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From Qubits to GDP: Unlocking New Zealand's Quantum Economy

The New Quantum Growth Frontier

Growth & Strategy/ Accenture Research

Executive Summary

New Zealand's Quantum Opportunity: Playing Smart in a Giant's Game

The quantum computing ecosystem is occupied by tech giants – well capitalised and prone to market dominance.

IBM has spent billions on superconducting hardware and has made its Qiskit software development kit the de facto industry standard. Google demonstrated quantum supremacy and continues to invest at scale. Bluefors of Finland controls over half the global market for dilution refrigerators — the critical cooling infrastructure without which most quantum computers cannot operate. The hyperscalers - Amazon, Microsoft, Google - are consolidating the cloud access layer.

A small, open, and research capable economy should restrain from the instincts of avoiding the space entirely or trying to compete directly. Our analysis, based on a strategic entry framework, points to a few areas to prioritise.

Quantum value is emerging bottom up

Quantum value is emerging from the bottom up, through security, sensing, software, and enabling systems - while utility-scale quantum computing remains a longer-term systems transition.

Succeed by embedding into global platforms

Small advanced economies succeed by embedding into global platforms, programmes and supply chains, rather than pursuing sovereign, end-to-end systems.

Strongest opportunities in enabling tech

The strongest opportunities for New Zealand sit in enabling technologies, system integration, applied research, and security-adjacent domains where capital intensity is lower but strategic leverage and spillover effects are high.

Invest in a networked approach to quantum capability

New Zealand does not have a single quantum hub but rather a distributed, highly collaborative ecosystem: Otago, Auckland, Wellington and Canterbury. This networked model is well aligned with how quantum research is evolving globally.

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Our research led us to the Quantum + Enabling Technologies* Value Chain

An established MECE (Mutually Exclusive Collectively Exhaustive) value chain for the quantum computing + enabling technologies ecosystem is hard to come by. Our research led us to the following “layers” within the ecosystem. Money flows downward from the highest row to the lowest.



Applications and buyers	Finance, pharma, logistics, telecoms, energy, government and defence.
Access and platforms	Cloud QC platforms, software development kits, hybrid classical-quantum computing interfaces.
Hardware	Superconducting, trapped ion, neutral atom, and photonic quantum computers.
Enabling systems	Dilution refrigerators, cryo-CMOS control electronics, quantum error correction software, quantum networking infrastructure.
Raw inputs	Helium-3 and cryogenic materials, chip foundries, RF and microwave components, photonic parts.

Note: * Quantum sensing and quantum communications are considered within photonics, which is a preferred entry point for both.

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Framework & Key Takeaways

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Value Chain Framework

Introducing a strategic entry framework to anchor our analysis - 3 approaches to enter this space

Pioneer Approach

Can you establish a position before the market becomes crowded?

Niche Approach

Can you compete alongside larger players by focusing on areas where your distinctive strengths matter most?

Ecosystem Approach

Can you build on others' capabilities to accelerate your own position?

The findings in this report reflect market conditions observed during the research period.The quantum technology market is evolving rapidly, with frequent changes in company positioning, investment activity, technology maturity, partnerships and market dynamics. The analysis presented in this report reflects Accenture's assessment based on information available at the time the research was conducted and should be interpreted as a point-in-time view rather than a current or ongoing assessment of market conditions.

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Quantum Value Chain

Money flows downward · Each row pays the row below
★ = attack point

★ Gov / sovereign funding — grants & contracts flow directly into rows 1–4; not earned through the commercial chain

★ Post-quantum cryptography — separate parallel market · commercial NOW · NIST-standardised 2024 · every regulated enterprise must comply · no quantum hardware required

Row 5 — Applications / buyers

- **Finance** — Risk, portfolio
- **Pharma** — Drug discovery
- **Logistics** — Optimization
- **Telecom** — Secure communications
- **Energy** — Simulation
- **Gov & defence** — Crypto, sensing

Row 5 pays Row 4 ↓

Row 4 — Access / Platforms

- Avoid — **Cloud QC platforms** — IBM, AWS, Azure, Google
- Avoid — **SDKs & dev tools** — Qiskit, Cirq
- ★ **Hybrid classical-QC** — Simulation, optimization

Row 4 pays Row 3 ↓

Row 3 — Hardware (qubits)

- Avoid — **Superconducting** — IBM, Google, Rigetti
- **Trapped ion** — IonQ, Quantinuum
- ★ **Neutral atom** — QuEra, Infleqtion, Atomionics
- **Photonic QC** — PsiQuantum, Xanadu

Row 3 pays Row 2 ↓

Row 2 — Enabling systems

- Avoid — **Dilution fridges** — Bluefors, Oxford
- ★ **Cryo-CMOS** — Intel, SemiQon, Delft Circuits, Aquark Technologies
- ★ **QEC & compilers** — Q-CTRL, Quantinuum, Entropica Labs, Terra Quantum
- **Networking** — IonQ, Xanadu

Row 2 pays Row 1 ↓

Row 1 — Raw inputs

- Avoid — **He-3 & materials** — Cryogenic inputs
- Avoid — **Chip foundries** — IMEC, GlobalFoundries
- ★ **RF & microwave** — Components, QphoX
- ★ **Photonic parts** — SNSPDs, lasers, fibre, Sparrow Quantum, QuiX Quantum, Quantum Source

Note: Quantum sensing and quantum communications are considered within photonics, which is a preferred entry point for both.

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Key Takeaways and Recommendations

Applying three strategic entry approaches to Quantum Computing - 8 Potential Nodes of Entry

Key:

- Pioneer
- Niche
- Ecosystem

1.

RF & Microwave Components — Row 1 *Pioneer Approach: enter the specification gap*

Classical defence and telecom suppliers make these components but have not re-engineered them for quantum-grade cryogenic operation. The quantum specifications — millikelvin stability, ultra-low noise, single-photon purity — are different enough that no incumbent has prioritised this market. A focused entrant sets the standard invisibly, before IBM or Google notices there is a standard to set. These components are also modality-agnostic: every qubit architecture needs them, regardless of which hardware approach wins.

2.

Photonics Parts — Row 1 *Pioneer + Niche Approach*

Light based components such as precision lasers and fiber optic links are required inputs across the entire quantum industry. Quick entry into making photonic parts, including chips, ensures that the entrant can be a supplier for photonic quantum computers, quantum sensing devices which use miniaturized photonic chips, and within communications, supply QKD encode chips. The current market is fragmented. Opportunity to be a player across all the verticals is present.

3.

Cryo-CMOS Control Electronics — Row 2 Pioneer + Niche Approach*: own the wiring crisis, sell to all combatants*

Scaling to millions of qubits requires control electronics operating inside the cryostat at millikelvin temperatures. The wiring bottleneck that makes room-temperature control architectures physically unscalable is the most acute technical constraint in the quantum hardware stack. SemiQon launched early-access chips in 2025; Intel has internal research not yet commercialised. The window to become the standard closes within three to five years. Critically, cryo-CMOS is modality-agnostic — it sells to IBM, IonQ, and QuEra simultaneously. Every company fighting the hardware race is your customer. Their competition is your distribution event.

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Key Takeaways and Recommendations

Applying the three approaches to Quantum Computing continued…

Key:

- Pioneer
- Niche
- Ecosystem

4. **QEC and Compiler Software — Row 2 *Pioneer and Niche: define the abstraction layer before a winner emerges***

No dominant player owns quantum error correction software or hardware-agnostic compilation. Whoever defines this abstraction layer sets the interface standard the industry builds on — IP that compounds in value as fault-tolerant systems scale. Hardware-agnostic positioning means you survive any modality outcome. IBM's Qiskit owns the SDK layer below; this layer above it remains genuinely open.

5. **Neutral Atom — Row 2 *Pioneer: define the abstraction layer before a winner emerges***

No dominant player owns the neutral atom modality. C.f. IBM for superconducting. The physics behind neutral atoms has been proven and the parts are modality agnostic. The same cannot be said about other areas. This provides an enticing entry point to a player with scientific expertise. Two leading commercial firms, QuEra and Infleqtion, are in their early stages so the opportunity to become a preferred supplier systems integrator.

6. **Hybrid Classical QC — Row 4 *Pioneer and Ecosystem: redirect into the channel incumbents cannot access***

Specific problems in industries such as finance, chemicals, and supply chain can be solved by combining quantum and classical computing today. Meaning, without requiring the uncertain wait times for fault-tolerant quantum computers. The opportunity is to leverage already existing hardware and ecosystems—IBM’s existing developer platform—and build software for one specific industry for instance, risk mitigation or supply chain optimization.

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Key Takeaways and Recommendations

Applying the three approaches to Quantum Computing continued…

Key:

- Pioneer
- Niche
- Ecosystem

7.

Post-Quantum Cryptography Migration Services — parallel market *Pioneer and Ecosystem: use the incumbent's authority as your market-creation event*

NIST finalised four PQC standards in 2024, creating an overnight compliance obligation for every regulated enterprise. Global banking regulators, governments and standards bodies have created the urgency — but none will deliver cryptographic transformation locally. That implementation gap is yours to own and control. Every regulated enterprise is already a warm prospect; the mandate is your inbound pipeline. No quantum hardware, no exotic physics. The fastest path to real revenue in the entire quantum landscape.

8.

Gov / Sovereign Funding — cross-cutting *Niche: redirect into the channel incumbents cannot access*

The dominant quantum infrastructure players are geographically concentrated — Bluefors is Finnish, IMEC is Belgian. Every major government is spending billions to reduce that dependency. A domestically incorporated player with a credible technical roadmap accesses a procurement channel that bypasses commercial competition entirely. Government contracts fund the R&D that builds your next commercial product. Your domestic address is an asset no incumbent can replicate.

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Key Takeaways and Recommendations

A non-technical overview of where the strategic entry approaches create openings

	Node	Value Chain Layer	Description
1	**RF & Microwave Components**	Raw Inputs	Existing electronic parts and components from defence/telecom don't work at near-absolute-zero temperatures. Re-engineering them for quantum can set the standard before big players notice.
2	**Photonic Parts**	Raw Inputs	Lasers, fibre optics, and single-photon detectors are needed across *all* quantum approaches — computing, sensing, and communications. The market is fragmented with no dominant supplier. This node is the most cross-cutting in the value chain.
3	**Cryo-CMOS Control Electronics**	Enabling Systems	Cryo-CMOS solve the scalability bottleneck. This is the "wiring“ in cold temperatures that lets quantum chips talk to the outside world. Today's approach doesn't scale — whoever solves this sells to *every* hardware maker.
4	**Quantum Error Correction (QEC) & Compilers**	Enabling Systems	Quantum systems are fragile and reliability in requires QEC. The software "translation layer" between a developer's code and the quantum chip. Whoever defines this standard controls the interface the whole industry builds on.
5	**Neutral Atom**	Hardware	A promising qubit technology with no dominant player yet. Early enough that a credible entrant can become a preferred supplier or systems integrator.
6	**Hybrid Classical-Quantum Computing**	Platforms	Combines today's conventional computers with early quantum hardware to solve real problems *now* — no need to wait for a fully fault-tolerant quantum computer.
7	**Post-Quantum Cryptography Services**	Parallel Market	New encryption standards (mandated by regulators in 2024) force every bank, government, and large enterprise to upgrade. No quantum hardware needed — this is a compliance and implementation play with near-term revenue.
8	**Sovereign & Government Procurement**	Cross-Cutting	Governments worldwide are spending billions to build domestic quantum capabilities. Any credible company — regardless of segment — with a local presence can access procurement channels that foreign incumbents simply cannot reach.

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Key Takeaways and Recommendations

Unpacking the Sovereign Procurement Opportunity

We acknowledge that this is an atypical layer in the Quantum Value Chain. However, given its size and significance, it is worth digging into how domestic credibility unlocks a non-competitive funding channel.

What's happening: Governments around the world — the US, EU, UK, Australia, Singapore, and others — are collectively investing tens of billions of dollars to build sovereign quantum capabilities. Their goal: reduce dependence on a small number of foreign suppliers concentrated in a handful of countries.

Why this is an entry point: The dominant players in quantum infrastructure (e.g., cryogenics, chip fabrication, photonics) are geographically concentrated in specific countries. Governments actively *want* alternatives. A domestically incorporated company with a credible technical roadmap doesn't need to outcompete these incumbents on technology alone — it wins by being *local*. The domestic address itself is an asset no foreign competitor can replicate.

Why it's segment-agnostic: This opportunity isn't limited to one part of the quantum stack. Whether a company operates in hardware components, software, sensing, or cryptography, the same dynamic applies: if you have technical credibility and a local presence, you can access government procurement dollars that bypass normal commercial competition. The entry point is your domestic footprint, not your specific product category.

The strategic payoff: Government contracts fund R&D that builds the company's *next* commercial product. Public money de-risks the technology development, while the resulting IP and capabilities create competitive advantage in the broader commercial market. It's a self-reinforcing cycle: government funding → capability building → commercial competitiveness → more government credibility.

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Segment Analysis

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Key Takeaways – Where Quantum Value Is Already Emerging

Quantum value is emerging bottom-up (security, sensing, enabling tech), while full fault-tolerant computing remains a capital-intensive medium-to-long-term systems challenge.

What is scaling first	Where long-term value is being built	Implications for NZIAT
Quantum sensing has crossed into early industrial deployment • GPS-free quantum navigation, gravimetry, and defense sensing are generating real contracts and revenue. **Post-Quantum Cryptography (PQC) is deploying now** • Driven by regulation, compliance, and enterprise security requirements — independent of quantum hardware timelines.	**Fault-tolerant quantum computing is an engineering transition, not a breakthrough race** • Value is shifting from qubit counts toward error correction, control systems, and system integration. **Photonics and cryogenics are structural bottlenecks** • These enabling layers determine scalability across computing, sensing, and communications.	**Competitive advantage comes from "picks-and-shovels," not full-stack platforms** • Control, integration, software, and enabling technologies scale across multiple winning architectures. **Economic participation depends on supply-chain position, not sovereign scale** • Countries succeeding are embedding themselves into global programs rather than building standalone systems.





Quantum Communications: Security & Networking

Current Status: Deployment of regional and satellite-to-ground testbeds to mitigate future quantum-enabled decryption risks to national infrastructure

The Commercial Core

Toshiba: A leading provider of fibre-based Quantum Key Distribution (QKD) systems for metropolitan and national-scale secure networks [1]

ID Quantique: Supplies QKD and QRNG (Quantum Random Number Generator) systems for government and telecom networks [2]

AWS: Pursuing quantum networking R&D via its Centre for Quantum Networking to enable future quantum-secure communications [3]

HEQA Security: Deploys integrated QKD and quantum-safe key management systems for enterprise and government networks [4]

Market Maturity

Current Phase: Bifurcated maturity — Early deployment for security use cases; long-term for quantum networking

Analysis: QKD is moving into operational deployment for government, defence, and regulated financial networks. Quantum networking remains pre-commercial due to repeater, cost, and fibre constraints.

Key Drivers: Market momentum is being driven by escalating security risk and regulatory mandates, particularly concerns around "Harvest Now, Decrypt Later" threats.

Innovation Hubs / Hot Spots

Hefei National Lab (China) Global leader in QComms. Hefei also includes the "Quantum Avenue" with 70+ quantum enterprises operating from there. Completed a 12,000-plus km network. [5]

CQT (Singapore): A global leader in satellite-based quantum communications research [6]

TU Delft (The Netherlands): Home to QuTech's world-first metropolitan-scale quantum internet testbed [7]

Emerging Market Signals

Telco players help to advance Quantum secure communications. Singapore's National Quantum-Safe Network Plus is a nationwide quantum security infrastructure initiative that will deliver quantum-safe communications across Singapore by 2030. [10]

China becomes a global leader in quantum comms. China Telecom launched commercial hybrid QKD+PQC distributed cryptography system, completing a 1,000 km quantum-encrypted phone call between Beijing and Hefei and rolling out across 16 cities. [11]

Strategic Implications for a Research Economy

- Viewed as a national infrastructure requirement, governments are prioritizing quantum-secure communications and cryptography to protect critical data backbones ahead of fault-tolerant quantum computing.
- Research economies can participate by contributing to protocols, network integration, and testbeds, without needing to own end-to-end national quantum networks.

Quantum Communications Company Profile: QphoX

Company

QPHOX

Netherlands
Spun out 2020

"The Quantum Modem": A critical building block for future distributed quantum networks

Tech Profile

Supply Chain Positioning: Developed a quantum transducer converting microwave superconducting qubits to telecom photons, enabling scalable quantum networking over optical fiber

Strategic Moat: Proprietary intellectual property enabling microwave-to-optical transduction for superconducting quantum networking over telecom fiber

Key Financials

Strategic Event: 8 rounds; €8M ($8.7M) Series A (2024), $11.5M Series A-II (Nov 2025), recently won a $5.8M US Air Force Research Lab (AFRL) contract in Sept 2025 to develop long-distance quantum entanglement links. [1] [2] [3]

Maturity & Economic Vitality: Early deployment/pilot integration stage; €20M+ total private funding (Series A & extensions), excluding non-dilutive contracts

Major Investors

QDNL PARTICIPATIONS, QUANTONATION, Speedinvest, HTGF, delftenterprises, European Innovation Council, Federal Ministry for Economic Affairs and Energy, Fraunhofer Gesellschaft, KFW CAPITAL, BASF, BAYER, BOSCH

Key Differentiator

The "Network Chokepoint": They develop a critical enabling interface for quantum networking; efficient transduction, is a prerequisite for scaling superconducting quantum systems beyond single cryostats.

Thermal-link scalability: Enables optical interconnects that can significantly reduce cryogenic wiring density and thermal load compared with conventional coaxial cabling.

Key Partners

Welinq, rigetti, QBLOX, BLUEFORS

Quantum Communications Company Profile: ID Quantique (IDQ) - acquired by IonQ

Company

IDQ

Switzerland
Estab. 2001

Leading provider of quantum-safe communication solutions

Tech Profile

Supply Chain Positioning: Develops Quantum Key Distribution (QKD) and Quantum Random Number Generation (QRNG) systems for ultra-secure encryption across fiber and network infrastructure

Strategic Moat: Strong first-mover advantage in deploying QKD networks at national scale, with integrations across telecom backbones and critical infrastructure systems

Key Financials

Strategic Event: Acquired by IonQ (2025) to strengthen its capabilities across quantum computing, networking, and cybersecurity [1]

Maturity & Economic Vitality: Among the most commercially mature players, with active deployments and revenue from government and enterprise contracts

Major Investors

SK telecom

IONQ (acquirer)

+ other global institutional investors

Key Differentiator

Quantum-secure communication: Provides end-to-end QKD-based encryption systems to support long-term protection against quantum-enabled cryptographic threats

Deployment maturity: Operational QKD networks across regions, moving beyond pilots to real-world infrastructure

Key Partners

cisco, Singtel, TURKCELL, T, SK broadband, THALES, REPUBLIQUE ET CANTON DE GENEVE, ORCA COMPUTING, HEQA SECURITY, LUXQUANTA, NOKIA, FORTINET, ThinkQUANTUM, SAMSUNG, Juniper



Quantum Sensing: Strategic Measurement & Navigation Systems

Current Status: The most commercially advanced quantum sector, with deployed systems enabling GPS-free navigation, defence sensing, and high-precision industrial and scientific measurement

The Commercial Core

Atomionics: Early commercial deployment of cold-atom gravimeters for subsurface mapping, with emerging GPS-denied navigation uses [3]

Bosch / Infineon: Accelerating the miniaturization of Nitrogen-Vacancy (NV)-diamond quantum sensors toward scalable automotive and biomedical sensing application [4]

Exail (Muquans): Consolidating the European supply chain for quantum gravimeters and high-performance laser systems for maritime and geophysics applications [5]

Market Maturity

Current Phase: Early industrial deployment

Analysis: This is the "quiet achiever" of the quantum stack, with multiple sensing modalities already transitioning from research into fielded and revenue-generating deployment.

Key Drivers: Atomic clocks and magnetometers have reached TRL 7-8 with field deployment. Quantum gravimeters remain in advanced prototyping. defence procurement is driving early but sustained revenue, making quantum sensing the first segment to demonstrate persistent real-world utility.

Innovation Hubs / Hot Spots

UK Quantum Technology Hub for Sensors, Imaging and Timing (QuSIT): UK hub for quantum sensing, imaging and atom-based gravity measurement [6]

MIT Lincoln Laboratory (USA): Building integrated photonics and chip-scale, in-vacuum electronics for quantum sensors and clocks [7]

Quantum Sensing Lab – University of Basel (Switzerland): Diamond NV-centre sensors for ultra-precise quantum magnetometry [8]

Emerging Market Signals

Space-Based Quantum Gravity Mission (Feb 2026): Infleqtion and NASA JPL launched QGGPf, the first orbital quantum sensor, mapping Earth's gravity for high-resolution subsurface and planetary insights [1]

GPS-Free Long-Distance Flight (Mar 2026): Q-CTRL and Airbus enabled a 6,700+ km GPS-free Cessna flight, delivering 50× better performance than conventional systems in GNSS-denied conditions [2]

Strategic Implications for a Research Economy

- Quantum sensing is delivering real-world value through GPS-independent navigation and the ability to detect physical phenomena that classical sensors cannot.
- By delivering a near-term asymmetric advantage in defence and critical infrastructure, this represents the fastest route to sovereign quantum capability.

Quantum Sensing Company Profile: Atomionics

Company

ATOMIONICS

Singapore
Estab. 2018

"Deep Earth Intelligence": Natural Resource Discovery with Quantum Gravimetry

Tech Profile

Supply Chain Positioning: Builds quantum gravity sensors using cold atom interferometry to map subsurface materials without drilling

Strategic Moat: Miniaturization of cold-atom traps for deployment in harsh field environments (mining, urban construction)

Key Financials

Strategic Event: 4 rounds since 2019; seed $2.5M (2019)

Maturity & Economic Vitality: Scaling; ~$14-15M total funding; closed a $12.7M round in late 2025 to scale field deployments.

Major Investors

wavemaker partners · SGInnovate · iqt In-Q-Tel · VU · 500 Global · Sixth · CapVista · Paspalis · BHP Ventures · Entrepreneurs First · sggrowth capital · apsara

+ angel investors like Alex Turnbull

Key Differentiator

Significant waste reduction: Reduces speculative drilling by enabling high-resolution non-invasive subsurface mapping prior to physical exploration

GPS-independent navigation: Enables navigation and positioning in GPS-denied or contested environments through quantum gravimetry–based sensing

Key Partners

Kincora Copper · Quantum Sensing Centre · Nanyang Technological University Singapore

- Collaborations in mineral exploration and defense sectors for gravimetry sensors.
- Field trials with mining/resource firms, leveraging cold-atom tech for subsurface mapping

Quantum Sensing Company Profile: SandboxAQ

Company

SANDBOXAQ

United States
Estab. 2022

Translating "Quantum Noise" into actionable intelligence for Defense and Healthcare

Tech Profile

Supply Chain Positioning: Blends AI with quantum physics models using quantum-inspired methods, deployable today without quantum hardware

Strategic Moat: SandboxAQ focuses on the software-defined interface between AI and Quantum Sensing. They lead the 2025–2026 "Sensing Surge," bringing quantum tools to commercial maturity in mining and oil & gas

Key Financials

Strategic Event: SandboxAQ raised $95M via an oversubscribed secondary offering to provide employee liquidity, following a $452M primary round in April 2025 [1]

Maturity & Economic Vitality: Scaling; Privately valued at ~$5.7B with approximately $1B in total funding

Major Investors

Alphabet (origin)

SoftBank

breyercapital

+ other global institutional investors

Key Differentiator

Government relevance: Actively involved in post-quantum cryptography migration efforts mandated by NIST and the U.S. government

Magnetic anomaly mapping: Their sensing technologies support magnetic anomaly detection and navigation resilience in GPS-denied environments

Key Partners

U.S. AIR FORCE
DEFENSE INNOVATION UNIT
accenture
EY
carahsoft
Mount Sinai
DIANA Defence Innovation Accelerator for the North Atlantic
AstraZeneca
SANOFI
vodafone
MapLight
Google Cloud
NVIDIA.
open fold
UCSF Health
Mumtalakat



Quantum Photonics: The Scalability Engine

Current Status: Using light (photons) instead of electricity to move and process quantum information, promising faster speeds and room-temperature operation

The Commercial Core

Key companies

PsiQuantum: Building a million-qubit photonic computer using standard silicon-chip manufacturing processes for scalability

Xanadu: Leading the open-source PennyLane software and developing cloud-accessible photonic quantum hardware

QuiX Quantum: Providing low-loss photonic processors that serve as the "standard hardware" for European research

TundraSystems: Designing high-performance photonic microprocessor architectures to bypass the heat limitations

Market Maturity

Current Phase: Moving from experimental validation into selective industrial deployment

Analysis: Quantum photonics is moving beyond experimental validation into selective early commercial deployment, with QRNG and fibre-based QKD leading near-term adoption, while photonic quantum computing and satellite applications remain in advanced development.

Key Drivers: Pilot production facilities for Silicon Photonics (SiPh) and Silicon Nitride (SiN) are coming online; shift toward manufacturing-scale interconnects

Innovation Hubs / Hot Spots

QuTech (Netherlands): Global leader in photonic quantum networking and integrated quantum photonics [1]

USTC (China): World-leading photon-based quantum computing and communications research [2][3]

Abbe Centre of Photonics (Germany): Europe's core hub for quantum optics, photonic components, and industrial translation [4]

Emerging Market Signals

Integrated Silicon Photonics: CMOS-compatible fabrication of quantum photonic circuits enables wafer-scale manufacturing and positions photonic quantum systems for long-term cost and scalability advantages. [5]

Strategic Implications for a Research Economy

- Photonics is the "dark horse" of quantum: if it scales, it can significantly reduce— and in some architectures eliminate—dependence on ultra-low-temperature cryogenic systems.
- Photonics serves as a "manufacturing bridge," enabling quantum and hybrid quantum-classical chips to be fabricated using existing CMOS semiconductor foundries.

Quantum Photonics Company Profile: QuiX Quantum

Company

QUIX QUANTUM

Netherlands
Estab. 2019

A leading supplier of room-temperature photonic quantum processors

Tech Profile

Supply Chain Positioning: Manufactures large-scale photonic quantum processors based on proprietary Silicon Nitride (SiN) waveguide technology

Strategic Moat: Among the leading providers of low-loss, room-temperature photonic processors with demonstrated multi-qubit capability

Key Financials

Strategic Event: Series A €15M (2025, co-led Invest-NL/EIC); prior EIC Accelerator grant, €14M contract by the German Aerospace centre (DLR) to deliver a universal photonic computer in 2026 [1]

Maturity & Economic Vitality: Scaling; $20-25M total funding; Series A (July 2025) co-led by Invest-NL and the EIC Fund

Major Investors

INVESTNL
European Innovation Council
oost nl
ARTILUX
FORWARD.one Advancing your innovations
PHOTON VENTURES

Key Differentiator

Supply chain dominance: Their processors are used by multiple European research programs and systems developers as a core photonic hardware component

Scalability: Room-temperature photonic processors enable modular scaling and native telecom-fibre connectivity, avoiding reliance on cryogenic infrastructure

Key Partners

DLR Deutsches Zentrum für Luft- und Raumfahrt
Fermionic
Q-Alliance
Deltares
kvantify
QM ware

Quantum Photonics Company Profile: Xanadu

Company

XANADU

Canada
Estab. 2016

Leading developer of photonic quantum computing and quantum software

Tech Profile

Supply Chain Positioning: Develops photonic quantum computers and software platforms (PennyLane) for quantum machine learning and hybrid AI-quantum workflows

Strategic Moat: Strong position in photonic system design paired with a widely adopted open-source software ecosystem

Key Financials

Strategic Event: Xanadu became the first publicly listed pure play photonic quantum computing company on March 27, 2026 [1]

Maturity & Economic Vitality: Trading under "XNDU"; previously received ~$275M+ funding, backed by global investors

Major Investors

Georgian · OMERS Ventures · AMD · Bessemer Venture Partners · Radical Ventures · BMO Global Asset Management · CIBC · CIBC Asset Management · Alumni Ventures · MMC ventures

+ other global institutional investors

Key Differentiator

Photonic quantum computing: Light-based qubits enabling room-temperature systems components and long-term scalability pathways

Quantum-AI tooling convergence: PennyLane platform integrates quantum workflows with classical machine learning framework for hybrid experimentation

Developer ecosystem: Strong open-source adoption, lowering barriers for enterprise and research use

Key Partners

THORLABS · Mitsubishi Chemical · University of Toronto · NRC-CNRC · ETRI Electronics and Telecommunications Research Institute · A*STAR Agency for Science, Technology and Research Singapore · BMW · Volkswagen · Rolls-Royce · Creative Destruction Lab



Quantum Cryogenics: Enabling Infrastructure

Current Status: A foundational supply-chain sector enabling the ultra-low temperatures (milli-Kelvin) operating environments required by superconducting qubits and leading silicon spin-qubit architectures

The Commercial Core

Bluefors: A leading manufacturer of dilution refrigerators, supporting superconducting quantum research globally [1]

Oxford Instruments: Supplies cryogenic dilution refrigerators and high-magnetic-field systems for quantum computing research [2]

Menlo Micro: Recently launched the MM4250, a cryogenic SP6T RF switch designed specifically to scale superconducting qubit control [3]

Intel: Pioneered Horse Ridge, a cryogenic control chip for in-fridge qubit management, advancing scalable quantum control electronics.[4]

Market Maturity

Current Phase: Established infrastructure layer, transitioning from single-system deployments to capacity-driven scaling

Analysis: Cryogenics has shifted from a specialist research enabler to a strategic scaling bottleneck for quantum computing systems

Key Drivers: The “wiring crisis”—the unsustainable scaling of room-temperature cabling— is accelerating adoption of Cryo-CMOS control electronics anchored inside dilution refrigerators. Focus is shifting from lab-scale experimentation toward practical, industrial-scale quantum system architectures..

Innovation Hubs / Hot Spots

VTT Technical Research Centre (Finland): The world’s primary hub for cryogenic engineering and superconducting materials [5][8][9]

Daresbury Laboratory (UK): New 2026 facility designed to attract global firms needing "cooling-as-a-service [6]

LBNL Berkeley Lab (USA): Focused on low-temperature physics for the National Quantum Initiative [7]

Emerging Market Signals

Closed-Cycle Refrigerators: Commercial standardization of automated, low-power cryogenic systems reflects the transition from lab-scale experiments to scalable quantum infrastructure. [10]

Strategic Implications for a Research Economy

- Cryogenics represents a critical scaling bottleneck for superconducting and spin-based quantum architectures; governments are funding open-access facilities to support early-stage hardware development.
- A comparatively stable commercial segment, where demand is anchored in unavoidable physical cooling requirements rather than application-led adoption.

Quantum Cryogenics Company Profile: YQuantum

Company

Switzerland
Spun out 2024

"Scaling the Qubit Core": Transitioning Lab Prototypes into Industrial-Grade Quantum Systems

Tech Profile

Supply Chain Positioning: Develops miniaturised, high-performance cryogenic hardware and control components for superconducting and spin-qubit quantum processors

Strategic Moat: Addresses cryogenic hardware scaling constraints through compact, high-density QPU packaging and miniaturised cryogenic control components optimised for seamless integration

Key Financials

Strategic Event: Awarded CHF 150K (~$187K) from Venture Kick in late 2025 to accelerate the commercialization of its next-generation hardware stack [1]

Maturity & Economic Vitality: Early Stage / Seed. Currently transitioning from a university spin-off to a commercial hardware provider for global research labs and quantum startups

Major Investors

VENTURE KICK

Key Differentiator

Miniaturization-led scalability: Focuses on shrinking the hardware footprint to support higher qubit density while preserving qubit fidelity as systems scale

Cross-platform compatibility: Their components are designed to support multiple low-temperature qubit platforms, including superconducting and spin-qubit architectures

Key Partners

University of Basel
Berkeley UNIVERSITY OF CALIFORNIA
Anyon Technologies

Quantum Cryogenics Company Profile: Bluefors

Company

BLUEFORS

Finland
Estab. 2008

Benchmark supplier of dilution refrigerators for quantum computing infrastructure

Tech Profile

Supply Chain Positioning: Develops dilution refrigerators (~10–15 mK) required for stable operation of superconducting qubits

Strategic Moat: Leading global supplier of quantum cryogenic systems, with deep integration across global quantum hardware supply chains

Key Financials

Strategic Event: Acquisition of Cryomech (2023) and expansion of US manufacturing capacity [1]

Maturity & Economic Vitality: Scaling; ~€200M estimated revenue (2024), export-driven business with strong demand from global QC players

Major Investors

DevCo · Aalto University · venture cup

+ private equity and institutional backing

Key Differentiator

Cryogenic infrastructure dominance: Primary supplier for IBM, Google, Rigetti, IQM and other superconducting QC leaders

Critical supply chain dependency: Acts as a chokepoint technology layer, with limited alternatives globally

Scalability enabler: Advanced systems designed to support large-scale, multi-qubit quantum processors

Key Partners

Delft Circuits — Hardware for quantum engineers · Linde · AIST

+ other Quantum hardware ecosystem partners



Quantum Computing: Roadmaps converging on the path to fault-tolerant systems

Current Status: : Early-stage commercial experimentation keeps growing. Prototypes are still in the noisy intermediate-scale quantum (NISQ) era. Broad quantum advantage estimated to be years away.

The Commercial Core

IBM: Entering the utility phase, where 100+ qubit processors are used as scientific tools to explore (narrow) quantum advantage, moving beyond brute-force classical simulation[1]

Google Quantum AI: Advancing toward Milestone 4 of its roadmap--demonstrating logical gates on encoded qubits as a foundation for first error corrected applications [2]

Quantinuum: Leading trapped-ion performance (~99.9% two-qubit fidelity) and Level 2 "Resilient" computing with Microsoft [3]

Microsoft: Integrating Quantinuum hardware into Azure Quantum to deliver and scale reliable logical qubits to enterprise customers [4]

Market Maturity

Current Phase: Main industry leaders aim to achieve fault-tolerant quantum computing (FTQC) by roughly 2030.

Analysis: Focus is shifting from isolated "hero experiments" toward engineered, repeatable systems—anchored in logical qubits, error correction, and scalable system integration.

Key Drivers: Large-scale institutional funding is increasingly focused on the "plumbing"—control systems, error correction, cryogenics, and integration infrastructure—required to scale beyond lab hardware demonstrations.

Innovation Hubs / Hot Spots

Chicago Quantum Exchange (USA): U.S. national hub for quantum systems engineering, error correction, and HPC-quantum co-design [5]

Quantum Valley Lower Saxony (Germany): Industry-led hub scaling fault-tolerant quantum systems and control electronics. [6]

RIKEN Centre for Quantum Computing (Japan): National hub for large-scale quantum system, cryogenics, and error-corrected architectures. [7]

Emerging Market Signals

Logical-Qubit Engineering (2025–2026): Platforms are shifting from qubit counts to encoded logical qubits, with repeated demonstrations of error-corrected operations and logical gate execution signaling a transition from NISQ to fault-tolerant system engineering. [8] [9] [10] [11]

HPC–Quantum System Integration: Co-design between quantum processors and HPC systems is accelerating, positioning QPUs as tightly coupled accelerators enabling hybrid quantum-classical workflows. [12] [13] [14]

Strategic Implications for a Research Economy

- As quantum computing moves from NISQ experiments to fault-tolerant architectures, competitive advantage increasingly sits in error-correction, control systems, and HPC–quantum integration rather than raw qubit counts.
- Leadership in logical-qubit engineering, hybrid quantum–classical workflows, and scalable system integration positions research institutions to become long-term partners for global platform builders as quantum computing industrialises.

Quantum Computing Company Profile: Terra Quantum

Company

Switzerland
Estab. 2019

"The Bridge to Utility": Scaling Quantum Value through Hybrid Classical-Quantum Architectures

Tech Profile

Supply Chain Positioning: Develops hybrid quantum algorithms running on GPU and cloud infrastructure today, with performance pathways to future acceleration on native quantum hardware

Strategic Moat: Proprietary hybrid quantum algorithms for optimization, simulation, and quantum-enhanced machine learning, deployable without fault-tolerant hardware

Key Financials

Strategic Event: 4+ rounds; €10M early (2020), Series A upsized to $75M (2022), latest PE round in 2023 [1]

Maturity & Economic Vitality: Deploying; ~$80-90M total funding, actively generating revenue through long-term industrial contracts in the automotive and energy sectors

Major Investors

LAKE STAR INVESTCORP

+ Karl-Heinz Kipp (Family Office), and a top cryptocurrency investor

Key Differentiator

Algorithm-first strategy: Focuses on hybrid quantum-classical software targeting practical optimization and finance use cases on current platforms

Global QaaS Launch: Launch of the TQC Cloud in late 2025, a global "Quantum-as-a-Service" (QaaS) platform

Key Partners

HRI Honda Research Institute EU
NVIDIA
THALES
SIEMENS
Cre8Ventures
BBVA

Quantum Computing Company Profile: PsiQuantum

Company

PsiQuantum

US / Australia
Estab. 2016

A long-horizon, fault-tolerant quantum computing effort

Tech Profile

Supply Chain Positioning: Intended to leverage CMOS-compatible silicon photonics and established semiconductor foundry processes

Strategic Moat: PsiQuantum will leverage foundry-manufactured silicon photonics (via GlobalFoundries) for scalable quantum hardware. [2]

Key Financials

Sovereign Partnership: In March 2025, they secured $620M AUD from the Australian Commonwealth to build the world's first utility-scale fault-tolerant computer in Brisbane [1]

Maturity & Economic Vitality: Scaling; Holds a $7B valuation with over $1.75B in total capital raised

Major Investors

BLACKROCK TEMASEK Baillie Gifford

Australian Government

+ other global institutional investors

Key Differentiator

Fault-tolerant-first architecture: Designed from inception around error-corrected systems rather than near-term NISQ devices

Photonic quantum computing (light-based qubits): Reduces reliance on millikelvin dilution refrigeration relative to superconducting systems

Utility-scale ambition: Pursuing a long-term pathway toward ~million-qubit-scale systems

Key Partners

DARPA · Linde · LOCKHEED MARTIN · AIRBUS · 国立がん研究センター National Cancer Center Japan · NVIDIA · UKRI Science and Technology Facilities Council

+ several Australian Universities

Geographic Analysis

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Key Takeaways – Geographic Patterns in Quantum Commercialization

1. **Specialization—not self-sufficiency—defines leading quantum ecosystems.**
   Most leaders focus on narrow strengths—platforms, infrastructure, software, or security—while fully sovereign, end-to-end systems remain rare.

2. **Value accrues to supply-chain chokepoints, not flagship systems: Durable advantage sits in enabling layers, not headline hardware.**
   Control over cryogenics, photonics, control electronics, software, and security scales across architectures and captures value regardless of which computing modality prevails.

3. **Public capital anchors ecosystems; private capital scales them.**
   States catalyze markets, but sustained growth depends on attracting foreign venture capital, hyperscalers, and defense-industry partnerships. Government can provide reference value via strategic procurement rather than tactical grants.

4. **Smaller economies succeed by embedding into global programs.**
   Integration into allied supply chains matters more than domestic scale, with participation in international programs and platforms outperforming standalone national builds.

5. **Security and infrastructure drive near-term deployment.**
   Post-quantum cryptography, quantum sensing, and secure communication are deploying now, while fault-tolerant computing remains a medium-term systems transition.

6. **The commercial race is shifting from “who builds” to “who enables.”**
   As fault-tolerant paths converge, advantage is moving toward error correction, orchestration software, manufacturing, and integration layers that support multiple global platforms.



Key Takeaways – Country Analysis

Profiles in this section are focus on the following 10 comparable countries to New Zealand: Australia; Finland; Ireland; Singapore; Sweden; France; Germany; Israel; The Netherlands; and Switzerland.

Emerging / Strategic Entrants	Focused, Niche Led Participants	Enabling Technology & Systems Specialists	Advanced System & Architecture Leaders	Global Platform Leaders
Early stage or demand driven participation, often security or sovereignty motivated	Selective participation aligned to national strengths rather than end to end computing	Critical contributors to fault tolerant progress without owning full platforms	Strong national systems, deep research, and validated fault-tolerant pathways	Full-stack capability; shaping architectures, standards, and long-term roadmaps
• **India** • **Middle East (UAE/KSA)**	• **Australia** • **Finland** • **Ireland** • **Singapore** • **Sweden**	• **France** • **Germany** • **Israel** • **The Netherlands** • **Switzerland**	• **Canada** • **Japan** • **United Kingdom**	• **China** • **United States**

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Emerging / Strategic Entrants

- **India**: Scaling national research programs; early fault-tolerant progress, with long-term potential driven by talent and scale
- **Middle East (UAE / KSA):** Investor- and demand-led engagement focused on access, security, and ecosystem building—not indigenous platforms

Focused, Niche Led Participants

- **Australia:** Strong academic and photonics base, pursuing selective fault-tolerant pathways through international partnerships
- **Finland:** Critical cryogenics and enabling infrastructure supplier, foundational to superconducting quantum computing, not a platform builder
- **Ireland:** Software- and semiconductor-adjacent ecosystem benefiting from hyperscalers, with limited sovereign quantum computing ambition
- **Singapore:** Demand-side leader leveraging imported platforms, focused on PQC, secure computing, and system integration
- **Sweden:** Strong research in materials, devices, and sensing-adjacent work, with limited standalone quantum computing platforms

Enabling Technology & Systems Specialists

- **France:** Applied research and industrial translation across photonics, control systems, and defence-aligned quantum technologies
- **Germany:** Applied research and industrial engineering strengths, emphasizing sensing adjacent computing, modular systems, and industrial translation
- **Israel:** Leads in quantum control, compilers, and orchestration software; monetises across hardware modalities via a “software toll booth” role
- **Switzerland:** Strong precision engineering and spin outs with corporate backing; limited ambition for sovereign, full stack quantum systems
- **The Netherlands:** Controls photonics, networking, and control layers; positioned as an “ASML like” quantum enabler, not platform builder

Advanced System & Architecture Leaders

- **Canada:** Research-led ecosystem transitioning to industrial scale, with strengths in photonics, error correction, and hybrid architectures
- **Japan:** Long-term industrial strategy emphasizing system engineering, cryogenics, materials, large-scale integration, and strong corporate participation
- **United Kingdom:** Balanced strengths across hardware, software, and sensing, supported by public funding and strong international partnerships

Global Platform Leaders

- **China:** State directed quantum superpower with vertically integrated programs spanning computing, communications, sensing, and infrastructure
- **United States:** Global platform leader with full stack systems, hyperscaler backing, capital scale, standards influence



Australia: Quantum Platforms and Enabling Technologies

Australia is leveraging deep academic strengths in silicon qubits and photonics to pursue selective pathways toward utility-scale fault-tolerant systems, anchored by international partnership

Firm Profiles & Supply Chain Position

PsiQuantum: US-based photonic quantum computing company developing a utility-scale, fault-tolerant system in Brisbane, supported by substantial Australian sovereign investment

Silicon Quantum Computing: Atomic-precision silicon qubits targeting long-term fault-tolerant systems

Diraq: CMOS-compatible silicon spin-qubit architectures for scalable quantum processors

Labs → Pilot → Scale Transition

Key Research Hubs: UNSW Sydney (CQC²T); University of Sydney (Sydney Quantum); Griffith University (QUATRI); University of Queensland; Pawsey Supercomputing Centre [1][2][3][4][5][6]

Investment Type & Revenue Dependence

Primary Vehicle: Federally supported sovereign co-investment and research funding [7]

Total Ecosystem Value: Concentrated, high-capex hardware-led investment [8]

Domestic vs. International: ~40% domestic / 60% international (Indicative comparison of public commitments and disclosed private capital – PsiQuantum) [9][10]

Major Investors: Australian Commonwealth Government: Global institutional investors (US/EU) [11]

Emerging Market Signals

Large-scale sovereign backing for photonic fault-tolerant hardware (PsiQuantum, Brisbane); Continued long-term progress in silicon spin-qubit architectures via CMOS-compatible approaches [12]

Strategic Implications for a Research Economy

- Australia has made targeted, high-conviction bets on select fault-tolerant quantum pathways, prioritizing depth over a broad, end-to-end national ecosystem.
- Its comparable strengths lie in hardware science, precision device fabrication, and long-term system engineering, anchored by leading university research in silicon qubits, photonics, and quantum materials with a focus on scaling challenges rather than near-term applications.
- Australia's global relevance is shaped by a dual model of sovereign co-investment in internationally led platforms and integration into allied research and defense programs, providing access to scale, capital, and market pull beyond what its domestic ecosystem alone can sustain.



Finland: Cryogenics & Enabling Infrastructure

Finland occupies a critical position in the global supply chain, producing the cryogenic environments required for almost all superconducting quantum computers

Firm Profiles & Supply Chain Position

Bluefors: Preferred global provider of "cryogen-free" (dry) dilution refrigerators for high-stakes quantum research

IQM Quantum Computers: Europe's leading full-stack superconducting system developer

Vexlum: Specialised laser solutions for quantum clocks and sensors

Labs → Pilot → Scale Transition

Key Research Hubs: VTT Technical Research Centre and Aalto University (InstituteQ) [3]

Investment Type & Revenue Dependence

Primary Vehicle: Finnish Quantum Technology Roadmap 2035

Total Ecosystem Value: €274M allocated (2020-2024); €70M for scaling qubits (2024-2027) [1][2][3]

Domestic vs. International: ~25% Domestic / 75% International (High US/EU institutional interest) [4]

Major Investors: BlackRock (€50M financing in March 2026), Tesi, and the European Investment Bank (EIB) [2][3][5]

Emerging Market Signals

HELMI-LUMI Integration: Successfully connected Finland's 54-qubit "HELMI" system to the LUMI supercomputer for hybrid HPC-Quantum workflows [6]

Strategic Implications for a Research Economy

- Most high-end quantum computers cannot be run without Finnish technology. Almost every superconducting quantum lab in the world relies on Bluefors dilution refrigerators to reach near-absolute zero temperatures.
- Finland owns the "refrigeration" chokepoint of the industry. While others fight over qubit counts, Finland scales the essential hardware infrastructure.
- Finland has achieved "un-substitutable" status in the global supply chain. They are the essential partner for any nation wanting to build physical quantum hardware.

Ireland: Quantum Communications, Silicon & Talent

Serving as a European testbed for quantum communication while acting as a software talent hub anchored by US Big Tech presence

Firm Profiles & Supply Chain Position

Equal1: Global leader in CMOS-based "Quantum-on-Chip" processors

Asiera (formerly HEAnet): Deploying the national quantum-secure networking backbone

IBM Quantum (Ireland): Large-scale R&D presence focusing on cloud software

Investment Type & Revenue Dependence

Primary Vehicle: IrelandQCI (National Quantum Communication Infrastructure) [1]

Total Ecosystem Value: €10M (IrelandQCI) co-funded by the EU's DIGITAL Europe program [1]

Domestic vs. International: ~20% Domestic / 80% International (Heavy reliance on EU grants and US corporate R&D) [3]

Major Investors: Atlantic Bridge, European Commission, Department of Enterprise, Trade and Employment (DETE) [2]

Labs → Pilot → Scale Transition

Key Research Hubs: Tyndall National Institute (Cork) and CONNECT Centre (Trinity College Dublin) [5] [6]

Emerging Market Signals

Municipal QKD Demonstration: First real-world trial of quantum-secure communication integrated into Dublin City Council's municipal fibre network (Feb 2026) [4]

Strategic Implications for a Research Economy

- Ireland is leveraging its role as a major European data and cloud hub to act as a connective layer between U.S. hyperscalers (IBM, Google, Microsoft) and European quantum research.
- By prioritizing CMOS-compatible "Quantum-on-Chip" approaches (e.g., Equal1) and software integration, Ireland is positioning itself for emerging "Quantum-as-a-Service" (QaaS) delivery models.
- Ireland's strategy emphasises workforce readiness and semiconductor-adjacent integration, illustrating how an established tech ecosystem can provide a pragmatic on-ramp into the quantum economy.



Singapore: Quantum-Safe Communications & Sensing

Singapore's approach is centred on national security and financial infrastructure, prioritizing quantum-resistant cryptography and satellite-to-ground links

Firm Profiles & Supply Chain Position

Horizon Quantum Computing: Automating the transition from classical code to quantum-ready algorithms

SpeQtral: Satellite-based Quantum Key Distribution (QKD) for global secure comms

Atomionics: Cold-atom sensors for underground resource exploration and navigation

Labs → Pilot → Scale Transition

Key Research Hubs: Centre for Quantum Technologies (CQT) at NUS (National University of Singapore), A*STAR (Agency for Science, Technology and Research) and NTU (Nanyang Technological University) [2]

Investment Type & Revenue Dependence

Primary Vehicle: National Quantum Strategy (NQS) under A*STAR [2]

Total Ecosystem Value: S$300M initial; part of a larger S$37B R&D budget (2026–2030) [1]

Domestic vs. International: ~50% Domestic (Sovereign Wealth) / 50% International [3] [4]

Major Investors: Temasek, SGInnovate, Cap Vista and international tech giants (Quantinuum partnership) [3]

Emerging Market Signals

- The "Helios" System: Singapore is the first nation outside the US to host Quantinuum's highest-fidelity trapped-ion system on-shore for local industry use [4]
- Deployment of the National Quantum-Safe Network (NQSN) for testing quantum-resistant cryptography in banking and telcos [1] [5]

Strategic Implications for a Research Economy

- As a global financial hub, Singapore views quantum as an existential threat to data privacy. Their strategy is security-first and deployment-led: building a "Quantum-Safe" fortress to keep global capital and data flowing through the city-state.
- Singapore positions itself as a leading commercial testbed for Quantum Key Distribution (QKD), particularly for financial and telecom infrastructure. Singapore banks are the most secure in APAC.
- Singapore provides the blueprint for how a small, high-density nation can protect its banking and telecom sectors from future "Harvest Now, Decrypt Later" attacks.



Sweden: Research-Led Quantum Systems & Enabling Technologies

Sweden is advancing quantum computing through deep, privately anchored research programs and industrial partnerships, with strengths in superconducting systems, control, and materials rather than full-stack leadership

Firm Profiles & Supply Chain Position

ConScience AB: Superconducting-qubit fabrication and nanofabrication services enabling rapid prototyping

SCALINQ: Cryogenic packaging and high-density interconnects enabling scalable superconducting and spin-qubit systems.

QET Sweden (Quantum Enabling Technologies): Superconducting parametric amplifiers for scalable, high-fidelity qubit readout

Labs → Pilot → Scale Transition

Key Research Hubs: Chalmers University of Technology (WACQT — quantum computing, national coordinator); KTH Royal Institute of Technology (quantum communication); Lund University (quantum sensing, NanoLund); Stockholm University (quantum sensing and communication, WACQT node) [1] [2] [3] [4]

Investment Type & Revenue Dependence

Primary Vehicle: Privately anchored, long-duration research led by WACQT, complemented by Vinnova support [5]

Total Ecosystem Value: ~SEK 1.4B committed through WACQT (2018–2030), plus additional targeted commercialization programs [5]

Domestic vs. International: Predominantly domestic funding, with growing EU, Nordic, and global partnerships [6]

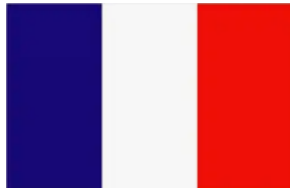
Major Investors: Knut and Alice Wallenberg Foundation; Vinnova; industrial partners including Ericsson, Volvo Group, AstraZeneca

Emerging Market Signals

Public funding continues to generate export-relevant photonics, sensing, and control-technology suppliers integrated into global quantum value chains. [7] University-linked research programs are consistently translating into niche hardware and enabling-technology spin-outs. [8]

Strategic Implications for a Research Economy

- Sweden's quantum value is created through research-led specialization, translating long-horizon programs into export-relevant enabling technologies rather than sovereign platforms.
- Sustained philanthropic foundation funding supports deep capability development in superconducting devices, control, and materials that integrate into global quantum system builders.
- Economic participation is maximised by embedding Swedish spin-outs into international supply chains, where niche hardware and enabling systems scale with global demand.



France: Enabling Quantum Technologies & Industrial Translation

France is leveraging strong public research and defense-linked procurement to advance enabling and system-level quantum hardware, photonics, and control technologies toward industrial relevance.

Firm Profiles & Supply Chain Position

Quandela: Photonic quantum processors with modular hardware targeting research applications and early fault-tolerant pathways

Muquans (Exail): Cold-atom quantum gravimeters and inertial sensors for geophysics, navigation, defense and space applications

Pasqal: Neutral-atom quantum systems leveraging dual analog-digital capability for scalable architectures and applied use cases

Investment Type & Revenue Dependence

Primary Vehicle: State-led research programs and defense-adjacent procurement [6] [7]

Total Ecosystem Value: €1.8B Plan Quantique (public-private), including €500M defense-administered PROQCIMA across five competing hardware companies. [8] [9]

Domestic vs. International: ~60% Domestic / 40% International (Largely domestically funded with EU support and rising international engagement) [10]

Major Investors: Bpifrance, France 2030 / PROQCIMA (DGA), Quantonation

Labs → Pilot → Scale Transition

Key Research Hubs: France's quantum research is anchored by three national organisations — CEA, CNRS, and Inria — concentrated across two world-class geographic clusters: Paris-Saclay (photonics, neutral atoms, algorithms) and Grenoble (silicon qubits, semiconductor fabrication, sensing). [1] [2] [3] [4] [5]

Emerging Market Signals

Continued public investment in photonics, quantum sensing, and control systems aligned to industrial and defense applications;
Strong flow of spin outs from national labs into applied quantum hardware and systems companies [11] [12]

Strategic Implications for a Research Economy

- France’s advantage lies in a diversity of advanced hardware pathways—spanning neutral atom, photonic, cat qubit, and silicon-adjacent architectures—supported by expertise in photonics, control systems, and system integration.
- Deep public research institutions enable reliable lab to industry translation across photonics, sensing, and control.
- Defense and sovereign procurement provide early anchor deployments, while commercial demand is gradually emerging to complement public-sector pathways to scale.

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Germany: Applied Quantum Systems and Industrial Engineering

Germany is leveraging strengths in applied research, industrial engineering, and manufacturing-adjacent quantum technologies to advance modular, system-level pathways toward fault-tolerant and sensing-led quantum deployment

Firm Profiles & Supply Chain Position

EleQtron: Ion-trap quantum computers using microwave control, targeting scalable, industrially deployable fault-tolerant systems

planqc: Neutral-atom quantum computing spin-out from Max Planck, focused on scalable, fault-tolerant system engineering

Q.ANT: Photonic processors for energy-efficient AI and HPC, with a parallel quantum computing program targeting photonic qubit architectures.

Investment Type & Revenue Dependence

Primary Vehicle: Public-led research programs combining federal funding, Länder co-investment, and major national research institutes [6] **Total Ecosystem Value:** ~€3B public commitment since 2020 across national programs, infrastructure, and applied quantum systems [7]

Domestic vs. International: ~55% Domestic / 45% International (Primarily domestically funded public research, complemented by EU programs and selective international partnerships) [8]

Major Investors: BMBF; Federal States (Länder); EU (Horizon Europe, EuroHPC); Siemens; Bosch; SAP; Fraunhofer Venture [9]

Federal Ministry of Research, Technology and Space

Fraunhofer

Labs → Pilot → Scale Transition

Key Research Hubs & Quantum Clusters: Max Planck and Fraunhofer (applied quantum systems); Helmholtz and Jülich (infrastructure, HPC-quantum integration); Munich Quantum Valley (national coordination) [1] [2] [3] [4] [5]

Max Planck Quantum Alliance

Fraunhofer

HELMHOLTZ

JÜLICH Forschungszentrum

Munich Quantum Valley

Emerging Market Signals

Continued public investment in modular quantum systems, neutral-atom platforms, and HPC–quantum integration [10]

Translation of Max Planck and Fraunhofer research into scalable, industry-aligned quantum hardware spin-outs [11]

Strategic Implications for a Research Economy

- Germany's advantage lies in applied systems engineering and manufacturing-adjacent quantum technologies rather than full-stack platforms.
- Leadership in modular architectures, sensing-led computing, and HPC integration positions Germany as an industrial translation partner.
- Economic value is captured through embedding quantum capabilities into automotive, materials, energy, and industrial supply chains.



Israel: Quantum Software & Control Systems

Builds on its cybersecurity and defence heritage to specialise in quantum control systems, orchestration software, and security-critical layers of the quantum stack

Firm Profiles & Supply Chain Position

Quantum Machines: Quantum control orchestration (the "brain" of the computer)

Classiq: Quantum software automation and functional modelling

Quantum Source: Photonic architecture targeting practical, fault-tolerant quantum computing

Labs → Pilot → Scale Transition

Key Research Hubs: Israeli Quantum Computing Centre (IQCC) at Tel Aviv University (operational 2024), Weizmann Institute of Science, and Hebrew University of Jerusalem [1]

Investment Type & Revenue Dependence

Total Ecosystem Value: Israel's quantum sector has attracted >$650M VC funding; $390M initial national program budget (INQI – Israel National Quantum Initiative) [1] [4]

Domestic vs. International: ~30% Domestic / 70% International (Heavy US and Gulf state interest) [2] [5]

Major Investors: Israel Innovation Authority, MizMaa, Bessemer Venture Partners, and Red Dot Capital [2] [5]

Emerging Market Signals

Hybrid Cloud-Quantum Integration: The IQCC is the first facility to combine multiple hardware types (superconducting and photonic) with classical HPC in a single on-site centre [3]

Strategic Implications for a Research Economy

- Israel is betting that the first real-world value of quantum will not be a 1-million-qubit computer, but the software and security protocols that protect existing data.
- By dominating the control layer (Quantum Machines) and software automation (Classiq), Israel ensures that regardless of which hardware wins (Google, IBM, or IonQ), the world will likely need Israeli IP to run it.
- A low-cap, high-IQ strategy that creates a "software toll booth" for the global quantum industry.

The Netherlands: Photonics & Quantum Networking

Often described by analysts as aspiring to an ASML-like role in quantum, the Netherlands prioritises controlling key enabling technologies—like photonics and networking—over building a single national quantum computer

Firm Profiles & Supply Chain Position

QuantWare: World's first to sell "off-the-shelf" quantum processors (QPUs)

Qblox: Scalable control stacks for massive qubit arrays

QuiX Quantum: Market leader in photonic quantum processors

Labs → Pilot → Scale Transition

Key Research Hubs: QuTech (Delft), which is a partnership between TNO and TU Delft; Quantum Amsterdam

Investment Type & Revenue Dependence

Primary Vehicle: Quantum Delta NL (QDNL) National Growth Fund [1]

Total Ecosystem Value: €615M committed (2021–2028), with an additional €10.5M 2025/2026 call [1] [2]

Domestic vs. International: ~60% Domestic / 40% International [4]

Major Investors: Invest-NL, DeepTechXL, and the NWO (Netherlands Org. for Scientific Research),

Emerging Market Signals

The First Quantum Internet: Successfully demonstrated the world's first multi-node quantum network using entanglement-based protocols in a metropolitan area (Delft-The Hague) [3]

Strategic Implications for a Research Economy

- The Netherlands is positioning itself as the ASML of Quantum. They aren't just building a computer; they are building the specialised manufacturing and networking supply chain that the rest of Europe will depend on.
- Their lead in photonic chips and entanglement-based networking (QuTech) makes them the "plumbing" of the future quantum internet.
- Dutch-developed photonic, control, and networking technologies are likely to play a foundational role in European and allied quantum infrastructure.



Switzerland: Precision Engineering, Spin-Outs & Enabling Quantum Technologies

Switzerland's quantum relevance is driven by deep university-led research, precision engineering spin-outs, and global leadership in enabling technologies—rather than sovereign, end-to-end quantum computing platforms

Firm Profiles & Supply Chain Position

Qnami: Diamond-based quantum sensing for nanoscale magnetic and materials analysis

YQuantum: Miniaturised cryogenic hardware components for scalable superconducting and spin-qubit quantum processors

Miraex: Photonic quantum interconnects enabling distributed quantum computing, sensing, and future quantum networks via PIC-based transduction

Labs → Pilot → Scale Transition

Key Research Hubs: ETH Zurich Quantum Centre; Basel Quantum Centre at the University of Basel; EPFL; University of Geneva; and Quantum Technology Initiative at CERN [1][2][3][4][5]

Investment Type & Revenue Dependence

Primary Vehicle: University-anchored research funding and public grants, plus early-stage private capital and corporate partnerships [6]

Total Ecosystem Value: ~CHF 400–600M deployed since 2018, with CHF 200–300M additional recommended under the 2026 Swiss Quantum Strategy [7][8][9]

Domestic vs. International: ~40% Domestic / 60% International (Strong domestic research anchor with significant foreign VC, corporate, and defence-adjacent capital at scale-up stage) [10][11]

Major Investors: SNSF, Innosuisse, Venture Kick, Swisscom Ventures, Quantonation

Emerging Market Signals

University-anchored research continues to generate globally relevant photonics, sensing, and cryogenic suppliers embedded in international quantum supply chains. [12]

Strategic Implications for a Research Economy

- Switzerland's strength lies in translating world-class academic research into globally relevant enabling quantum technologies.
- Its economic participation is driven by precision engineering spin-outs embedded in international quantum supply chains rather than sovereign, full-stack systems.
- This model demonstrates how small research economies can capture value by specializing in high-leverage components—photonics, sensing, and cryogenic hardware—at scale.

Data Analysis

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Key Takeaways

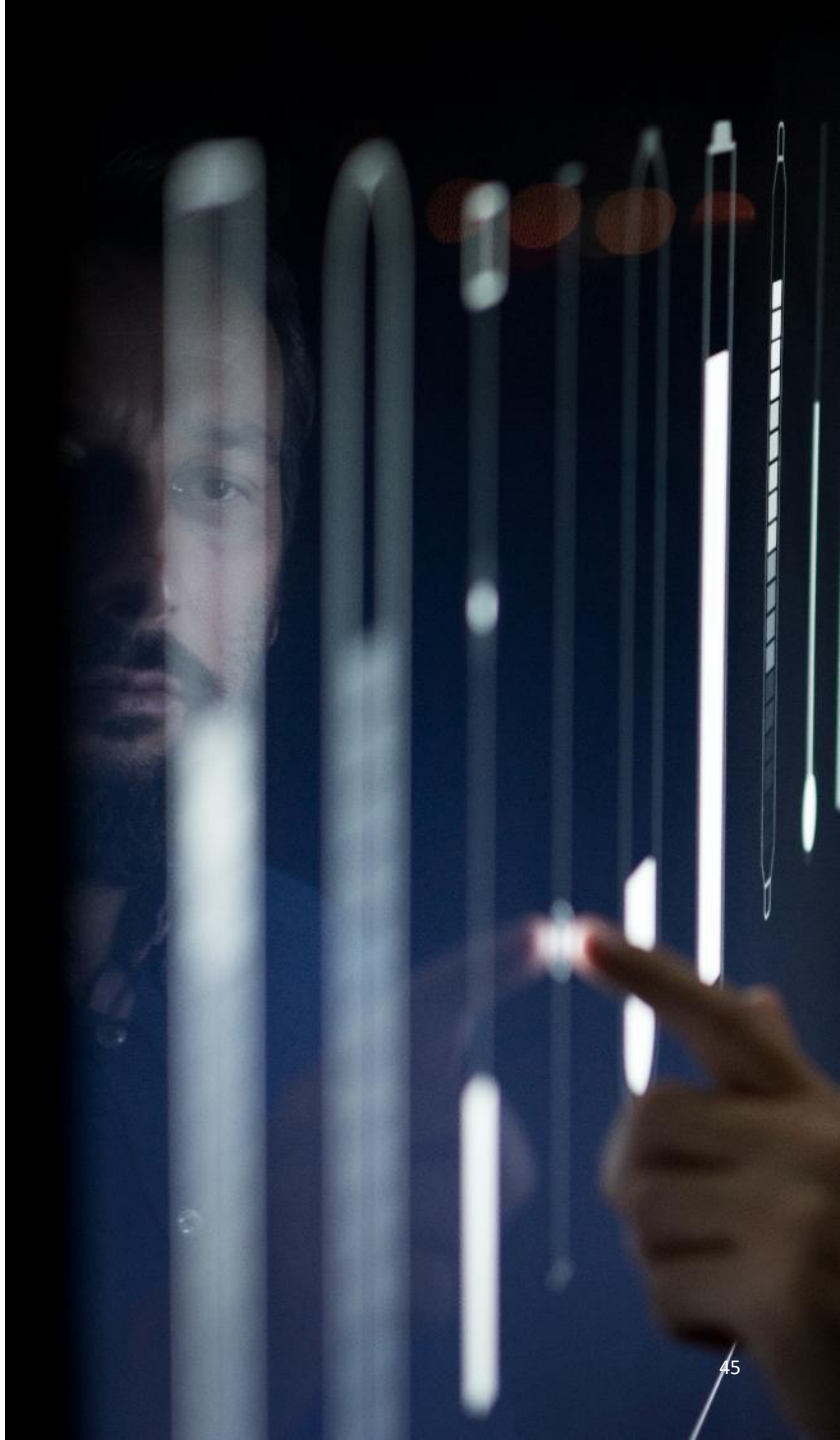
- **Ecosystem is expanding but remains early-stage**
  Quantum startup activity has grown significantly (+55%), with ~50% concentrated in the US, UK, and Canada. However, most companies remain in validation and deployment stages, with only a handful reaching full commercial maturity.

- **Investment is concentrating as the market matures**
  Funding is heavily skewed toward quantum computing (~60% of total funding), while photonics attracts the largest deal sizes. The market is shifting toward fewer, larger deals, with top transactions accounting for a disproportionate share of total funding.

- **Innovation leadership is highly concentrated**
  ~80% of quantum patents originate from China and the US, with China surpassing the US in 2019 and maintaining leadership. Outside these two markets, innovation remains fragmented with no scaled third global hub.

- **Talent demand is accelerating but remains specialised**
  Quantum hiring has accelerated sharply in 2025–2026, driven primarily by technical and research roles. Demand is concentrated in quantum computing, with the US leading globally and India emerging as a key engineering and developer talent hub.

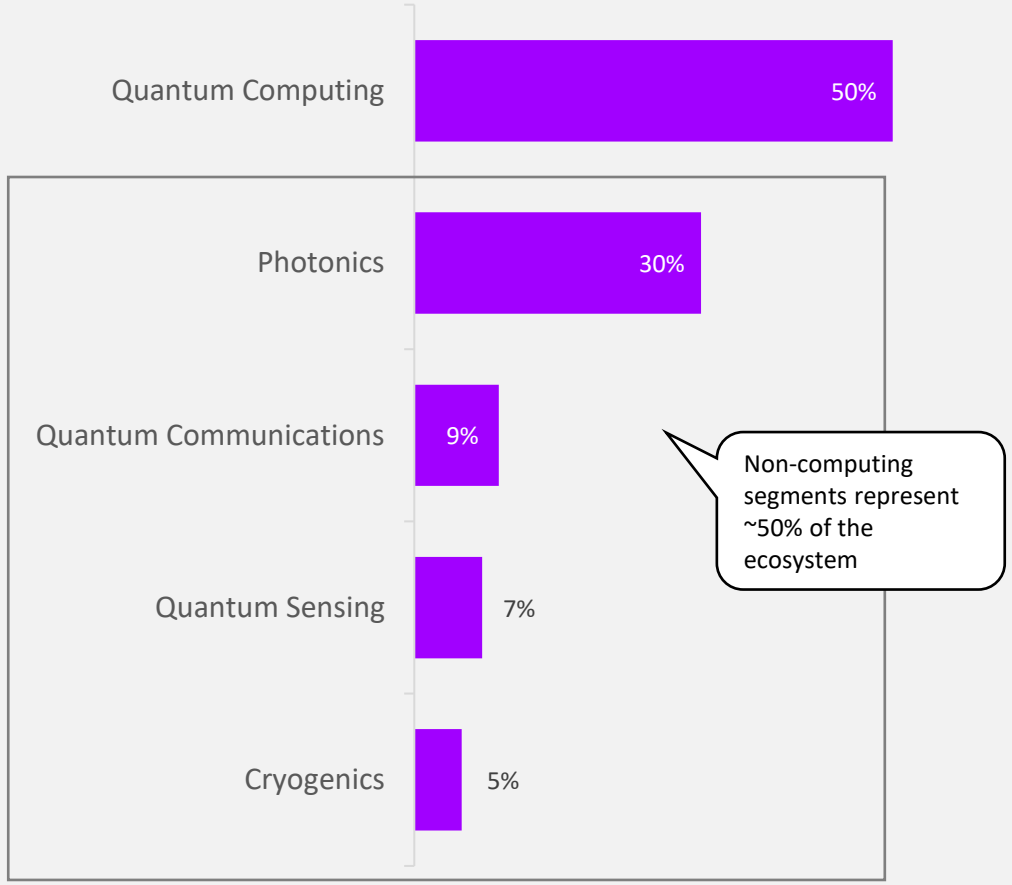
- **Capital and ecosystem dynamics vary by market maturity**
  The investor base is broad (1.7K+ investors), with VC participation dominating and government playing a smaller but strategic role. Smaller markets rely more on foreign capital, while the US and China benefit from stronger domestic funding ecosystems.



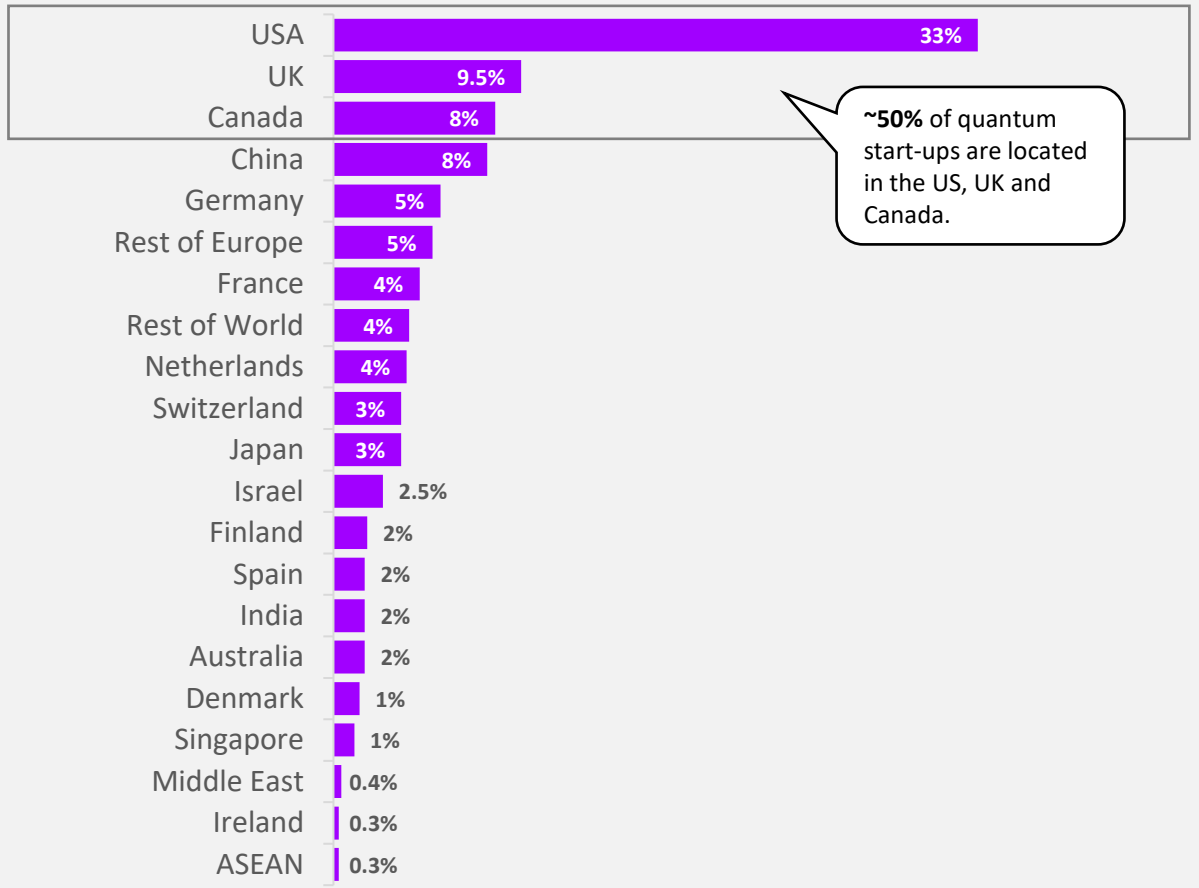
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Quantum + Enabling Technologies Landscape – By Segment And Regions

Share of start-ups by segment (March 2026)



Share of quantum + enabling technologies related start-ups by region (March 2026)



Source: Sources include public and proprietary market intelligence, company disclosures, industry databases, expert interviews and Accenture analysis.

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Quantum + Enabling Technologies Landscape – Segments X Region

Share of global start-ups by region and segment (March 2026)

US shows broad leadership across all segments, while China's activity is more concentrated in photonics and computing

US dominates across all segments

China shows stronger focus in photonics

	Quantum Computing	Photonics	Quantum Communications	Quantum Sensing	Cryogenics
USA	13.3%	11.5%	2.4%	2.9%	2.7%
UK	4.6%	2.9%	1.1%	0.7%	0.3%
Canada	6.0%	1.1%	0.7%	0.4%	0.1%
China	2.5%	4.0%	1.1%	0.1%	0.1%
Germany	2.5%	1.2%	0.5%	1.1%	0.1%
Rest of Europe	3.4%	1.1%	0.4%	0.1%	
France	2.1%	1.5%	0.3%	0.4%	0.1%
Rest of World	2.1%	1.2%	0.5%		
Netherlands	1.6%	1.2%	0.4%	0.1%	0.4%
Japan	2.1%	0.9%	0.3%		0.1%
Switzerland	1.6%	0.9%	0.4%	0.5%	
Israel	1.6%	0.7%	0.1%		0.1%
Finland	1.2%	0.3%			0.3%
Australia	1.2%			0.4%	
India	0.9%	0.1%			0.5%
Spain	0.9%	0.4%	0.1%	0.1%	
Denmark	0.5%	0.5%	0.3%		
Singapore	0.8%		0.1%	0.1%	
Middle East	0.1%	0.1%	0.1%		
ASEAN	0.3%				
Ireland	0.1%	0.1%			

Low — High

Source: Sources include public and proprietary market intelligence, company disclosures, industry databases, expert interviews and Accenture analysis.

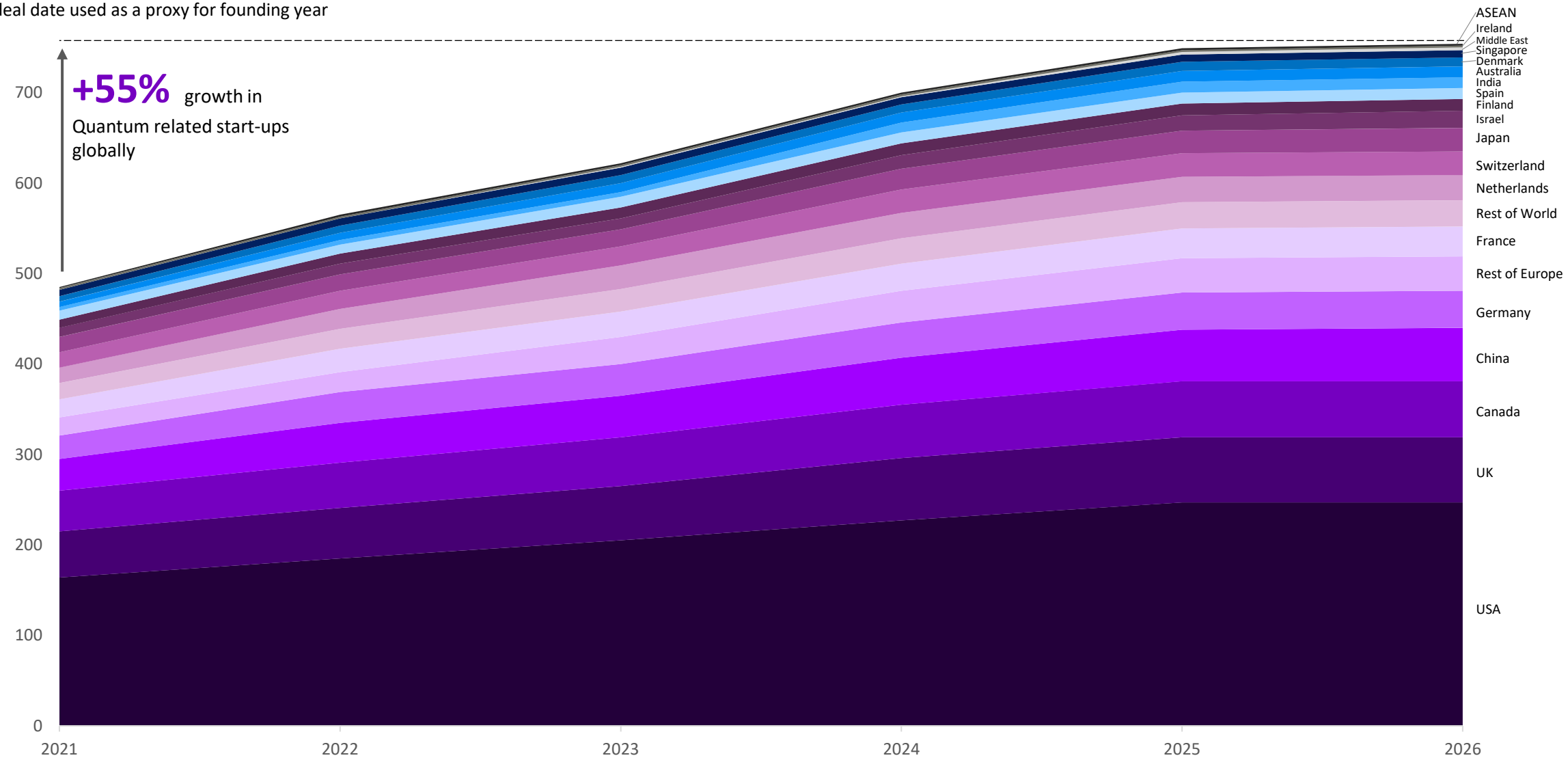
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Quantum + Enabling Technologies Landscape – Region Over Time

Cumulative total of quantum + enabling technologies related start-ups by first deal date and region (2021 – 2026*)

First deal date used as a proxy for founding year



Source: Sources include public and proprietary market intelligence, company disclosures, industry databases, expert interviews and Accenture analysis.

*2026 data is partial until March 2026.

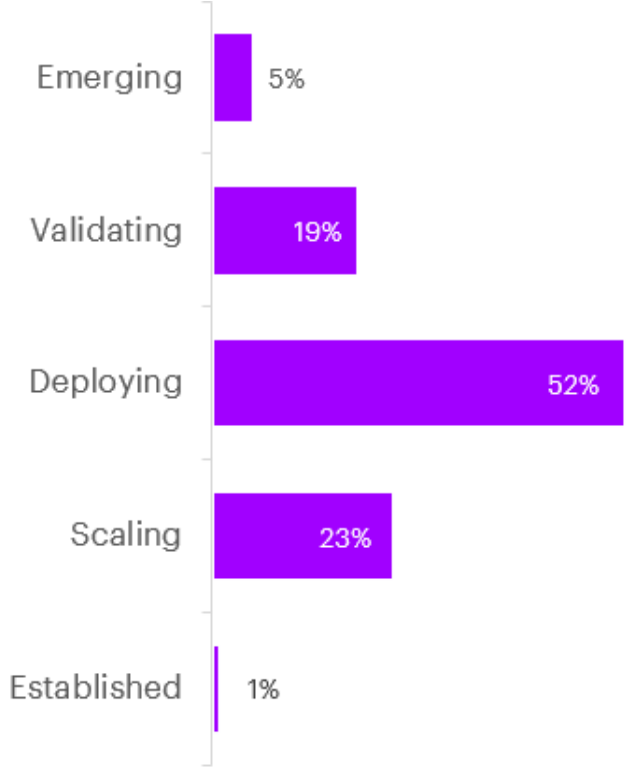
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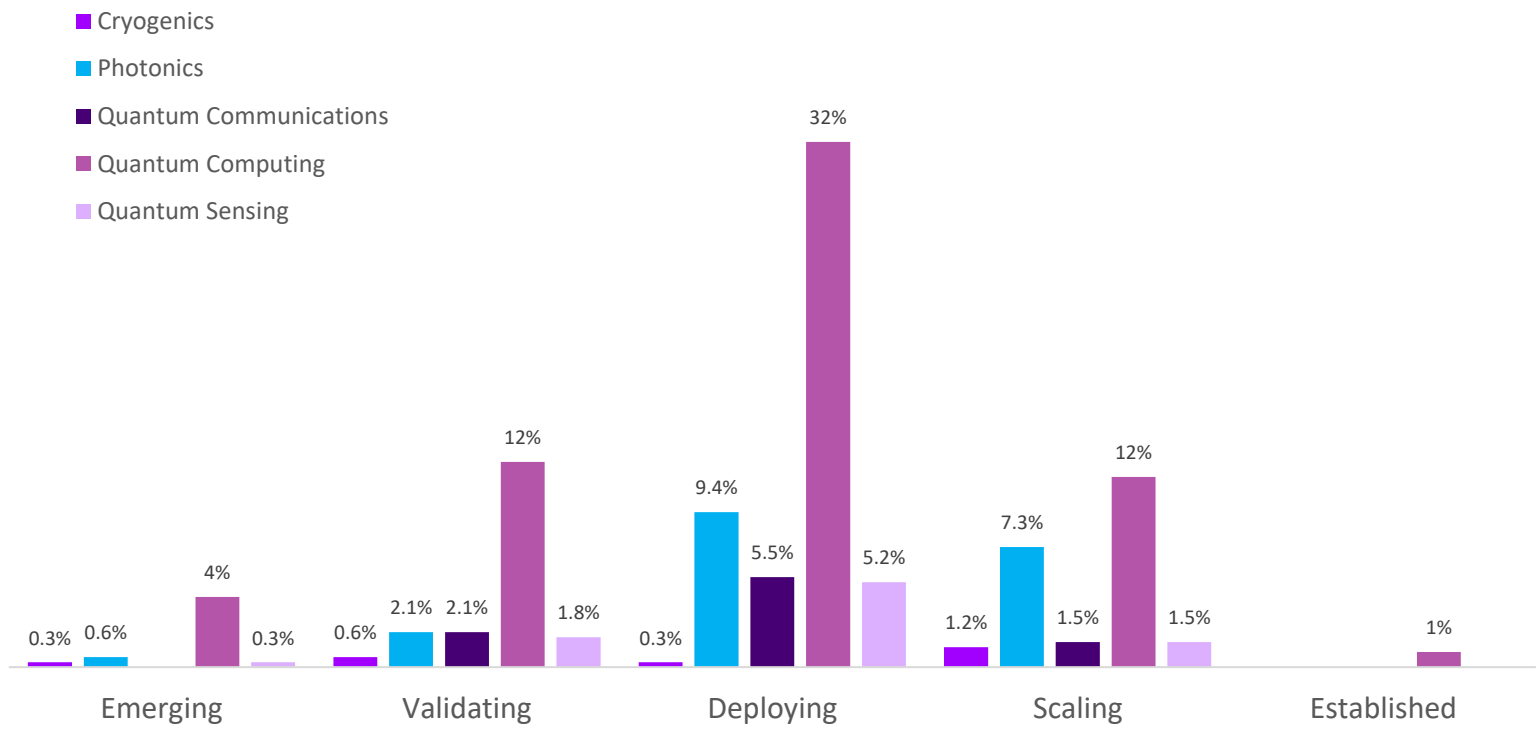
Quantum + Enabling Technologies Landscape - Startup Maturity

Maturity assesses a startup's market readiness on a 5-level scale (Emerging to Established) based on traction indicators such as customers, funding, and partnerships.

Share of quantum + enabling technologies related start-ups by maturity stage (March 2026)



Share of quantum + enabling technologies related start-ups by maturity stage & segment (March 2026)



Emerging: Early-stage company, founding team only, pre-Series A, product still in development.
Validating: Introducing product to market via pilots and early testing; yet to achieve commercial validation.
Deploying: Validated concept with a live product in early commercial distribution and beginning to acquire customers.
Scaling: Gaining market traction with growing client base, partnerships, headcount, and revenue.
Established: Widely adopted, stable market presence with sustained commercial operations and capital flows.

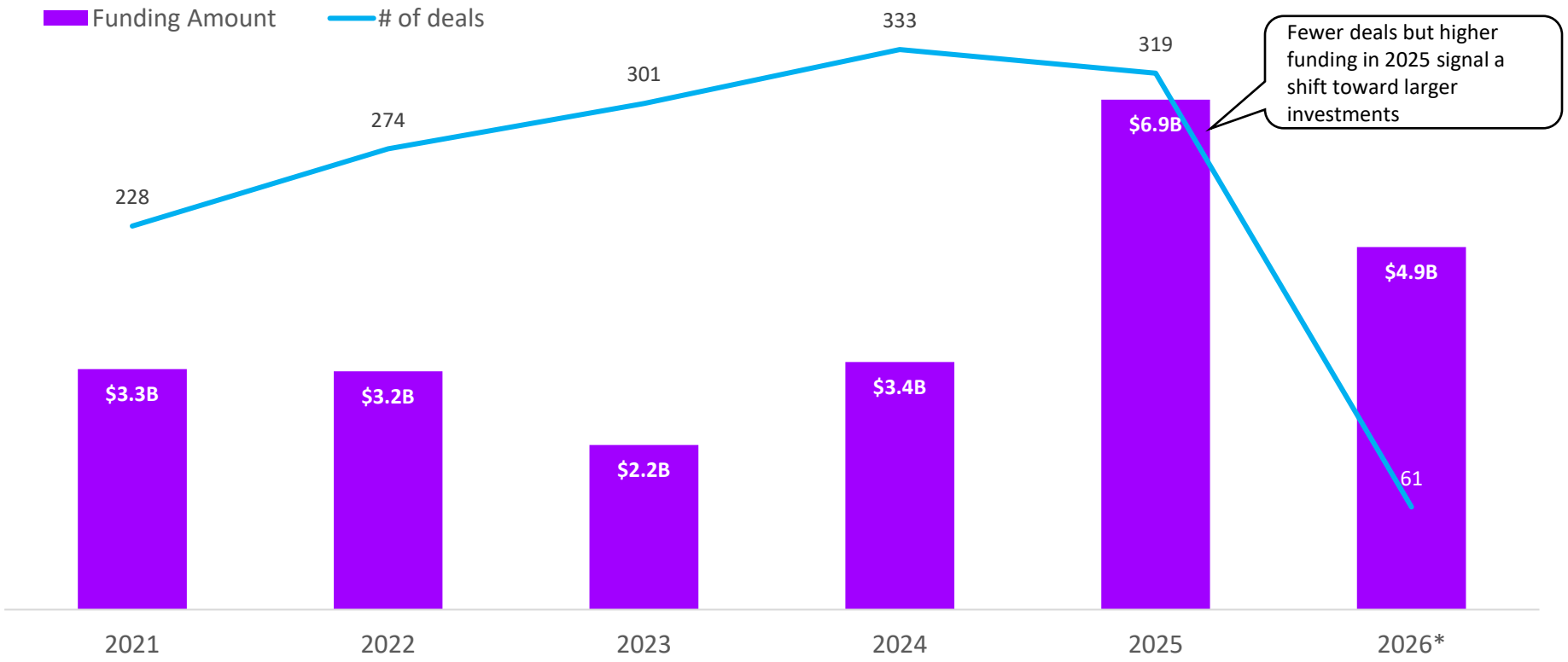
Source: Sources include public and proprietary market intelligence, company disclosures, industry databases, expert interviews and Accenture analysis.

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Quantum + Enabling Technologies Landscape – Deals & Funding Over Time

Total deals vs. funding amounts for quantum + enabling technologies related startups (2021 – 2026*)



*2026 data is partial until March 2026.

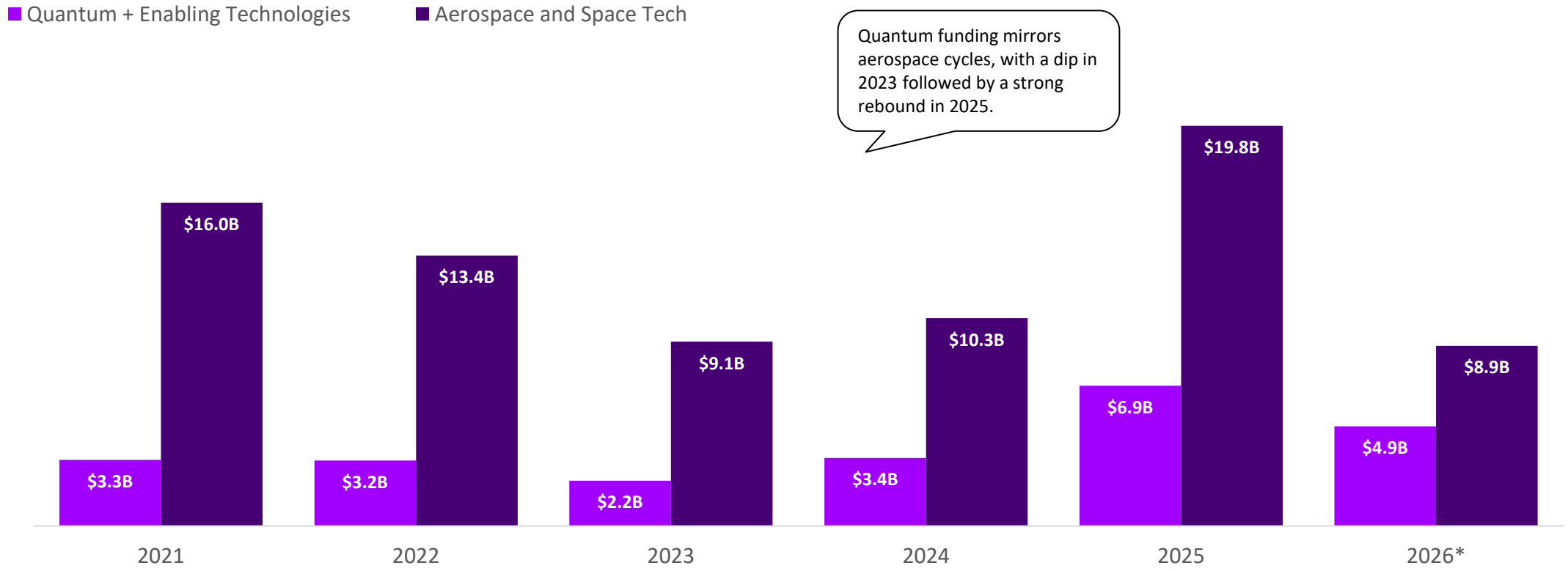
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Quantum + Enabling Technologies Landscape – Aerospace Comparison

Total funding amounts for quantum + enabling technologies and aerospace related startups (2021- 2026*)



*2026 data is partial until March 2026.

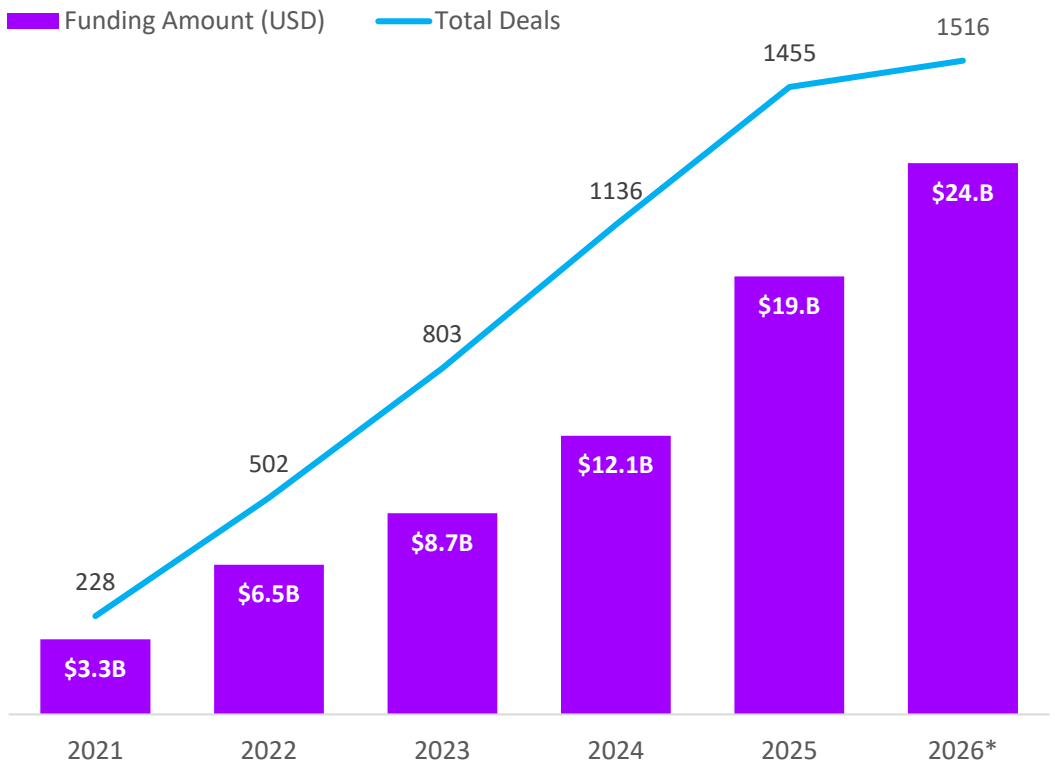
Source: Sources include public and proprietary market intelligence, company disclosures, industry databases, expert interviews and Accenture analysis.

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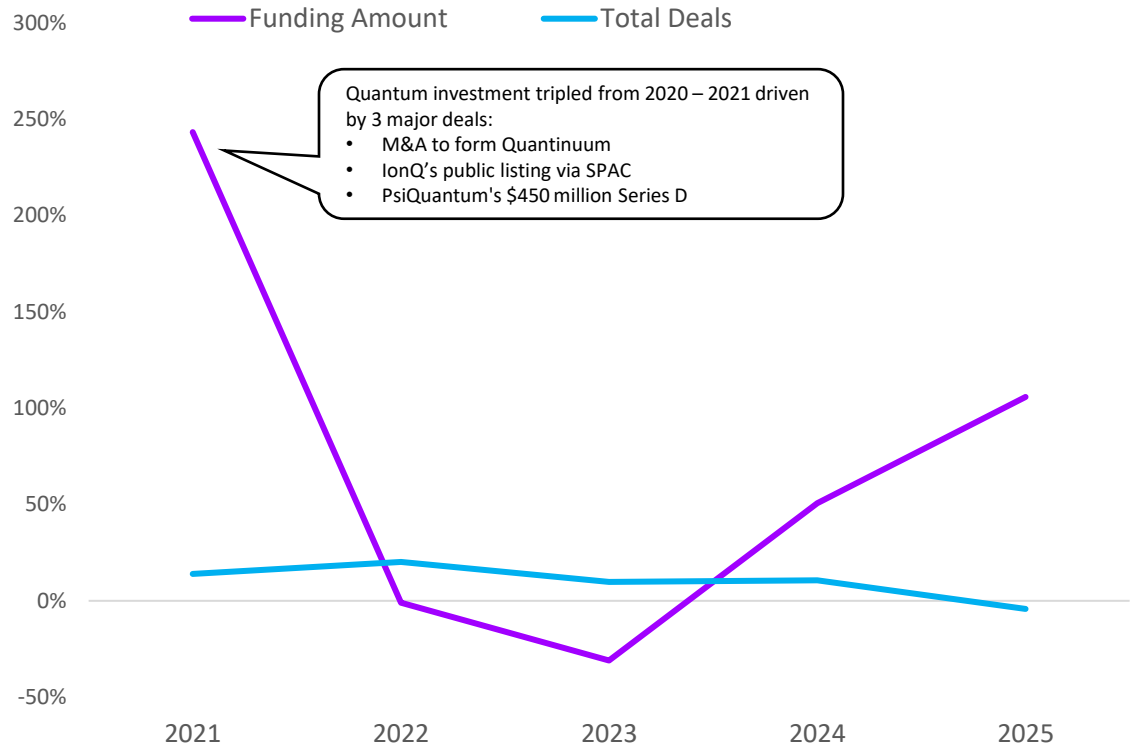
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Quantum + Enabling Technologies Landscape – Cumulative & YoY Growth

Cumulative deals and funding amount for quantum + enabling technologies related startups (2021 – 2026*)



YoY growth in deals and funding amount for quantum + enabling technologies related startups (2021 – 2025)



*2026 data is partial until March 2026.

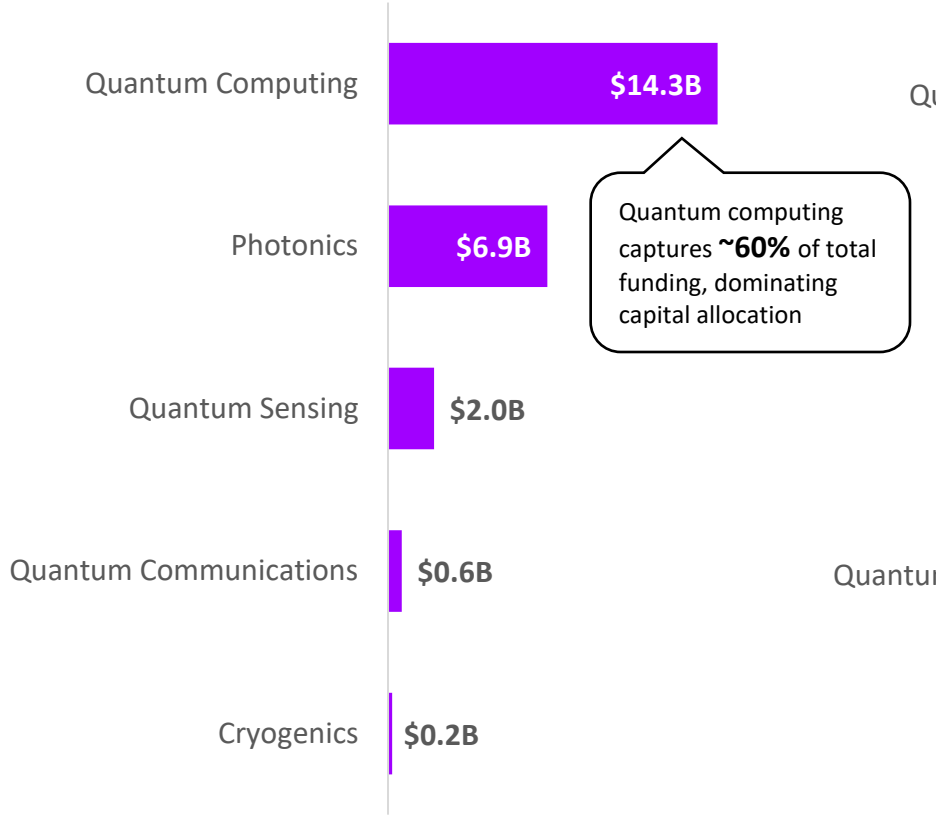
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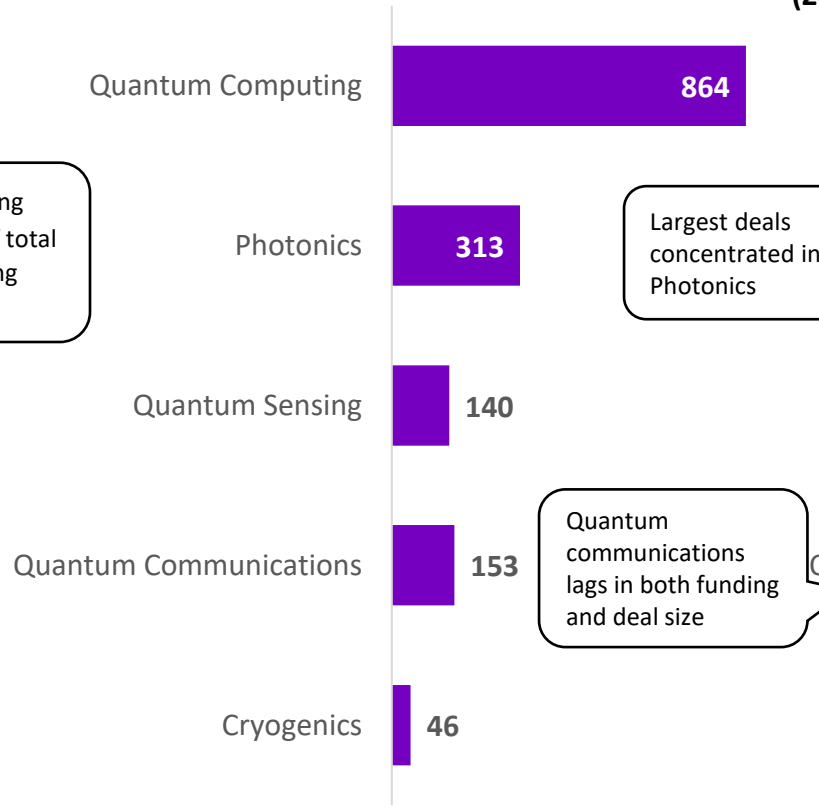
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Quantum + Enabling Technologies Landscape – Segments X Deals & Funding

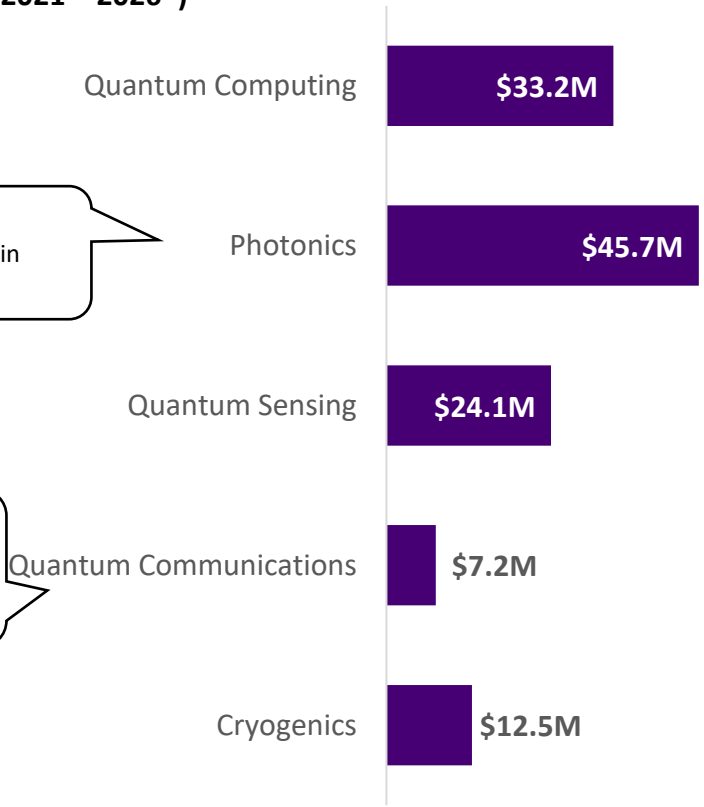
Total funding amount by segment (2021 – 2026*)



Total deals by segment (2021 – 2026*)



Avg. funding amount per deal by segment (2021 – 2026*)**



*2026 data is partial until March 2026.
** Average funding amount per deal only includes deals with amounts disclosed in the calculation.
Source: Sources include public and proprietary market intelligence, company disclosures, industry databases, expert interviews and Accenture analysis.

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Quantum + Enabling Technologies Landscape – Top 10 Deals

Top 10 deals (2025–2026 YTD) account for **~70%** of total funding but only **~3%** of total deals from 2025- 2026*

Top 10 deals for quantum + enabling technologies related startups by deal funding amount (2025 – 2026*)

Companies	Funding Amount(M, USD)	Deal Date	Round Investors	Segment	Region
Lumentum	2,000	3/2/2026	NVIDIA	Photonics	USA
Coherent	2,000	3/2/2026	NVIDIA	Quantum Computing	USA
IonQ	1,000	7/7/2025	Heights Capital Management	Quantum Computing	USA
PsiQuantum	1,000	9/10/2025	1789 Capital, Adage Capital Management, Baillie Gifford, BlackRock, Blackbird Ventures et al.	Quantum Computing	USA
Quantum Computing	750	9/21/2025	Undisclosed Investors	Photonics	USA
Quantinuum	600	8/12/2025	Amgen, Cambridge Quantum Holdings, Honeywell, JPMorganChase et al.	Quantum Computing	USA
IQM	320	9/3/2025	55 North, Bayern Kapital, EIC Fund, Elo, Schwarz Group, Ten Eleven Ventures, Tesi et al.	Quantum Computing	Europe
QuEra Computing	230	2/11/2025	Google Quantum AI, QVT, Sabanci Ventures, Safar Partners, SoftBank et al.	Quantum Computing	USA
Multiverse Computing	215	6/12/2025	Bullhound Capital, CDP Venture Capital, EIC STEP Scale Up, ForgePoint Capital, HP Tech Ventures et al.	Quantum Computing	Europe
Lightelligence	210	9/4/2025	CAS Star, China Mobile, China Reform Fund, Pudong VC, Shanghai State-owned Capital Investment et al.	Photonics	China

*2026 data is partial until March 2026.
Source: Sources include public and proprietary market intelligence, company disclosures, industry databases, expert interviews and Accenture analysis.

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Quantum + Enabling Technologies Landscape – Top 10 Deals in Photonics

Top 10 deals by deal size for Photonics (2021 – 2026*)

Companies	Funding Amount(M, USD)	Deal Date	Round Investors	Company Type	Region
Lumentum	2000	3/2/2026	NVIDIA	Supplier	USA
Quantum Computing	750	9/21/2025	Undisclosed Investors	Quantum	USA
PhotonDelta	680.96	4/14/2022	Undisclosed Investors	Ecosystem enabler	Netherlands
PhotonDelta	508.04	4/14/2022	National Growth Fund	Ecosystem enabler	Netherlands
Lightmatter	400	10/16/2024	Fidelity Investments, Google Ventures, T. Rowe Price	Supplier	USA
Black Semiconductor	245.73	6/12/2024	Federal Ministry for Economic Affairs and Climate Action	Supplier	Germany
Yuanjie Semiconductor	216	12/21/2022	Public	Supplier	China
Lightelligence	210.31	9/4/2025	CAS Star, China Mobile, China Reform Fund, et al.	Supplier	China
Lightmatter	155	12/19/2023	Google Ventures, Undisclosed Investors, Viking Global Investors	Supplier	USA
Lightmatter	154	5/31/2023	AXIAL Partners, Fidelity Investments, Google Ventures, et al.	Supplier	USA

*2026 data is partial until March 2026.
Source: Sources include public and proprietary market intelligence, company disclosures, industry databases, expert interviews and Accenture analysis.

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Quantum + Enabling Technologies Landscape – Funding by Segments X Region

Total funding amount (USD, M) by segment and region (2021- 2026*)

	Quantum Computing	Photonics	Quantum Communications	Quantum Sensing	Cryogenics
USA	8,403.03	3,963.00	68.18	1,572.34	111.74
Netherlands	1,155.31	1,481.64	33.09		16.04
Canada	789.08	110.76	237.13	1.01	4.94
France	895.39	97.95	10.10	12.20	
China	203.57	603.56	10.66	18.45	
UK	568.54	52.32	103.57	36.35	
Germany	185.57	282.21	12.31	214.56	15.22
Israel	493.12	71.00			27.61
Finland	583.36	6.47			
Spain	364.87	33.47	0.80		
Australia	188.45			124.36	
Switzerland	71.94	4.86	75.00	7.32	
Japan	66.47	50.41	25.33		
Denmark	27.41	97.84	3.68		
Rest of Europe	56.90	40.19	10.52		
Ireland	71.49	5.91			
Rest of World	63.46	2.90	1.00		
Singapore	38.10		8.30	14.57	
India	56.23	0.12			
Middle East			1.78		
ASEAN	0.93				

Low — High

Key takeaways:

- US accounts for majority of funding across all segments
- China shows strong focus in photonics ($600M+)
- Germany stands out in quantum sensing ($215M)
- Canada is investing in quantum communications ($237M)
- Netherlands' funding is driven by PhotonDelta and Quantum Delta, both raising over $1B over the past 5 years.

*2026 data is partial until March 2026.
Source: Sources include public and proprietary market intelligence, company disclosures, industry databases, expert interviews and Accenture analysis.

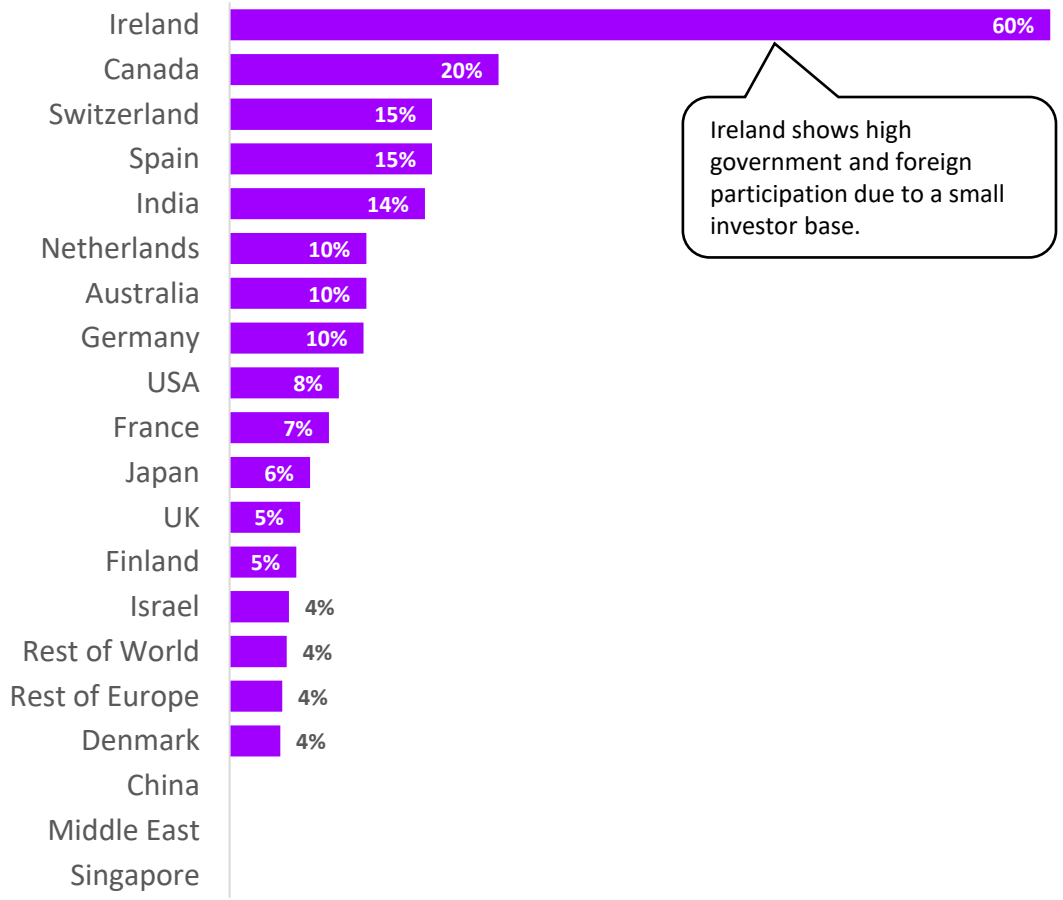
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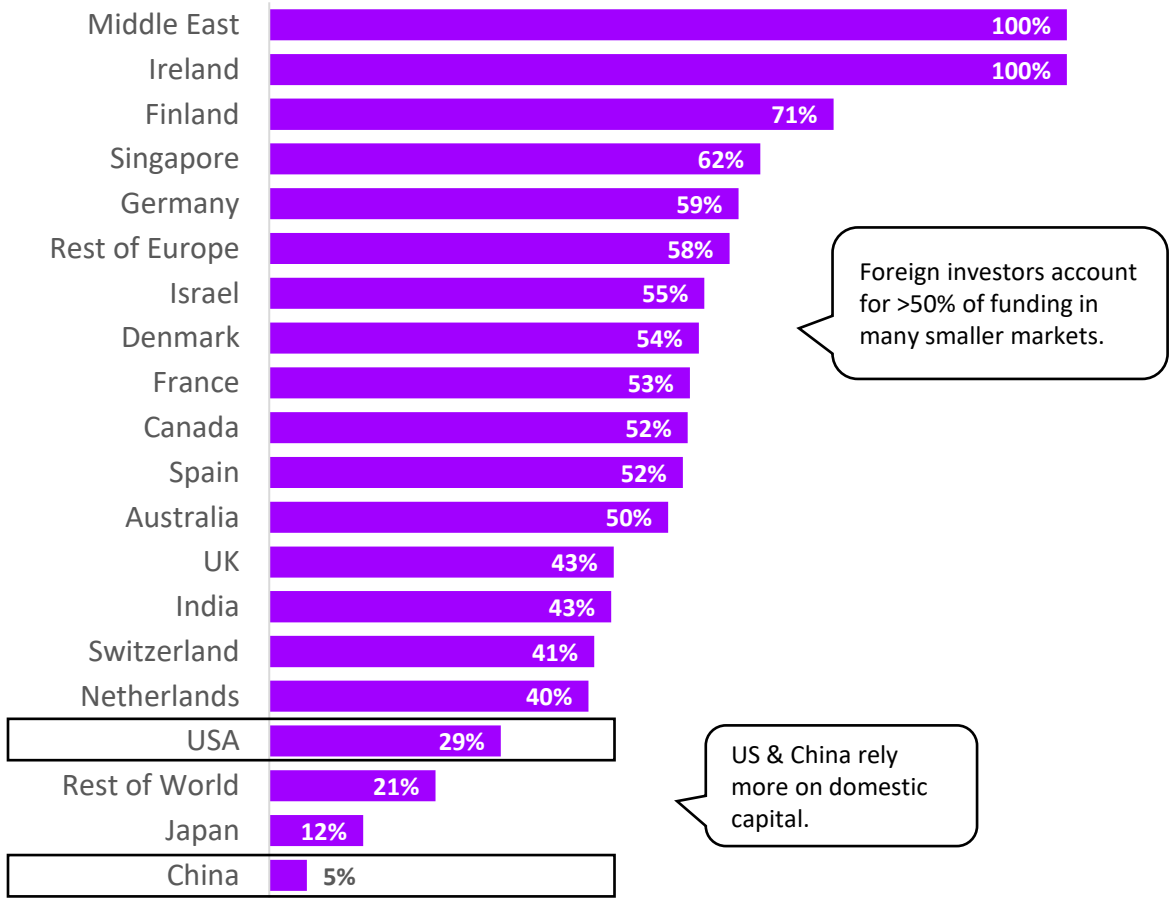
Quantum + Enabling Technologies Landscape – Investor Type

Government funding remains limited across most markets, increasing reliance on foreign investors.

Share of government investors by startup region/country (2021 – 2026*)



Share of foreign investors by startup region/country (2021 – 2026*)



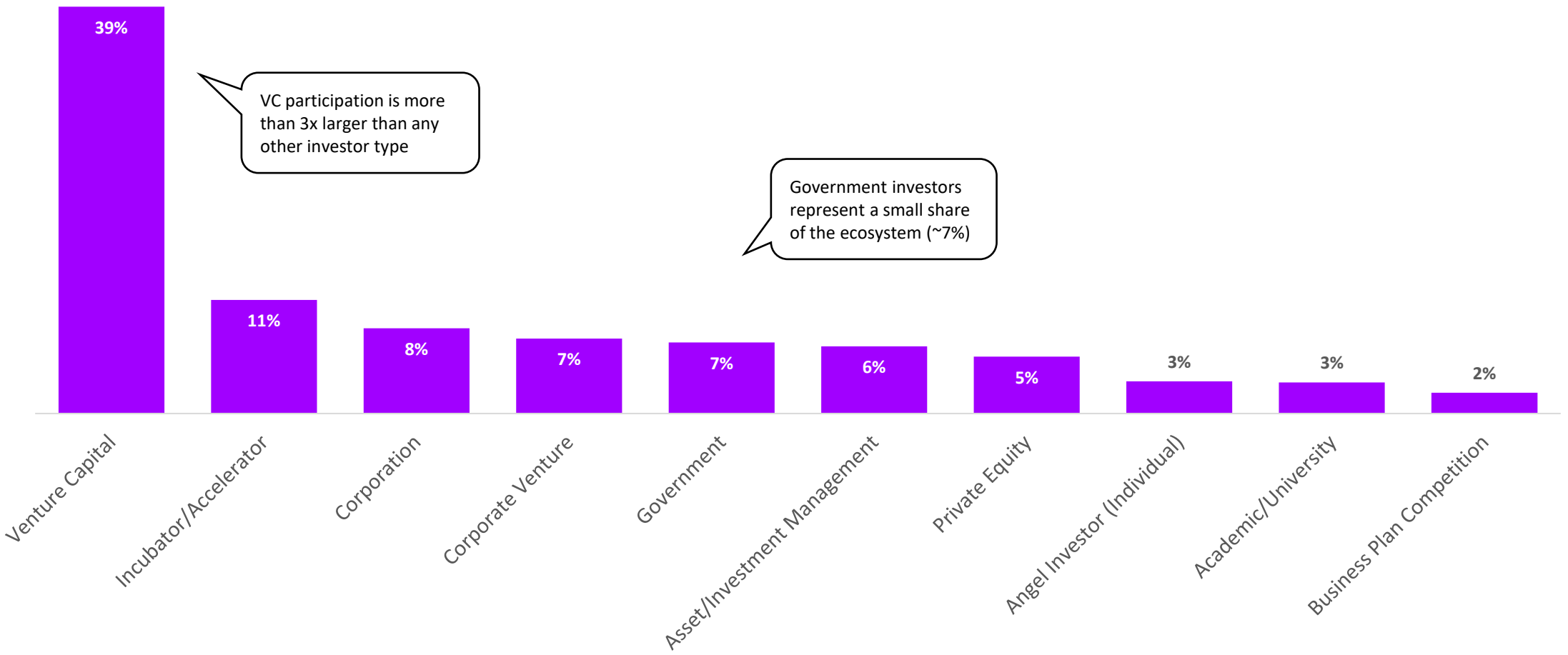
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Quantum + Enabling Technologies Landscape – Partnership/Investor Type

Share of investors investing in quantum + enabling technologies related start-ups by partnership / investor type (Top 10); 2021 – 2026*



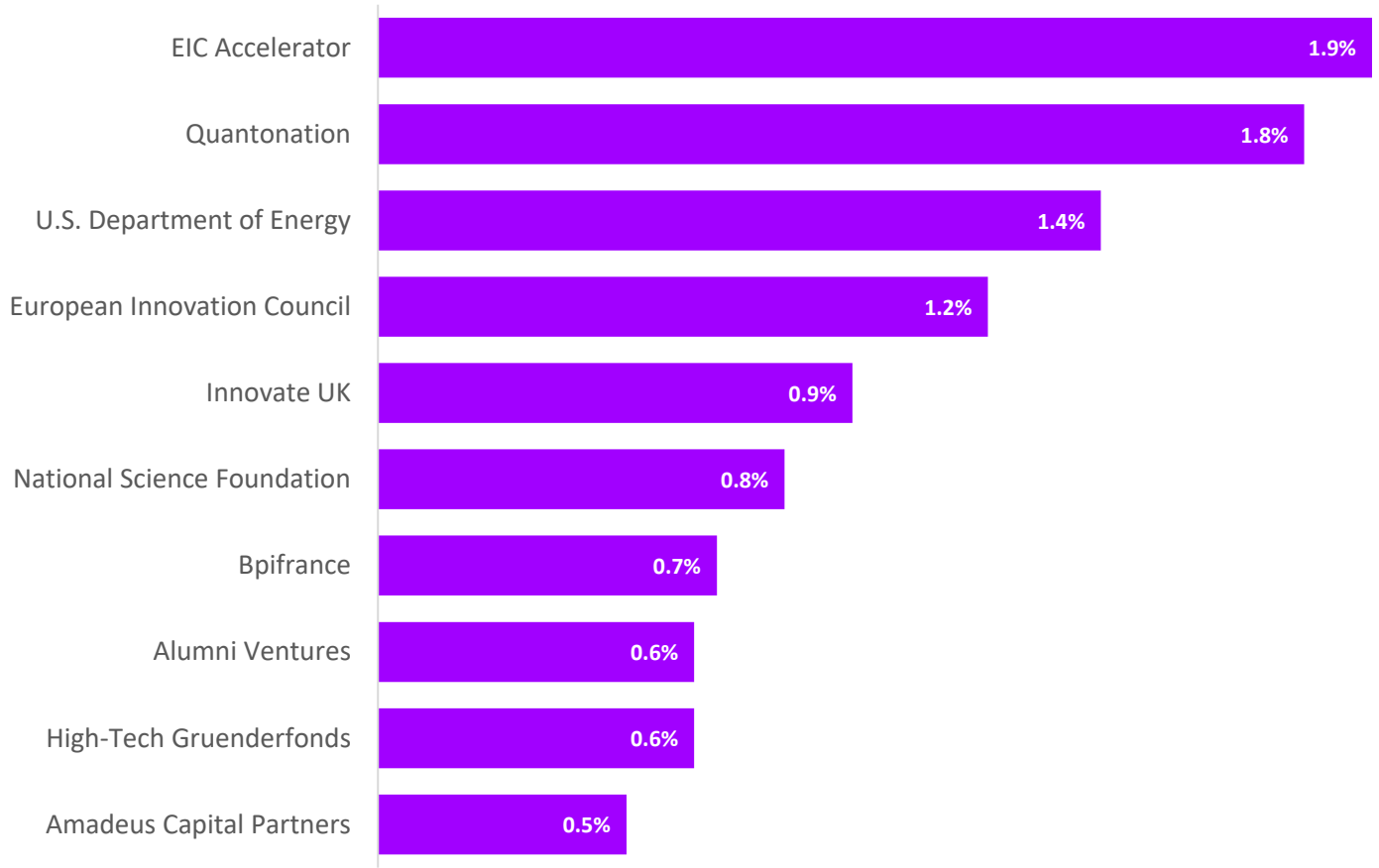
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Quantum + Enabling Technologies Landscape – Top Investors

Share of deals for Top 10 investors investing in quantum + enabling technologies related start-ups by total deals (2021 – 2026*)



Key takeaways:

- Across 1.7K+ investors, no single player has a significant share
- Top investors each account for only ~1–2% of total deals
- ~50% of the top 10 investors by total deals are public entities suggesting they play a significant role in early-stage funding

*2026 data is partial until March 2026.
Source: Sources include public and proprietary market intelligence, company disclosures, industry databases, expert interviews and Accenture analysis.

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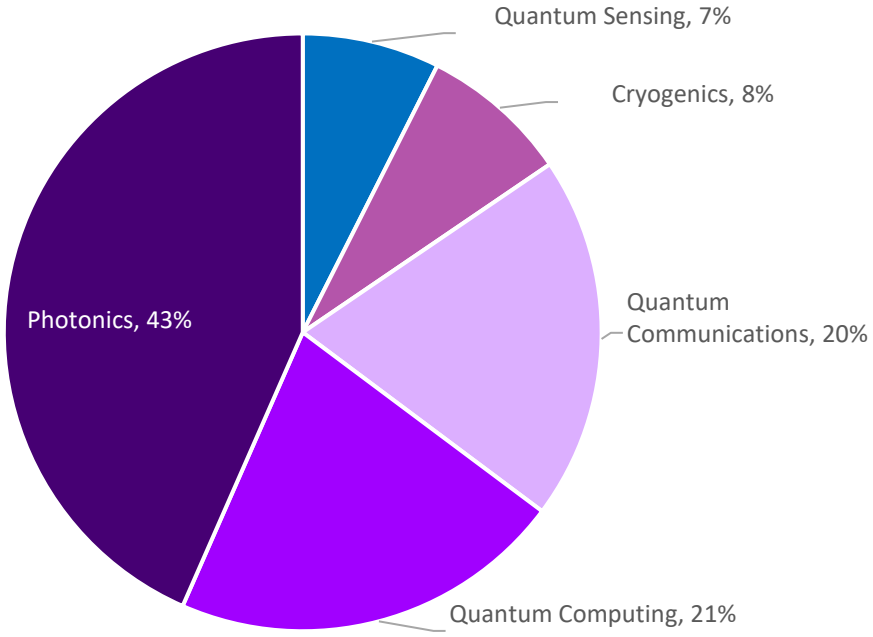
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Quantum + Enabling Technologies Innovation - Segments

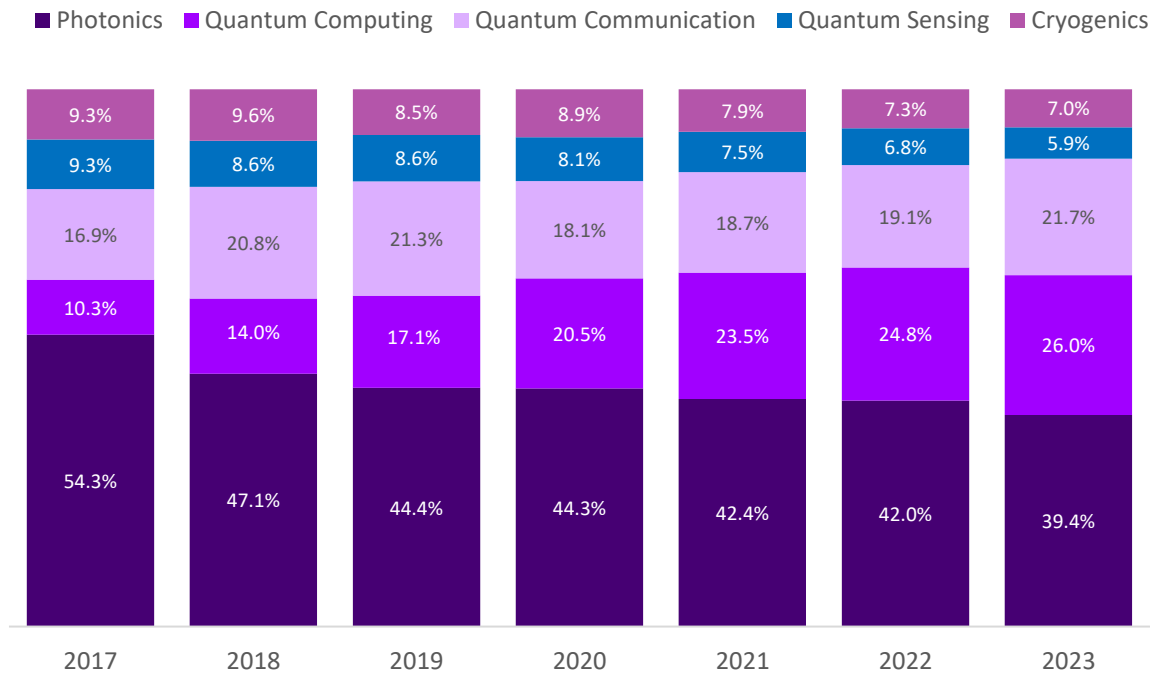
Patent activity indicates a maturing ecosystem, with innovation shifting from enabling technologies toward scalable quantum applications

Photonics remains dominant, but its share has declined as quantum computing and communications gain traction.

Share of patent families by segment (2017 – 2023)



Share of patent families by segments (2017 – 2023)



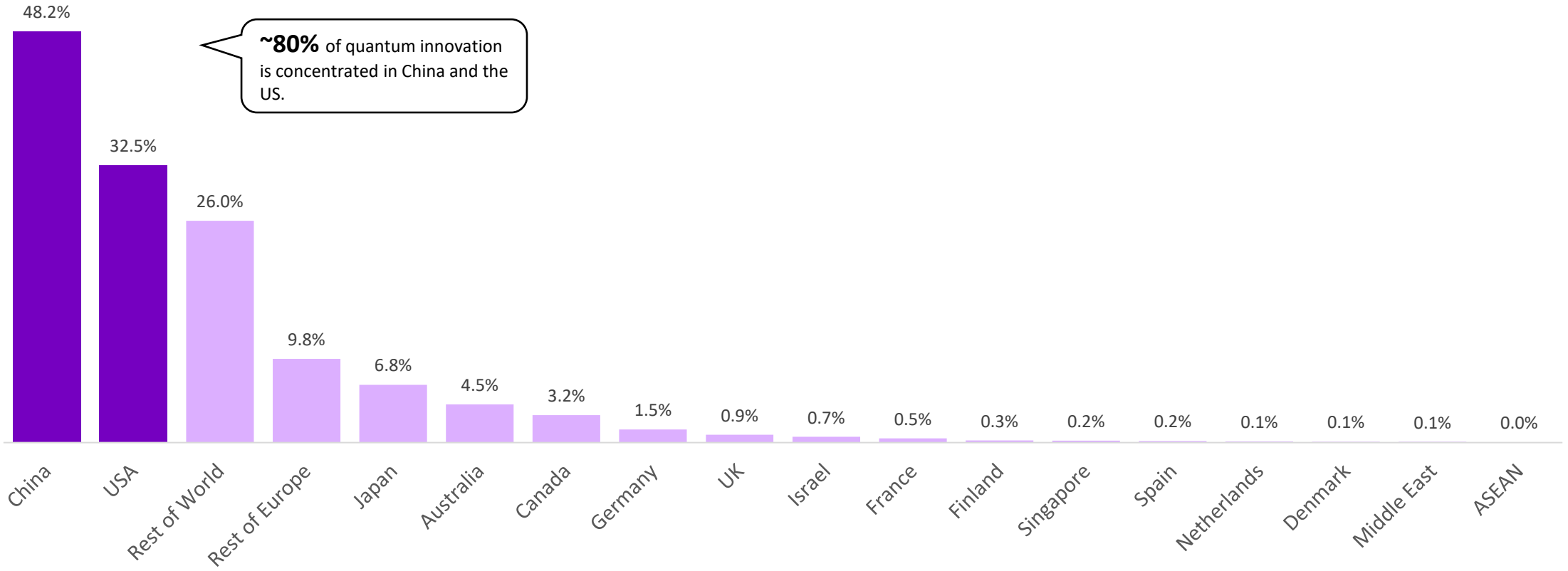
Photonics and cryogenics are treated as enabling domains and therefore include patents beyond pure-play quantum technologies.
2024 and 2025 numbers are excluded due to 18-month lag in patent publication data.
Source: Sources include public and proprietary market intelligence, company disclosures, industry databases, expert interviews and Accenture analysis.

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Quantum + Enabling Technologies Innovation - Region

Quantum + enabling technologies related patent families by region (2017 – 2023)



2024 and 2025 numbers are excluded due to 18-month lag in patent publication data.
Source: Sources include public and proprietary market intelligence, company disclosures, industry databases, expert interviews and Accenture analysis.

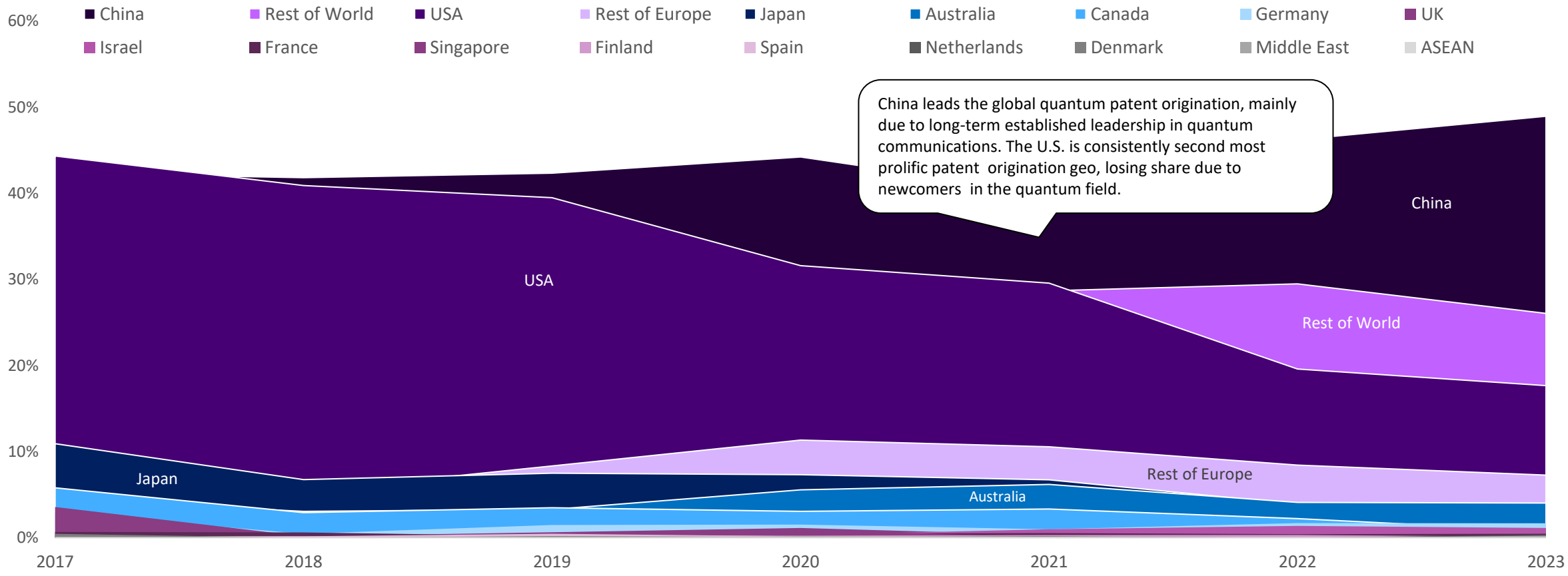
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Quantum + Enabling Technologies Innovation – Region Over Time

Share of quantum + enabling technologies related patent families by region and earliest application date (2017 – 2023)

China's recent rise in quantum innovation is primarily led by their focus on quantum communications

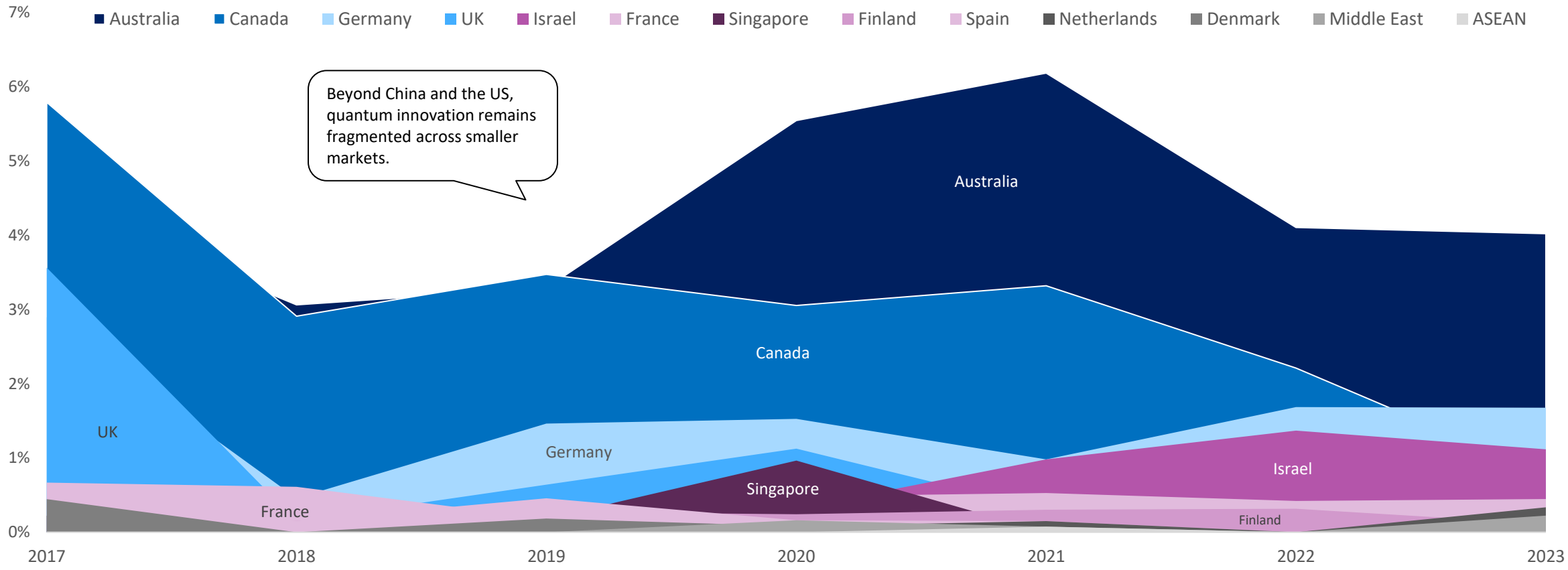


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Quantum + Enabling Technologies Innovation – Region Over Time

Share of quantum + enabling technologies related patent families by regions (excluding China, USA, Rest of World, Rest of Europe, and Japan) & earliest application date (2017 – 2023)

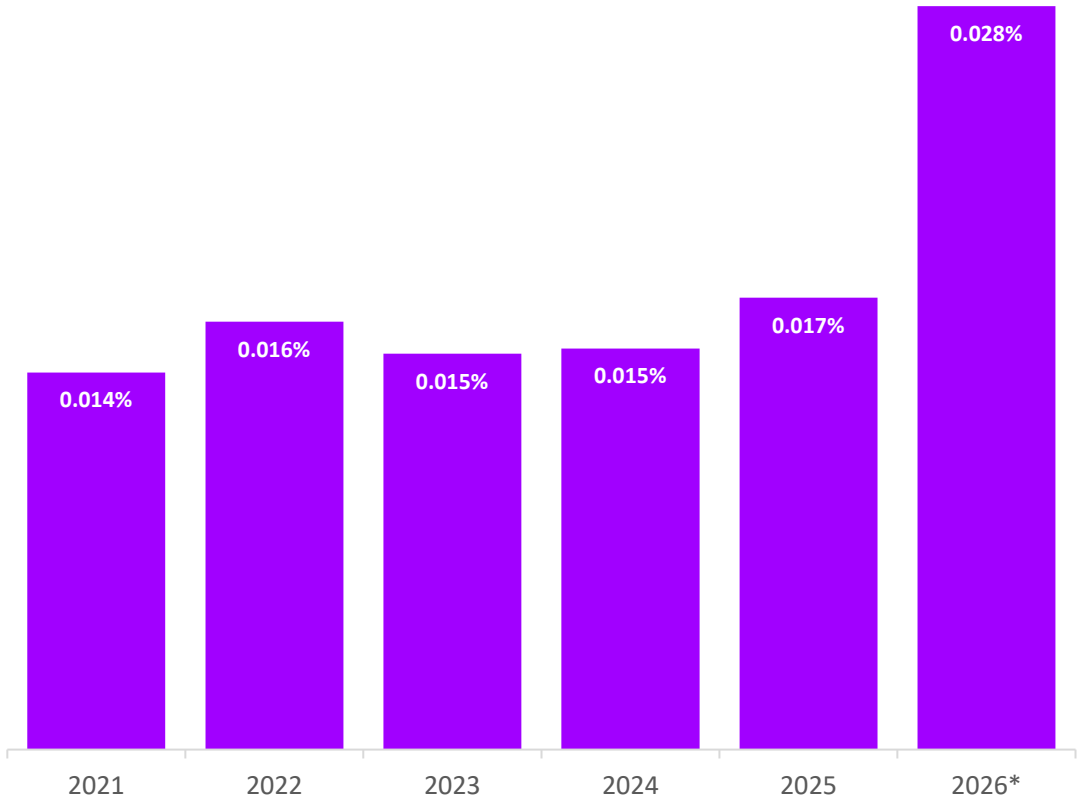


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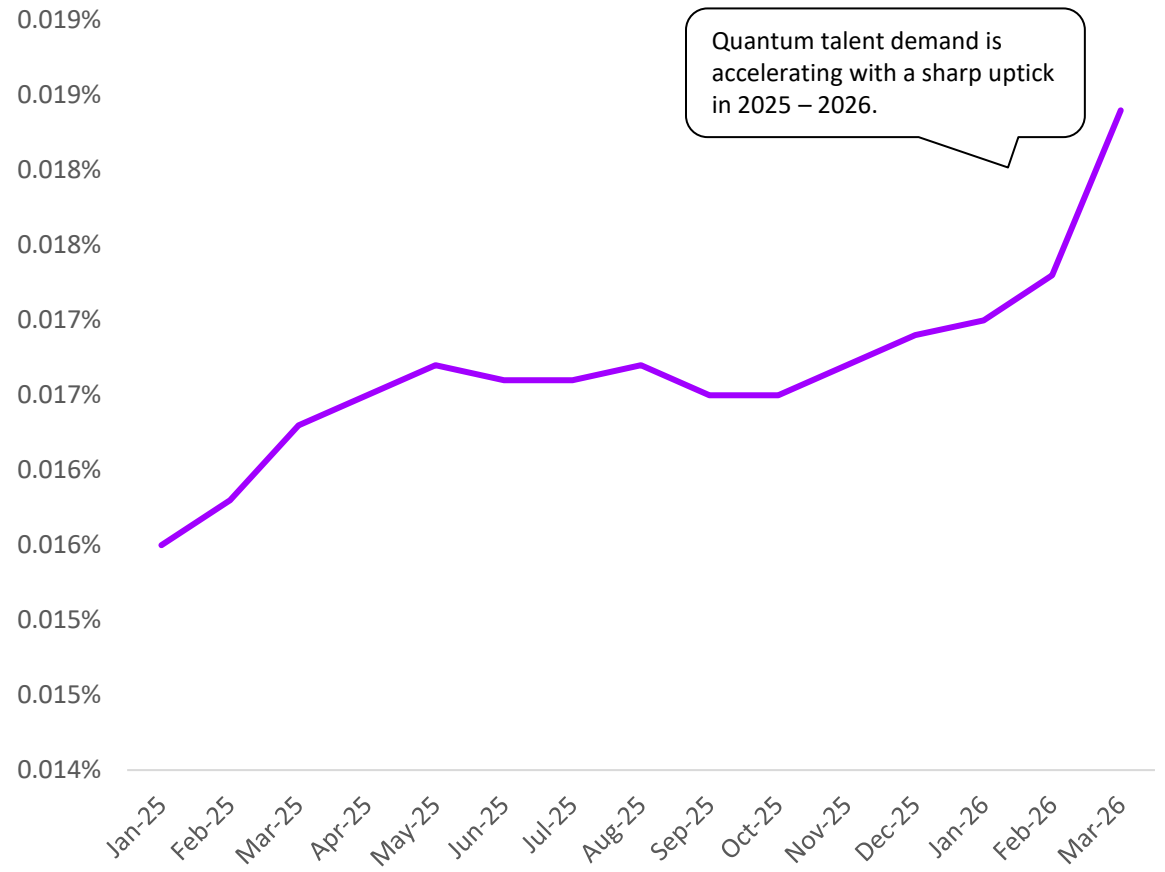
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Quantum + Enabling Technologies Talent Demand – Over Time

Share of quantum + enabling technologies related job postings over time (2021 – 2026*)



Share of quantum + enabling technologies related job postings over time (12m rolling total); 2025 – 2026*



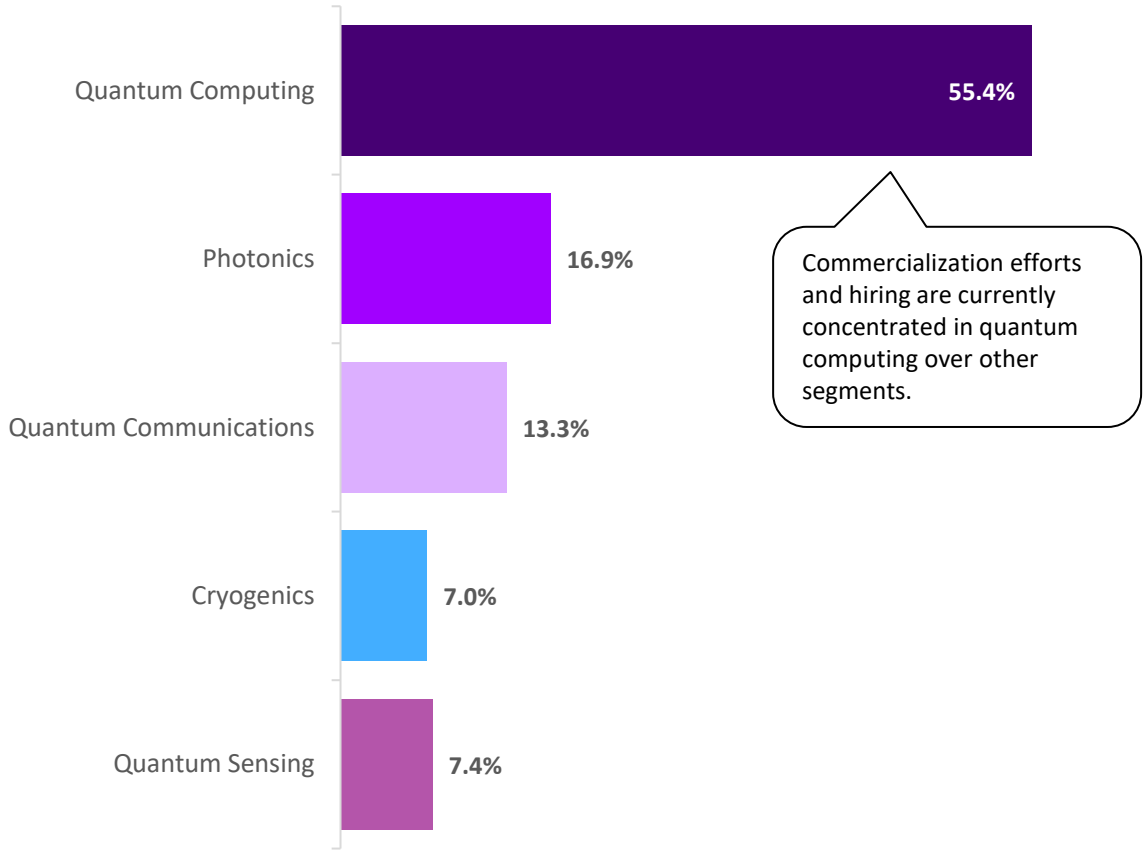
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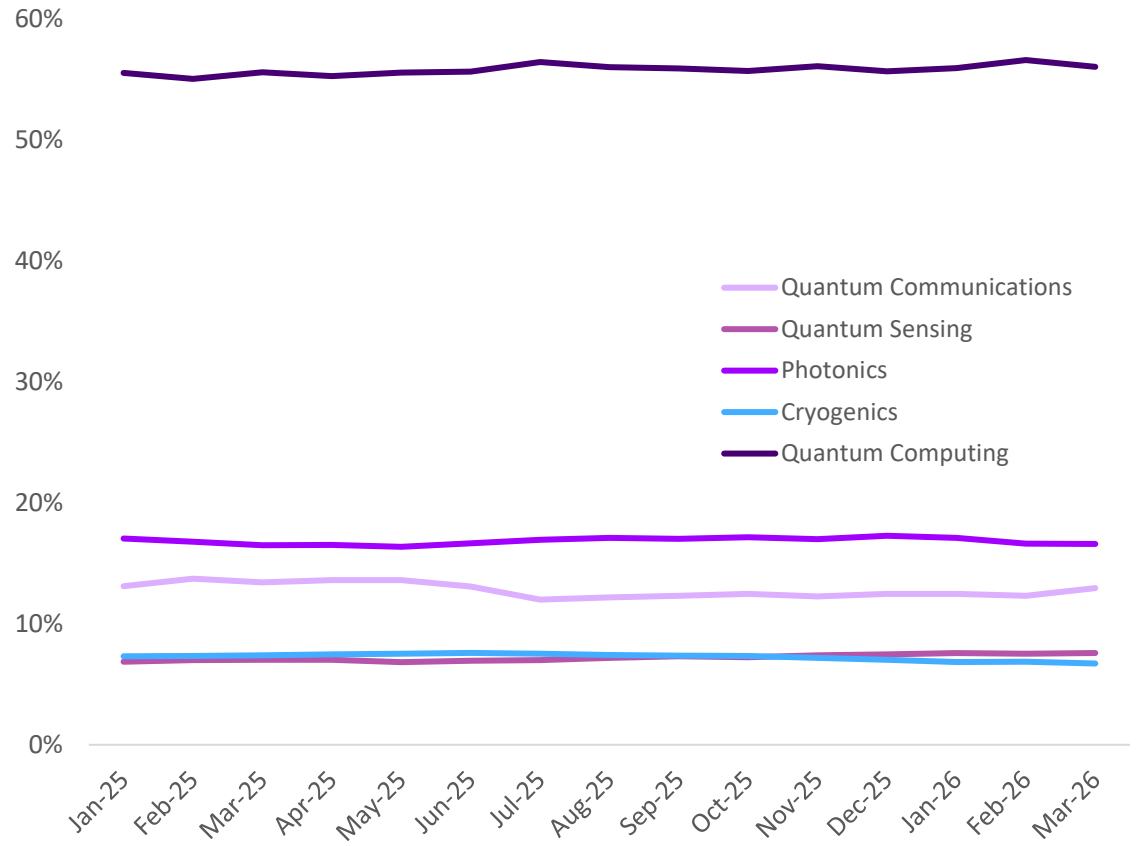
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Quantum + Enabling Technologies Talent Demand - Segments

Share of segments in quantum + enabling technologies related job postings (2021 – 2026*)



Share of segments in quantum + enabling technologies related job postings over time (12m rolling total); 2025 – 2026*

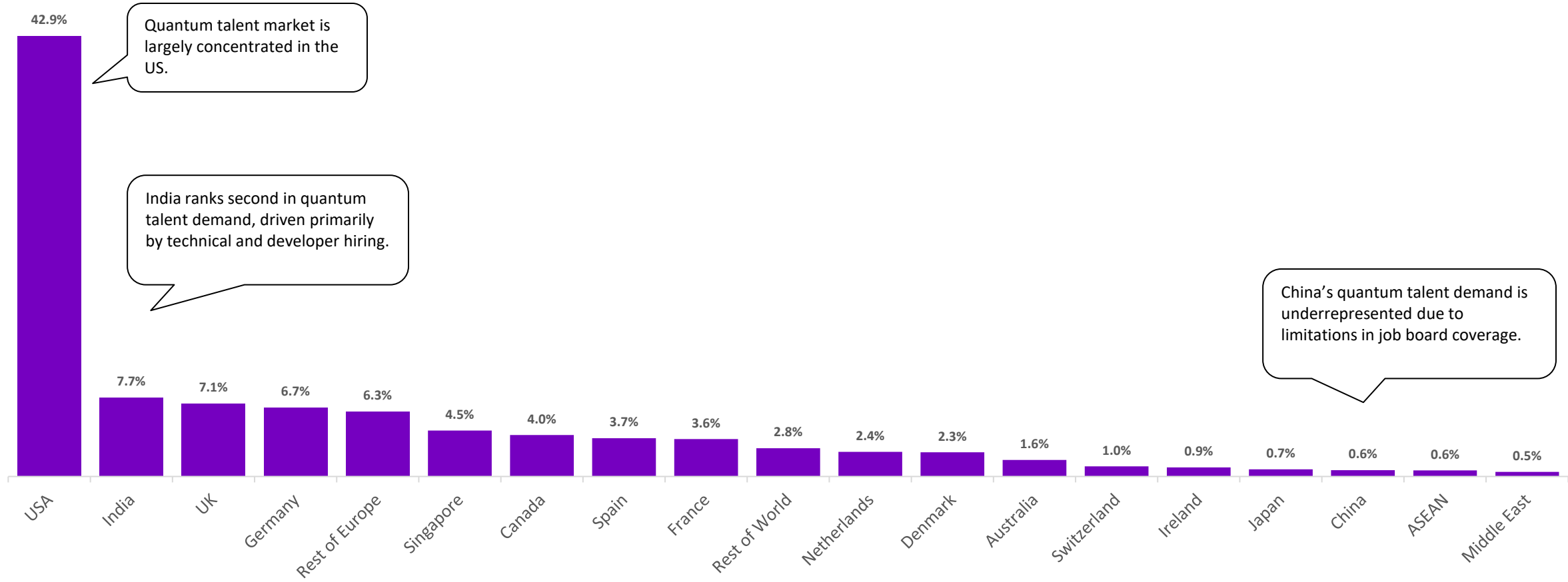


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Quantum + Enabling Technologies Talent Demand - Region

Share of quantum + enabling technologies related job postings by region (March 2025 – March 2026)

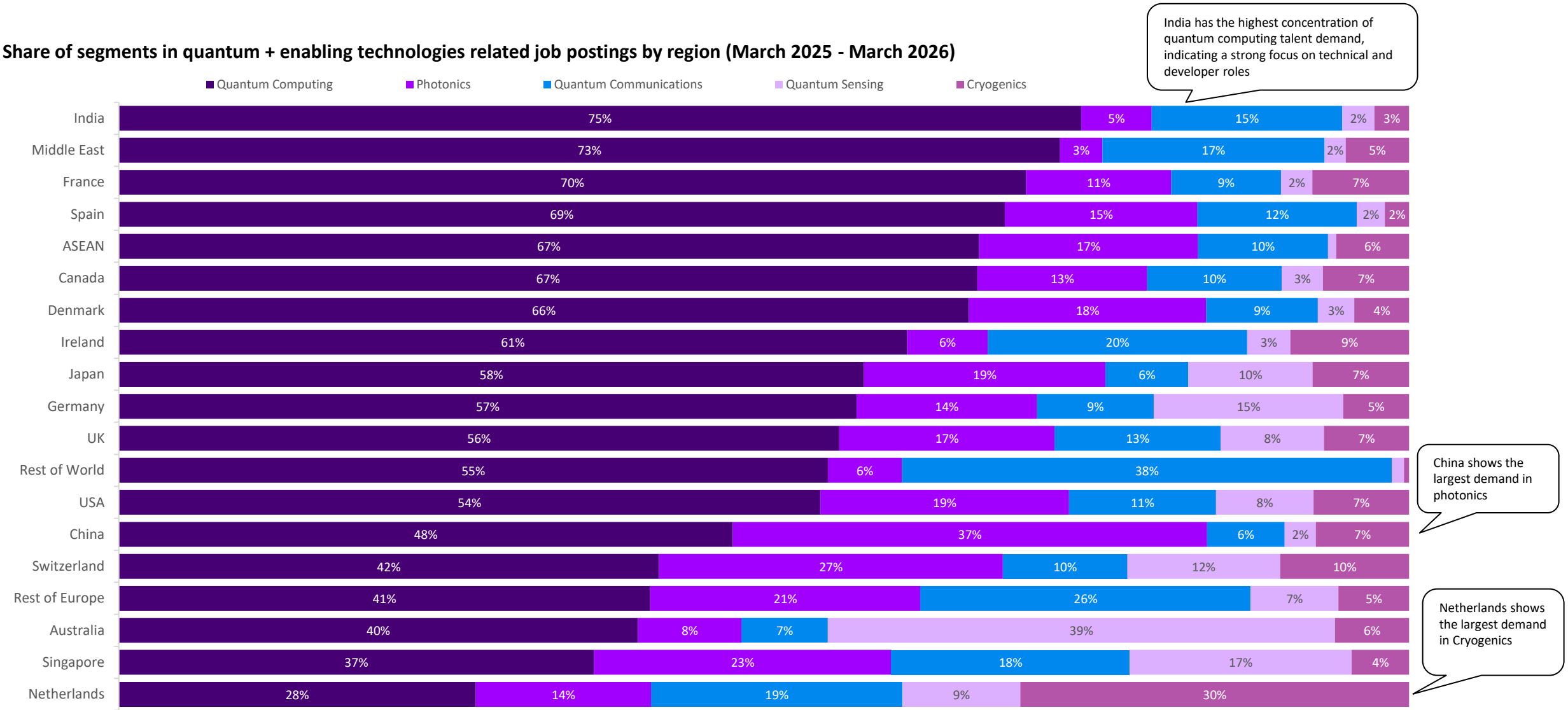


*2026 contains partial data until March 2026.
Source: Sources include public and proprietary market intelligence, company disclosures, industry databases, expert interviews and Accenture analysis.

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Quantum + Enabling Technologies Talent Demand – Region X Segments

Share of segments in quantum + enabling technologies related job postings by region (March 2025 - March 2026)



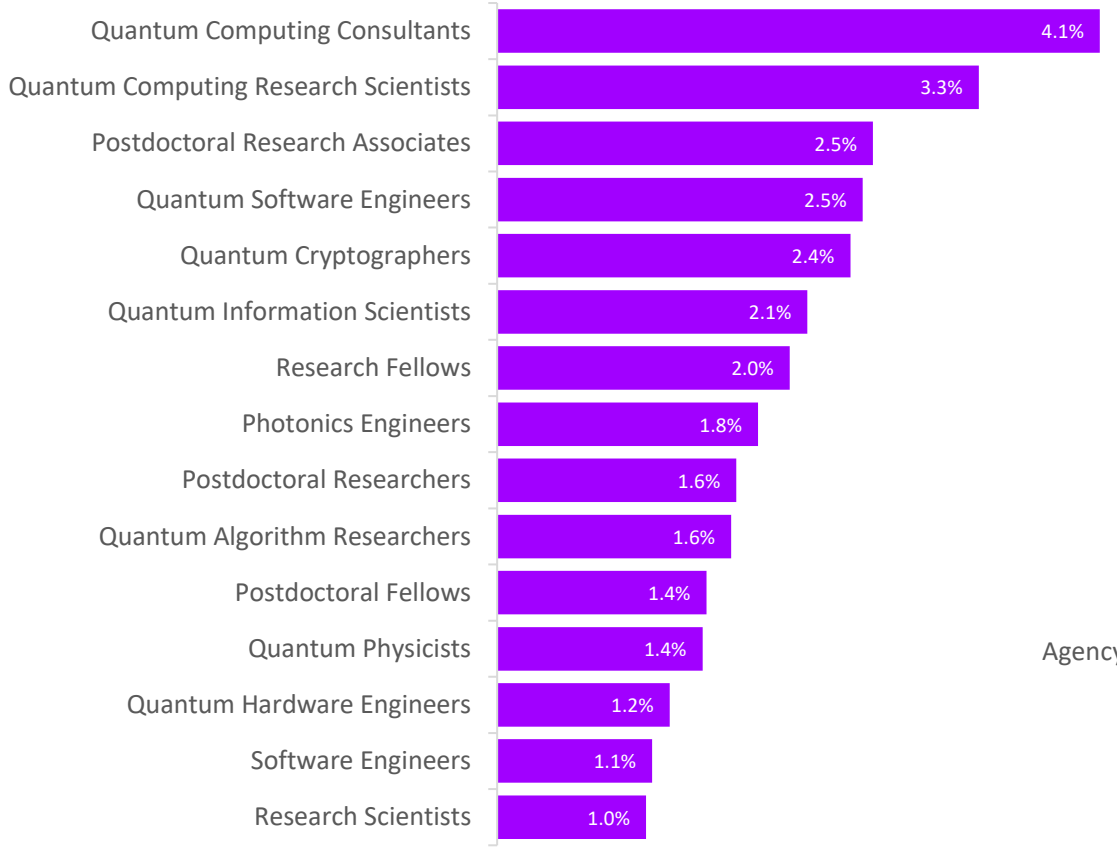
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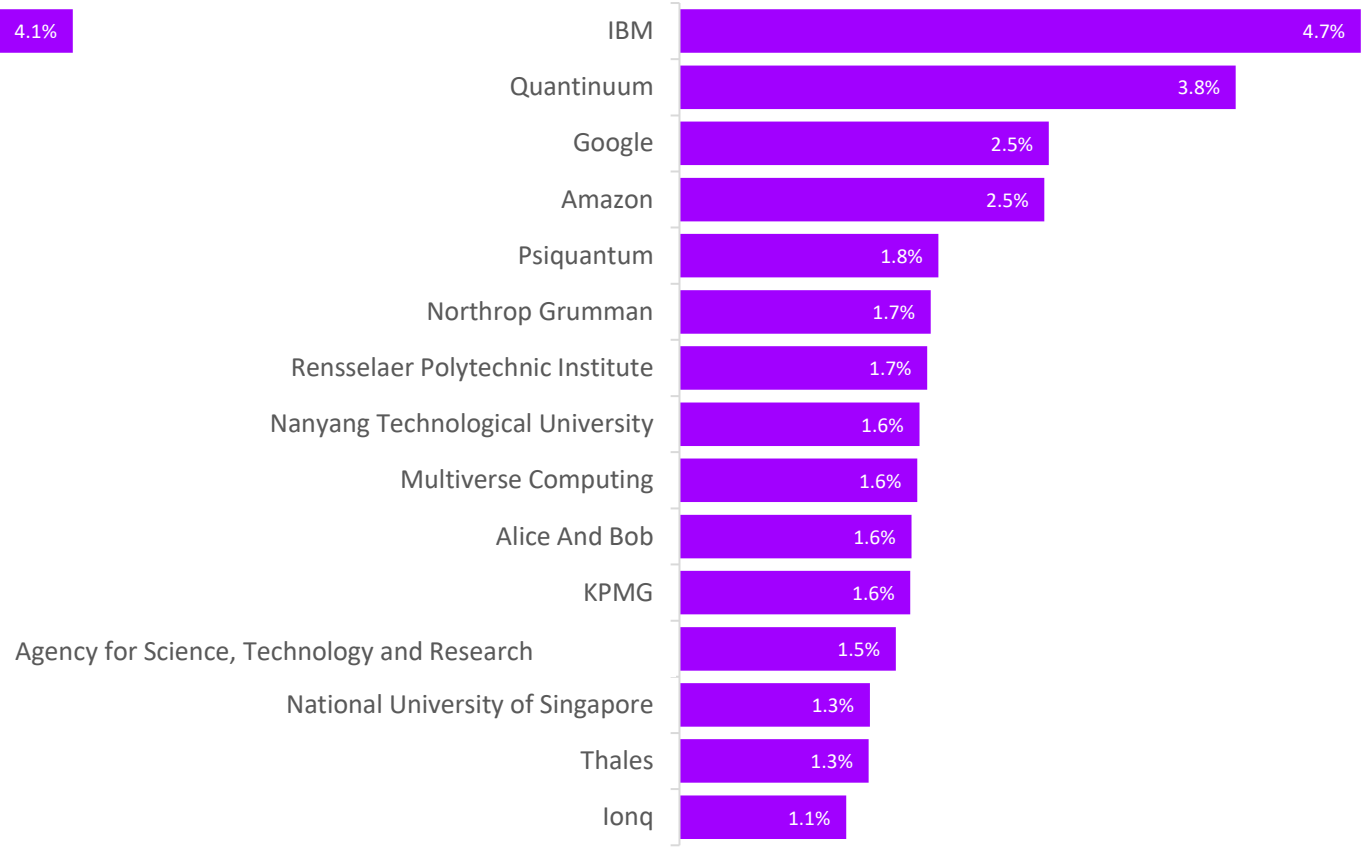
Quantum + Enabling Technologies Talent Demand – Top 15 Roles & Companies Hiring

Quantum hiring is dominated by research and technical roles, led by large tech and specialised players.

Top 15 in demand roles by share of quantum + enabling technologies related job postings (March 2025 – March 2026)



Top 15 companies hiring in quantum by share of quantum + enabling technologies related job postings (March 2025 – March 2026)



Source: Sources include public and proprietary market intelligence, company disclosures, industry databases, expert interviews and Accenture analysis.

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Methodology

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About the research

Sources and Limitations

Segment & Geographic Analysis

Analyses are based on structured secondary research, including review of company websites and disclosures, published government quantum strategies and policy initiatives, research institutions and programs, industry news, and analyst commentary. This qualitative evidence base was triangulated across sources to assess market positioning, maturity, and supply-chain roles by segment and country.

Data Analysis

This report draws on a range of public and proprietary information sources, including company disclosures, industry publications, market intelligence databases, expert interviews and Accenture analysis. Findings represent Accenture's interpretation of the information available during the research period and should be considered directional rather than definitive. The analysis was undertaken for the purposes of informing NZIAT's discovery process and was not designed as a continuously maintained market benchmark.

Investments / Deal Flow

We leveraged VC investment data (Jan 2021 – March 2026) to assess the global quantum + enabling technologies startup ecosystem across funding activity, technology segments, and geographic distribution. Startups were classified using a keyword-based semantic model applied to company descriptions, technology focus, and offerings.

Considerations for the data:

- 2026 data is partial (through March).
- Total deal metrics include transactions with undisclosed funding amounts.
- Segments assigned to startups are mutually exclusive.
- Funding values represent directional estimates of market activity and can be treated as a lower bound due to partial or undisclosed funding rounds.
- View of startup investments and deal flow is partial and based on available data and disclosed investments.
- National quantum funding programs are excluded from this analysis.
- Photonics and cryogenics are treated as enabling domains rather than pure-play quantum segments.

Patents

We analysed global patent data to identify innovation trends across the quantum + enabling technologies ecosystem. Patents were first filtered using relevant IPC codes, followed by a keyword-based semantic text classification approach to further refine and segment the dataset. Results were cross-validated against external benchmarks.

Considerations for the data:

- Analysis is based on patent families to account for duplicate filings across multiple patent offices.
- Photonics and cryogenics are treated as enabling domains and therefore include patents beyond pure-play quantum technologies.
- Regional counts may include double counting, as patents can be filed in multiple jurisdictions.
- Patent counts are estimates based on patent applications (filed patents)

Labour Demand

We analysed global labour demand using job postings data to estimate talent demand across quantum + enabling technology segments. Job postings were classified into relevant segments using a keyword-based semantic text classification approach.

Considerations for the data:

- Regional data may be underestimated due to incomplete job board coverage.
- Job postings reflect demand signals, not confirmed hires.

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Quantum + Enabling Technologies Landscape – Keywords by Segment

Segments	Keywords
Quantum Computing	Atom Computing, Classiq, D-Wave, Google + Quantum, Google + Willow, Grover's algorithm, IBM + Quantum, IonQ, Microsoft + Quantum, Microsoft Majorana, NVIDIA CUDA-Q, Pasqal, post-quantum cryptography (PQC), PsiQuantum, Q-CTRL, Quantinuum, quantum advantage, quantum algorithm, quantum annealing, quantum bit, quantum chemistry, quantum cloud, quantum computer , quantum computing, quantum cryptography, quantum derived randomness, quantum dots, quantum encryption, quantum entanglement, quantum error correction, quantum internet, quantum key distribution, quantum machine learning, quantum optimization, quantum sensing, quantum simulation, quantum supremacy, quantum use case, quantum-as-a-service (QaaS), qubit, QuEra Computing, Qunnect, Rigetti Computing, Riverlane + quantum, SandboxAQ, Shor's algorithm, superconducting quantum computer, Xanadu + quantum
Quantum Sensing	atomic clock, bose einstein condensate sensor, cold atom sensing, flux locked loop, flux quantum, gravimeter, heisenberg limit, high sensitivity measurement, inertial sensing, interferometry, ion trap clock, magnetocardiography, magnetoencephalography, magnetometer, nitrogen-vacancy (NV) centres, NV-centre diamond sensor, optical lattice clock, quantum detection, quantum metrology, quantum sensing, quantum sensor, quantum-enhanced sensing, quantum-optical sensor, rydberg atom, spin squeeze, sqif, squid, standard quantum limit, superconducting quantum interference, timekeeping precision, ultra-precise measurement
Quantum Communication	BB84 protocol, entanglement distribution, fibre-based QKD, photon-based communication, polarization encoding, quantum channel capacity, quantum communication, quantum cryptography, quantum encryption, quantum information networks, quantum internet, quantum key distribution (QKD), quantum network, quantum repeater, quantum teleportation, satellite quantum communication, time bin encoding
Photonics	beam splitter, indium phosphide quantum, integrated photonics, light-based quantum systems, nonlinear optics, optical interferometer, optical quantum computing, photon entanglement, photonic circuit, photonic qubits, quantum light sources, quantum optics, quantum photonics, silicon nitride photonics, silicon photonics, single-photon source, snspd, thin film lithium niobate, waveguide
Cryogenics	adiabatic demagnetization, ADR cooling, charge qubit, cooling infrastructure, cryogenic cooling, cryogenic engineering, cryogenics, cryostat, dilution refrigerator, flux qubit, helium 34, josephson junction, kinetic inductance detector, liquid helium, liquid nitrogen, low-temperature physics, milliKelvin temperatures, mixing chamber, pulse tube cooler, refrigeration systems, superconducting circuit, superconducting materials, superconducting qubits, thermal noise reduction, transmon qubit, ultra-low temperature

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Quantum + Enabling Technologies Patents Analysis – IPC Codes

IPC Codes used	Definition
B82Y0010000000	Nanotechnology for information processing, storage, or transmission, e.g. quantum computing or single electron logic
B82Y0015000000	Nanotechnology for sensing or actuating applications, e.g. quantum dots as markers in protein assays or molecular motors
B82Y0020000000	Nanooptics, e.g. quantum optics or photonic crystals
F25B0009000000	Refrigeration machines using special working fluids or special cycles
F25B0009140000	Dilution refrigerators
F25D0019000000	Low-temperature storage apparatus and cryostats
G01C0019580000	Gyroscopes using quantum-mechanical effects — atom interferometry rotation sensors
G01R0033035000	SQUID (Superconducting Quantum Interference Device) magnetometers
G01R0033095000	Nitrogen-vacancy (NV) centre sensors and solid-state quantum sensors — diamond NV-centre magnetometers and spin-defect-based quantum sensing devices.
G01R0033326000	Instruments for measuring magnetic variables using SQUIDs — SQUID-based magnetometers, gradiometers, and susceptometers.
G02B0006120000	Integrated optical waveguides — planar and chip-based waveguide structures
G02B0006122000	Planar optical waveguides
G02B0006125000	Photonic bandgap waveguides
G02B0027280000	Beam splitters
G02F0001350000	Nonlinear optical devices
G02F0001390000	Optical frequency conversion devices
G04F0005140000	Atomic clocks
G06N0010000000	Quantum computing, i.e. information processing based on quantum-mechanical phenomena

IPC Codes used	Definition
G06N0010200000	Models of quantum computing, e.g. quantum circuits or universal quantum computers
G06N0010400000	Physical realisations or architectures of quantum processors or components for manipulating qubits, e.g. qubit coupling or qubit control
G06N0010600000	Quantum algorithms, e.g. based on quantum optimisation, or quantum Fourier or Hadamard transforms
G06N0010700000	Quantum error correction, detection or prevention, e.g. surface codes or magic state distillation
G06N0010800000	Quantum programming, e.g. interfaces, languages or software-development kits for creating or handling programs capable of running on quantum computers; Platforms for simulating or accessing quantum computers, e.g. cloud-based quantum computing
G06N0099000000	Computing not elsewhere classified in G06N
G12B0015000000	Temperature control in scientific and measuring instruments
H01L0039020000	Superconducting materials
H01L0039220000	Superconducting devices cooled below their transition temperature
H01S0005068300	Quantum dot lasers
H04B0010500000	Generic optical transmission class
H04B0010600000	Receivers (optical)
H04B0010700000	Photonic quantum communication
H04B0010800000	Catch-all for optical applications not in H04B 10/03–10/70
H04J0014020000	Wavelength-division multiplex systems
H04L0009080000	Key distribution and management — both classical and quantum key exchange protocols.

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Acronyms

Acronym	Definition	Acronym	Definition
CMOS	Complementary Metal-Oxide-Semiconductor	**QaaS**	Quantum-as-a-Service
Cryo-CMOS	Cryogenic Complementary Metal-Oxide-Semiconductor	**QC**	Quantum Computing
FTQC	Fault-Tolerant Quantum Computing	**QDNL**	Quantum Delta NL
GNSS	Global Navigation Satellite System	**QEC**	Quantum Error Correction
GPS	Global Positioning System	**QKD**	Quantum Key Distribution
He-3	Helium-3	**QPU**	Quantum Processing Unit
HPC	High-Performance Computing	**QRNG**	Quantum Random Number Generator
IPC	International Patent Classification	**RF**	Radio Frequency
MECE	Mutually Exclusive, Collectively Exhaustive	**SDK**	Software Development Kit
mK	milliKelvin	**SiN**	Silicon Nitride
NIST	National Institute of Standards and Technology	**SiPh**	Silicon Photonics
NISQ	Noisy Intermediate-Scale Quantum	**SNSPDs**	Superconducting Nanowire Single-Photon Detectors
NV	Nitrogen-Vacancy	**SPAC**	Special Purpose Acquisition Company
PIC	Photonic Integrated Circuit	**TRL**	Technology Readiness Level
PQC	Post-Quantum Cryptography	**VC**	Venture Capital

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Thank you

