united-states-leadership-in-quantum-computing-while-mitigating-risks-to-vulnerable-cryptographic-systems/.https://quantumconsortium.org/.

United States, The White House. 2024. U.S., Japan, and Republic of Korea Launch Cutting-edge Quantum Collaboration. https://bidenwhitehouse.archives.gov/briefing-room/statements-releases/2024/01/18/u-s-japan-and-republic-of-korea-launch-cutting-edge-quantum-collaboration/.