New Zealand Institute for Advanced Technology

Quantum Technologies Discovery Process Summary Report

July 2026



Foreword

About this report

This report summarises the findings of NZIAT's quantum technologies discovery process, completed in July 2026. The discovery process assessed New Zealand's quantum technology capabilities, opportunities for commercialisation and whether there was a case to proceed to the design of a potential quantum Growth Engine.

The discovery found that New Zealand has a scientifically credible and internationally connected quantum and enabling technologies research base, but that the ecosystem remains at an early stage of commercialisation. It identified quantum sensing, quantum communications and quantum-enabling technologies as potential areas of focus, and highlighted the value of greater national coordination, including through a national quantum strategy.

Since this report was completed, NZIAT has progressed this work into a design phase. The design phase is testing and refining the opportunities identified through discovery, including where New Zealand has the strongest potential to create commercial and economic value.

The findings and potential directions in this report should not be read as approved investment decisions or commitments. Moving into design does not commit NZIAT to an investment, its scale or its final focus. Any future investment will be subject to further design, due diligence and the appropriate decision-making processes.

This report is being published to provide transparency about the evidence and analysis that informed the discovery process and the decision to undertake further design work.

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Key Findings

Background

- On 10 December 2025, the New Zealand Government initiated a $1.35 million quantum technologies discovery process and requested the New Zealand Institute for Advanced Technology (NZIAT) to lead this work.
- The discovery process assessed New Zealand's quantum technology capabilities and global commercialisation opportunities, informed by domestic and international engagement.
- It aimed to inform decisions on whether NZIAT should proceed to design and initiate a quantum technology platform.
- The discovery process aligns to the New Zealand Science Investment Plan, which recognises quantum technologies as a high potential area of NZIAT investment.

Purpose

This report provides an evidence-based overview of New Zealand's quantum tech and enabling technology capabilities, and international opportunities for commercialisation. It seeks to answer three core questions: whether New Zealand is ready for a national quantum technology research platform, what the potential focus areas of a platform might be, and if a national strategy is needed.

Strategic Context

Quantum technologies represent a rapidly growing global market opportunity, including for smaller advanced economies, with potential applications across sectors such as healthcare, logistics, and finance. As a strategically significant capability, quantum technologies have the potential to enhance the performance of other advanced technology areas, including artificial intelligence, advanced materials, and synthetic biology. New Zealand's key partners are increasingly seeking trusted collaborators to strengthen and secure global quantum value chains.

Process

The quantum technologies discovery process drew on a set of due diligence inputs, including a public Request for Information (RFI), three stakeholder workshops; two global market intelligence scans; an international advisory panel; a targeted stakeholder roundtable; dozens of domestic and international engagements; and a visiting international expert from Technology Scotland. The evidence was assessed against an investment-style due diligence framework, designed in consultation with the New Zealand Institute for Advanced Technology (NZIAT) Board of Directors, to form a robust analysis.

Key Finding 1: Due Diligence on Investment Readiness

Sector Assessment

- Scientific Merit: New Zealand holds a scientifically credible and internationally connected quantum and enabling technologies research base with room to grow and drive impact.

- Commercial Viability: The ecosystem is undertaking more than fundamental scientific discovery but is not yet mature enough for commercial outcomes to emerge at scale without deliberate intervention and support.
- Economic Impact: Quantum technologies are a growing market globally. A compelling economic opportunity exists if a global supply chain position can be captured and sustained by New Zealand.
- Social Benefits: Workforce and capability development and use cases in areas such as health and climate resilience, show clear potential for social benefits, though over a longer time horizon. Challenges may exist around social licence and a dependency on commercial outcomes.

NZIAT Intervention Suitability and Value Add

- The core challenge for success in quantum technologies is not a lack of scientific capability, but the absence of national coordination, scale, and clear pathways from research to commercialisation. An NZIAT platform is a valid intervention given its purpose of research translation and national capability building.
- Quantum tech research activity remains distributed across institutions, disciplines, and funding mechanisms, with limited alignment around a shared national mission or clearly defined commercial outcomes. NZIAT is positioned to help overcome these challenges as an active investor.

Key Finding 2: Potential Platform Focus Areas

Evidence from discovery consistently identified quantum sensing, quantum communications, and enabling technologies as the strongest focus areas for a New Zealand quantum technology research platform. These areas are seen as offering the most credible pathway for near- to medium-term impact and strategic positioning in global value chains.

There was also broad support for a platform that:

- Maintains a strong domestic focus or anchor (e.g., agriculture, space, and oceans).
- Builds on existing research strengths and industry capability.
- Aligns with defence and security priorities – both domestic and international.
- Provides shared access to quantum tech infrastructure, such as quantum computing platforms, to support the development of components, sub-components, software, and devices for global supply chains.

Evidence from discovery was firmly against an investment in large-scale, domestic quantum computing capability, though acknowledging its importance in global markets and investment trends. This reflected concerns around cost, scale, and the lack of competitive advantage for New Zealand in this segment.

Key Finding 3: National Quantum Strategy

- The discovery process highlighted the absence of a coordinated national quantum strategy as a key gap, noting that current activity is fragmented across research, industry, and government.
- There was strong support across stakeholders and independent expert advice for a national strategy that sets clear priorities and aligns government investment decisions for quantum tech capability development.
- A national quantum strategy was seen as an important step for enhancing supply chain positioning and international partnerships within global value chains.

1. The Quantum Tech Discovery Process

NZIAT's quantum technology discovery task was to make a candid assessment of whether there is world-class quantum technology research in New Zealand that could form the basis of global commercialisation, support the creation of new high-tech firms, help New Zealand move into new high-value economic opportunities, and strengthen national productivity and growth.

1.1 Background

On 10 December 2025, the New Zealand Government launched a national quantum tech discovery process to explore New Zealand's domestic quantum tech capabilities and international opportunities for commercialisation. NZIAT was asked to work closely with researchers and businesses to explore both scientific and industry capabilities and needs and to convene an advisory panel to provide input and expert advice.

The Minister for Science, Innovation and Technology noted that "if the discovery process shows readiness for a quantum technology investment, then the New Zealand Institute for Advanced Technology would move ahead with design and initiation of a quantum technology research platform."[1]

The aim was to help determine whether NZIAT should design and initiate a quantum technology platform investment, what the potential focus areas of a platform might be, and whether a national strategy is needed.

Attention to quantum technologies aligns with New Zealand's Science Investment Plan 2026-2036. NZIAT investment activities form part of the Plan's "Technology for Prosperity" pillar, which aims to lift New Zealand's productivity and international competitiveness and deliver stronger public good and stewardship outcomes. The Plan recognises quantum technologies as a high potential area for NZIAT investment and within the technology pillar calls out opportunities for advanced tech investment to support enabling technologies that underpin high-value products, efficiencies, and participation in global value chains. These include photonics, sensing, and advanced materials – all of which overlap with the development of quantum tech capability.

1 Reti, S. (2025). *Government launches quantum tech discovery*. New Zealand Government. 10 December 2025. www.beehive.govt.nz/release/government-launches-quantum-tech-discovery

Box 1: Quantum technology terms and definitions

Quantum Technologies

For the purposes of the discovery process, 'quantum technology' refers to technologies that make use of the quantum mechanical properties of particles to achieve specific functions or performance advantages. This includes quantum information and quantum-adjacent / enabled technologies that read, process, transmit, or secure information by controlling quantum states such as superposition, entanglement, and coherence. It also encompasses the underlying science, engineering, and research that enable the development and application of quantum systems. This definition was used in the public Request for Information (RFI) by the Ministry of Business, Innovation and Employment and NZIAT (2025).

Quantum Technology Domains

"Quantum technology domains" are commonly considered across three areas, including quantum computing, quantum sensing, and quantum communications and networking.

Quantum Modalities

"Quantum modalities" refers to different modes of quantum bits (qubits) used across the technology areas: computing, sensing, and communications. Currently, these include trapped ion, superconducting, neutral atom, photonic, diamond (nitrogen-vacancy centres), and semiconductor spins.

Quantum Technology Stack

The "quantum tech stack" refers to the layers of the quantum value chain, from materials and hardware devices to cloud computing infrastructure and end customers.

1.2 NZIAT Quantum Tech Discovery Process

The NZIAT quantum technology discovery process was structured as an "investment-style due diligence" approach. It was designed at the direction of and in consultation with the NZIAT Board to support advice to New Zealand's Minister of Science, Innovation, and Technology (SIT).

The key investment questions posed by the NZIAT Board to underpin advice to the SIT Minister were:

- **Is New Zealand ready for a quantum technology platform?**
- **Is a platform investment the right intervention?**
- **Can NZIAT add value?**

The discovery process drew on a set of due diligence inputs that were finalised on 7 July 2026. These included a Request for Information (RFI), three stakeholder workshops (Dunedin, Wellington, and Auckland), two global market intelligence scans from a domestic provider and a global provider (Accenture New Zealand and The Quantum Insider powered by Resonance, based in Canada), an NZIAT Quantum Tech Advisory Panel[2] ("the Advisory Panel"), a targeted stakeholder roundtable (Christchurch), dozens of domestic and international engagements, and a visiting international expert from Technology Scotland. Additionally, NZIAT staff participated at the Quantum Australia conference, Sydney's state-level quantum showcase (April 2026), and held a Techweek26 panel with three international experts (from Beca, the Chicago Quantum Exchange, and Accenture) on The Quantum Opportunity for New Zealand (May 2026).

Throughout the discovery process, NZIAT worked closely with academic and industry stakeholders to:

- Identify the full scope and activities of actors in New Zealand who have interest, capacity, and/or capability in quantum technology research, commercialisation, and product/service development.
- Identify barriers that could limit acceleration of New Zealand's quantum technology research and its translation to commercial opportunities.
- Identify specific opportunities and paths to drive a sustainable commercial and competitive advantage for New Zealand through an investment in quantum technology.

Quantum Tech Discovery Workshops
Auckland – 31 March 2026



Source: NZIAT (2026)

Two significant pieces of NZIAT's domestic stakeholder engagement were the public RFI and the Quantum Tech Discovery Workshops held in partnership with Tech New Zealand. Through the February 2026 RFI, 20 stakeholder responses were captured, which comprised 5 from academia, 9 from industry, 3 from CRIs/ Crown agencies, and 3 from individuals.

Collectively, these responses provided a balanced cross-section of New Zealand's quantum tech ecosystem, spanning our research capabilities, commercialisation pathways, barriers to success, infrastructure, and end-user perspectives.[3]

2 See Annex 1

3 Ministry of Business, Innovation and Employment and NZIAT. (2026). *Request for Information (RFI) Response Findings Summary*. Prepared by NZIAT.

1.3 Due Diligence

Due diligence framework

A due diligence framework was designed in consultation with the NZIAT Board of Directors to systematically weigh the potential investment case for a national quantum technologies research platform.[4] It provided a structure to gather and critically evaluate discovery process evidence across four criteria, including:

1. **Scientific Merit**: Whether New Zealand's quantum tech and enabling technology research demonstrates sufficient quality, relevance, and distinctiveness compared with global benchmarks, international ecosystems, and global market opportunities.
2. **Commercial Viability**: Whether there is potential to translate research into commercial activity, including firm creation, industry adoption, and integration into global markets.
3. Economic Impact: Whether there is potential for economic outcomes, including high-value exports, productivity gains, investment attraction, and overall value creation.
4. **Social Benefits**: Whether there is potential for social benefits, including workforce development, societal resilience, and contributions to public good outcomes.

The board also requested the due diligence process look at the suitability of a platform investment approach and the potential for NZIAT to add value. Scientific merit was also considered an essential "engine" for a national quantum tech platform that creates a pipeline of innovation and is a magnet for talent and investment.

Under this framework, the inputs and evidence were tested against this set of criteria by considering questions such as whether New Zealand has scientific capability that is mature enough to justify a large, targeted investment, whether the domestic quantum tech ecosystem has a critical mass, whether there are credible pathways from research to commercial outcomes, and whether New Zealand can position itself within the global quantum value chain to unlock new opportunities.

The framework provided a structured method to identify risks and gaps in the ecosystem and to analyse whether a quantum technologies platform is the right policy intervention and likely to deliver value for New Zealand.

Due diligence approach

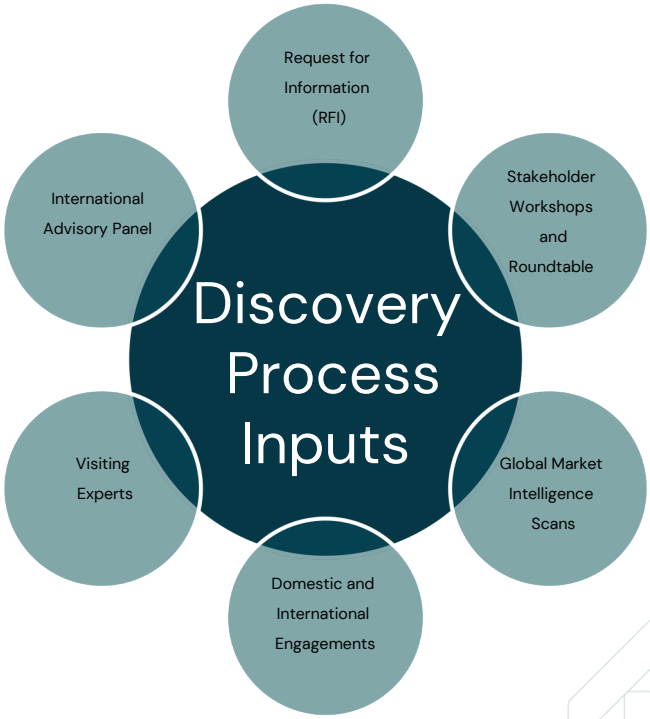
NZIAT's due diligence was based on the synthesis of evidence gathered in the discovery process and bolstered by expert, independent judgement through Advisory Panel engagements. This approach reflects the nature of the evidence available and the purpose of the discovery process. The due diligence inputs are diverse and largely represent a qualitative evidence base, which requires synthesis and judgement rather than a numerical grade. Importantly, the approach was not designed as a pass/fail test. Instead, the due diligence framework was used to highlight relative strengths, gaps, and risks across the criteria, with NZIAT's overall judgement based on a holistic view of whether New Zealand's ecosystem is ready, if opportunities for global commercialisation are compelling, and if the risks are manageable to proceed.

4 See Annex 2

1.4 Due Diligence Inputs

Each due diligence input served a specific purpose to gain domestic and international intelligence within the scope of the due diligence framework:

- **The RFI** provided understanding of NZ's current quantum tech capabilities, research maturity, commercial pathways, barriers, and domestic and international collaboration opportunities. The stakeholder workshops identified where NZ quantum stakeholders converged or diverged on ideal outcomes of a platform investment, potential platform focus areas, and platform design choices.
- **The global market intelligence scans** helped identify where quantum tech value and innovation are being captured globally, where the money is flowing, what focus areas look promising for a small country like NZ, and where domestic capabilities may align with global market opportunities.
- **The international advisory panel** stress-tested emerging discovery process findings against experienced, independent quantum tech experts who have supported various government-led quantum investment programmes and built regional and/or nationally recognised quantum tech ecosystems.
- **The targeted stakeholder roundtable** compared NZ's quantum tech research and enabling technology capabilities against global market opportunities and identified realistic "where to play" roles for NZ, informing discussion on potential platform focus.
- **The domestic and international engagements**, including NZIAT's visiting international expert and participation in Australian events, helped gather lessons learned, policy approaches, and best practices from other quantum tech ecosystems to benchmark possible models, mechanisms, and risks for NZ.
    - **International conference participation at the 2026 Quantum Australia Conference** by NZIAT enabled an understanding of the Australian quantum tech landscape and hearing the latest developments.
    - **Additional solicited discovery process inputs** from Auckland University of Technology (AUT) contributed to better understanding research activity, current focus areas, experience with commercialisation, and future opportunities to inform the discovery process.



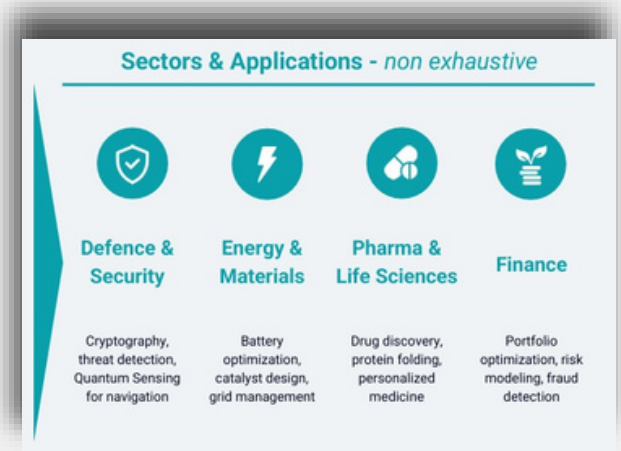
2. Global Context and Relevance to New Zealand

Quantum technologies sit within a rapidly evolving global landscape and have growing strategic importance for New Zealand, shaping how the country may position itself within emerging international markets and supply chains.

2.1 Global Context

The international quantum tech landscape is increasingly competitive. Many of New Zealand's peers are actively investing in quantum tech capabilities to capture economic value, drive scientific discovery, strengthen national security, and secure technological sovereignty. One driver of this urgency is the concept of "Q-day," which is coined by experts as the day quantum computers become capable of breaking current encryption systems that underpin most of today's digital infrastructure, including banking, communications, and security. The timeline for Q-day remains uncertain, but leading companies such as Google[5] and Citi Group[6] suggest it could arrive sooner than previously expected, potentially within the next decade. Quantum sensing and communications are also receiving increasing global attention, with sensing technologies already demonstrating real-world deployment and application.[7] Global public investment has now exceeded USD 50 billion. Leadership is concentrated in the United States (U.S.), China, and the United Kingdom (UK), alongside growing commitments from countries such as Canada, Germany, France, Australia, and Japan.[8] For example, the U.S. through its National Quantum Initiative (NQI) Act allocated more than USD 4 billion in funding for quantum science from 2019 through the end of 2024.[9]

Box 2: Quantum technology applications



Source: The Quantum Insider powered by Resonance, Prepared for NZIAT (2026).

5 Google. (2026, March 25). *Quantum frontiers may be closer than they appear: Google's timeline for PQC migration*. Google Blog. View article.

6 Citigroup. (2026, January). *Quantum threat: The trillion-dollar security race is on*. Citi Institute. View report.

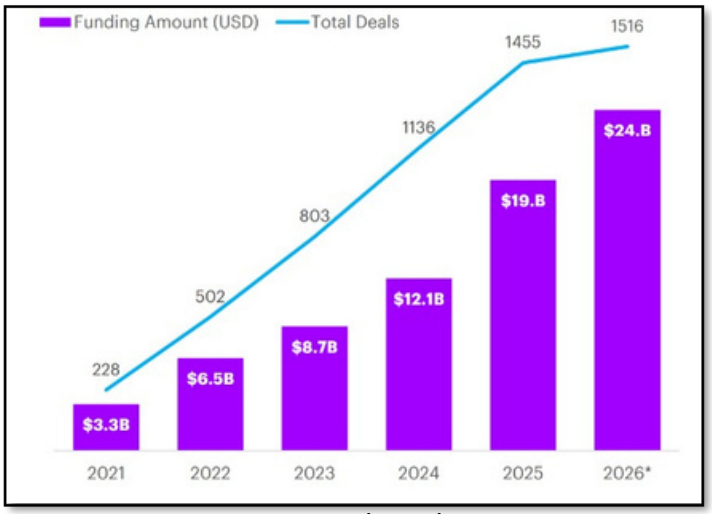
7 QED-C. (2022). Quantum sensing use cases: prospects and priorities for emerging quantum sensors. View report.

8 The Quantum Insider powered by Resonance. (2026). *NZIAT NZ Quantum Ecosystem Study*. Prepared by The Quantum Insider for NZIAT.

9 National Quantum Initiative (NQI). (2018). *National strategic overview for quantum information science*. www.quantum.gov/

In May 2026, the U.S. Department of Commerce announced USD 2 billion of federal incentives for a portfolio of quantum foundry and quantum computing companies, to accelerate solving technology challenges in developing fault-tolerant quantum computing.[10] Similarly, Australia has committed approximately AUD 940 million in a startup company, PsiQuantum, to deliver the world's first 'utility scale' quantum computer in Brisbane.[11] A further AUD 1 billion has been earmarked by Australia for critical technology and quantum companies through the National Reconstruction Fund (NRF). On February 3, 2026, the Fund made a AUD 20 million equity investment in quantum startup Diraq.[12] This is just one example of several quantum tech investments that have recently emerged.

Figure 1: Cumulative deals and funding amount for quantum + enabling technologies related startups (2021-2026*)



Source: Accenture Research (2026)

Private sector investment activity is also accelerating. Over the past five years, quantum-related startups have seen 55% growth and attracted over USD 20 billion in funding across 1,500+ deals. Accenture's analysis indicates a rapid expansion in quantum and enabling- technology startup activity between 2021 and 2026, with cumulative funding increasing from USD 3.3 billion to USD 24.8 billion and total deals rising from 228 to 1,516 (Figure 1). The sharpest acceleration occurs from 2023 onward, pointing to growing investor confidence and commercial momentum in the sector.[13]

By share of quantum and enabling technologies related startups, the U.S. leads by a significant margin, followed by the UK. Other countries demonstrating strong progress include Canada, China, Germany, and India, particularly in startup formation, quantum-related talent demand, and patent activity. Although market growth estimates range greatly, a recent analysis by The Quantum Insider estimated that quantum computing alone will contribute USD 1 trillion in economic value and create an approximately 840,000 new jobs by 2035.[14]

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10 National Institute of Standards and Technology (NIST). (2026). *Department of Commerce announces letters of intent with 9 companies for $2 billion to accelerate U.S. leadership in quantum computing*. U.S. Department of Commerce. 21 May. View article.

11 Quantum Australia. (2025). *Australia positioned to lead global quantum race with $2 billion investment*. 8 January. www.quantum-australia.com/news/australia-positioned-lead-global-quantum-race-2-billion-investment

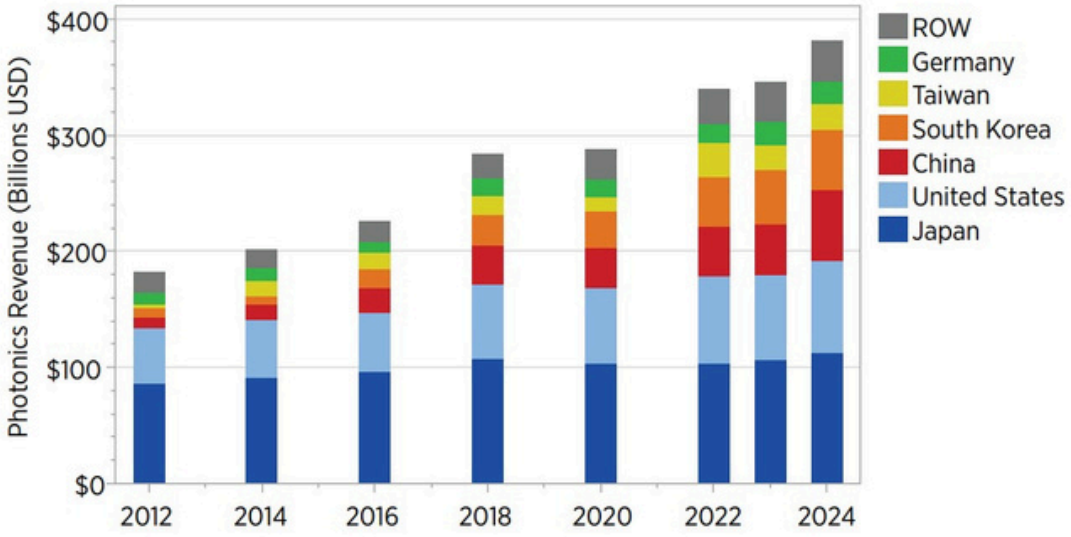
12 Australian Government, National Reconstruction Fund Corporation. (n.d.). *National Reconstruction Fund*. Retrieved June 8, 2026, from www.nrf.gov.au.

13 Accenture Research. (2026). *From Qubits to GDP: Unlocking New Zealand's Quantum Economy – The New Quantum Growth Frontier*. Prepared by Accenture for NZIAT. View report.

14 The Quantum Insider. (2024). *The Quantum Insider projects $1 trillion in economic impact from quantum computing by 2035*. 13 September. View article.

While quantum-enabling technology startup activity was captured in the Accenture study, the commercial opportunity associated with quantum technologies extends beyond the startup ecosystem into the broader and more mature optics and photonics industry. These enabling technologies provide an established pathway to commercialisation and a more immediate opportunity for economic value creation. A 2026 SPIE industry report found that the global optics and photonics industry generated approximately USD 381 billion in annual revenues in 2024, an increase of 10 percent from the previous year (Figure 2). The production of light-based technologies spans 65 countries and more than 5,400 manufacturers, with approximately 86 percent of firms classified as small- to medium-sized (generating less than USD 50 million in annual revenue), suggesting there are opportunities for existing New Zealand firms to participate in global value chains.[15] This perspective was reinforced through engagements with NZIAT's international visiting expert, Dr Alison McLeod, Director of Photonics Scotland (Technology Scotland), who highlighted the significant role that photonics plays in supporting Scotland's growing quantum tech ecosystem.

Figure 2: Global photonics revenue trend by company HQ country



Source: SPIE (2025).

Quantum use cases and applications are already emerging

McKinsey & Company finds that quantum computing is taking off in several key industries including chemicals and life sciences, transport and logistics, and financial services. These industries are leveraging quantum computing to run simulations at material and molecular levels, optimise processes in supply chains, and test risk scenarios and strengthen security across established decision flows.[16] Quantum sensing is emerging as a near-term commercial opportunity across a diverse range of sectors including environmental monitoring, aerospace and defence, energy, and mining. Finally, quantum communications technologies are developing through a set of layered technologies such as Post Quantum Cryptography (PQC) and Quantum Key Distribution (QKD), with solutions already commercially available.[17]

15 SPIE. (2026). *Optics & Photonics: Global Industry Report* 2025. View report.
16 McKinsey & Company. (2026, April). *McKinsey quantum technology monitor 2026: A commercial tipping point*. McKinsey & Company. View report.
17 Quantum Zeitgeist. (2026, May 8). *Top quantum networking companies 2026: QKD, quantum internet, repeaters guide*. Quantum Zeitgeist. View article.

For example, several solutions can be purchased by governments, financial institutions, or telecommunications companies for quantum resistant encryption. To capture this emerging economic value, over 30 governments have established significant quantum initiatives. Of these, more than 20 have implemented coordinated national policies to invest in capability, align activities, and strengthen international partnerships to secure positions in global value chains.[18] This was also clear from NZIAT's international engagements: policy counterparts in the U.S., UK and Canada consistently described quantum tech as a field that is reaching an important inflection point, with major economies now moving quickly to build capability, secure a place in global value chains, and accelerate research toward commercial outcomes. NZIAT received clear feedback suggesting focusing on finding a layer of the tech stack and adding to the global value chain that only your nation can do.

Critical technology lists consistently refer to quantum technologies

"Critical technology lists" have recently become a common policy tool used to prioritise government investment, manage national security risks related to advanced technologies, and signal areas of competitive advantage and opportunity.[19] While the scope of each critical tech list varies by country, there is a strong agreement on a core set of technologies with dual economic and strategic value (roughly 5-10 tech areas).[20]

Quantum technologies are consistently identified as an enabling and strategic national capability that could enhance the performance of other priority tech domains, including artificial intelligence, semiconductors and microelectronics, advanced materials, and synthetic biology. Because quantum tech could enable completely new ways of computation, measurement precision, and secure communication, it is nearly always included within these critical tech lists, despite being at relatively early stages of maturity.

Australia is a natural strategic partner

Australia was consistently identified through the discovery process as a critical strategic partner for quantum tech. NZIAT had several engagements with Australian counterparts across the Quantum Australia Conference (Adelaide), the Quantum Australia Sydney Showcase at UNSW, and bilateral meetings with organisations such as the Queensland Government (Department of Environment, Tourism, Science and Innovation, DETSI) and the Australian Economic Accelerator (AEA).[21] These engagements demonstrated an ecosystem that is actively transitioning from quantum tech research into commercialisation, with a visible and growing pipeline of startups and spinouts. It was also clear that there are deliberate, national- and state-level efforts in place to strengthen industry connections and attract private capital to move research toward commercialisation through structured pathways for innovators and entrepreneurs.

Additional engagements during the broader Australia visit, including interactions with the University of Adelaide and Beca Australia, highlighted an example of successful industry-research collaboration in the quantum sensing space, which aims to commercialise a "new generation of quantum sensors," Superconducting Quantum Antennas (SQAs), [that] will be

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18 The Quantum Insider powered by Resonance. (2026). *NZIAT NZ Quantum Ecosystem Study*. Prepared by The Quantum Insider for NZIAT. View report.

19 Bernsdorf, J., Ramos Erpenbeck, P., Wignjosaputro, A., Klueting, L., & Heinrichs, G. (2026). *Lists of critical and sensitive technologies: Scope, purpose and intended audience*. www.safeguarding- science.eu/wpcontent/uploads/DLR_PT_lists-critical-sensitive-technologies-scope-purpose-audience-2026.pdf

20 Belfer Center for Science and International Affairs. (2025). *Critical and emerging technologies index*. Harvard University. https://www.belfercenter.org/critical-emerging-tech-index

21 NZIAT (2026). *Quantum Australia Conference Summary*. Prepared by NZIAT.

capable of the highest sensitivity, linearity and dynamic range, combined with operation over an ultra-wideband frequency range."[22]

Across these interactions, Australia was consistently positioned not just as a comparator, but as an outward-looking and collaborative partner seeking to build trusted relationships across research and quantum tech supply chains. Engagements with Queensland's DETSI reinforced this openness to partnership, including joint research projects and shared infrastructure access. During a 10 June Queensland-New Zealand Quantum Collaboration Workshop, hosted by DETSI, participants focused on identifying practical pathways for trans-Tasman collaboration across research, infrastructure, and commercialisation in quantum tech. Discussions centred on mapping the respective capabilities of each ecosystem, identifying complementary strengths, and exploring where collaboration could create greater value than operating independently. These included overviews of:

- the ARC Centre of Excellence in Quantum Biotechnology (QUBIC) at the University of Queensland
- Queensland Quantum and Advanced Technologies Research Institute (QUATRI)
- Australian National Fabrication Facility (ANFF)
- Silicon Catalyst Australia
- the Dodd-Walls Centre
- the Robinson Research Institute at Victoria University Wellington.[23]

An additional insight noted through the discussions was the close talent linkages between the two ecosystems, with several quantum leaders based in Australia having been trained in New Zealand. This reinforces the depth of trans-Tasman connections and the opportunity to leverage these networks more deliberately. Another key takeaway was the strong alignment between both ecosystems on the need for coordinated international collaboration in quantum tech. For New Zealand specifically, Australia's combination of scale, infrastructure, commercial activity, and strategic intent highlights both a clear opportunity to partner more deeply and the importance of defining a complementary role within an allied ecosystem.

Securing international partners is important in quantum technologies

Supply chain risks and resilience are becoming increasingly central to the priorities of New Zealand's key partners, including quantum and enabling technologies. This creates a strategic opportunity for New Zealand to align with international partners by contributing to resilient, high-trust segments of the quantum value chain. Positioning within these segments could support both economic participation and strategic relevance, while reinforcing New Zealand's role as a trusted and collaborative partner in advanced technology ecosystems.

Advice from the Advisory Panel stressed that "countries and regions that are accelerating quantum tech investments are gaining traction due to a strategic focus on defence and national security."[24] Strengthening and enabling collaboration with the Five Eyes (FVEY) nations, including Australia, to support the establishment of bilateral and multilateral partnerships to access global expertise, quantum tech infrastructure, government procurement channels (i.e., defence and space) and international supply chains may be a key factor in the success of any quantum tech investment in New Zealand. As an allied country, supply chain pathways may exist for New Zealand researchers and firms to contribute to international defence supply chains, particularly in areas such as quantum tech

22 Beca. (2025). *Advancing Australia's quantum sensing capability*. 14 February. https://www.beca.com/about-us/news-and-awards/february-2025/advancing-australias-quantum-sensing-capability

23 NZIAT. (2026). *Summary of International Engagements*. Prepared by NZIAT.

24 NZIAT (2026). *New Zealand Quantum Tech Advisory Panel: Advice and Feedback*. Prepared by NZIAT.

components, testing, validation, and deployment. The defence sector is widely recognised as a key development partner for deep tech, dual-use technologies, with governments increasingly working directly with startups to develop and adopt new capabilities. This is particularly true in critical technology areas like AI, quantum, space, and semiconductors.

Collaboration with trusted partners can also provide a mechanism for New Zealand to align with trusted networks, manage security risks, and participate in emerging standards and governance frameworks. U.S.-based National Institute of Standards and Technology (NIST) is already leading the way in standards readiness through its post-quantum cryptography (PQC) standardisation programme, which has developed and finalised new encryption standards designed to withstand attacks from future quantum computers, providing a foundation for transition to "quantum-secure systems."[25] Standards Australia is also leading an initiative under the Asia-Pacific Economic Cooperation (APEC) umbrella seeking to identify and prioritise standardisation activities for quantum technologies across key economic sectors. New Zealand needs to be an active participant in these discussions, which will impact future trading conditions in quantum tech.[26]

Challenges in a globally connected market

The global context for quantum tech, and advanced technologies more broadly, also presents some challenges that New Zealand needs to consider as part of any investment decision. These include failing to define and sustain a clear "quantum niche"; brain drain or talent extraction to overseas ecosystems; limited access to private capital and reliance on foreign investment; and limited integration into international research networks, consortia, and standards bodies.

Evidence in the discovery process identified threats to New Zealand's quantum tech success as strategic and ecosystem-related risks rather than scientific. A central concern was the risk of failing to define a clear "quantum niche" and position New Zealand globally as a trusted partner. Stakeholders cautioned against trying to compete broadly across all quantum tech areas and modalities and warned of a risk of strategic drift over time if New Zealand is frequently pulled into global quantum computing "plays" and international research projects that do not align with NZ's specific capabilities or "quantum niche."[27]

Due to global competition for scarce quantum talent, stakeholders also consistently emphasised "brain drain" or talent extraction overseas as a significant risk to New Zealand's success in quantum tech.[28] The Advisory Panel reinforced this concern and highlighted the challenges of establishing a viable and globally competitive quantum tech ecosystem. Retaining quantum companies and talent is difficult – even within leading ecosystems like the UK – with the Panel noting that factors such as access to growth capital, the strength and connectivity of the startup environment, and incentives (i.e., future tax credits) also influence whether firms remain onshore or relocate.

With private funding flowing into established quantum tech ecosystems, insufficient access to private capital and a reliance on foreign investment could also limit New Zealand's ability to scale frontier firms and translate research into commercial outcomes. Participation in the global quantum market depends heavily on leveraging international partnerships and foreign investors. Accenture reports that in "smaller, advanced economies" – which also included Australia – more than 50% of funding comes

25 National Institute of Standards and Technology. (2024, August 13). *NIST releases first 3 finalized post-quantum encryption standards*. View article.
26 New Zealand is co-sponsoring these efforts and NZIAT is participating.
27 The Distillery and NZIAT (2026). *The Distillery-NZIAT Quantum Discovery Workshops Summary*. Prepared by the Distillery for NZIAT.
28 Ibid.

from foreign investors, with government investors often making up roughly 5-15% of the market.[29] New Zealand will need to put compelling cases forward to attract international funding.

Integration into international research networks, consortia, and standards bodies (i.e., the International Organization for Standardization) is also essential in the current global quantum environment. Without global integration, New Zealand risks being excluded from shared research platforms and early-stage technology validation, possibly slowing both scientific progress and commercial readiness.[30] Limited participation in these global groups is a material risk, as it could constrain New Zealand's access to shared quantum computing platforms, research collaborations, early-stage technology validation, and international supply chains, as well as reduce opportunities to engage in international procurement channels. It may also lock New Zealand out of critical standard- setting discussions that will set the scene for future trade in quantum tech products and services. If New Zealand is not actively involved in shaping or aligning with these standards, domestic firms may struggle to certify quantum tech products, integrate into international procurement channels, and compete for global business opportunities.

29 Accenture Research. (2026). *From Qubits to GDP: Unlocking New Zealand's Quantum Economy – The New Quantum Growth Frontier.* Prepared by Accenture for NZIAT.

30 Quantum Technologies Aotearoa (QTA). (2026). *Commercialising quantum technologies in New Zealand.* View Report.

2.2 New Zealand's Place in the Quantum Tech Landscape

New Zealand's shift in focus on advanced technologies

Attention to quantum technologies aligns well with New Zealand's Science Investment Plan 2026- 2036. NZIAT investment activities form part of the Plan's "Technology for Prosperity" pillar, which aims to lift New Zealand's productivity and international competitiveness and deliver stronger public good and stewardship outcomes. The Plan recognises quantum technologies as a high potential area for NZIAT investment and within the technology pillar calls out opportunities for advanced tech investment to support enabling technologies that underpin high-value products, efficiencies, and participation in global value chains. These include photonics, sensing, and advanced materials – all of which overlap with the development of quantum tech capability.

The potential for small, advanced economies in quantum tech

For small, advanced economies, the global quantum landscape presents a significant economic opportunity: the possibility of creating frontier firms, high-tech exports, and new jobs.

While major economies, including the U.S., the UK, Canada, and China, are investing significant capital in quantum technologies across modalities, the landscape remains early, with no dominant approaches or tech providers. This creates a window of opportunity for New Zealand to identify niche strengths, establish early footholds, and integrate into emerging global value chains. With roughly USD 50 billion in quantum tech investment over the last several decades,[31] the question becomes one of where and how NZ should play in global quantum tech supply chains to capture a "piece of the rapidly growing pie." The current geopolitical environment is further increasing the need for trusted technology providers, which positions New Zealand well to build on long-standing partnerships with allied nations.

The Advisory Panel affirmed that "it's hard to imagine a quantum industry that isn't global." There were also reflections from the Panel members on the rapid growth of and global investment in quantum technology over the last decade, noting "[we] don't see why NZ couldn't have a piece of the action – there's no shortage of opportunities."[32]

Box 3: Quantum modalities

The term "quantum modalities" refers to different quantum bits (qubits) used across the technology areas, computing, sensing, and communications.

Quantum Computing

Qubit Technology	What to Know	TRL
Trapped Ion	Uses individual atoms controlled by electric fields. Highly precise, stable, and operates in standard commercial environments.	8-9
Superconducting	Based on electrical circuits cooled to near absolute zero. Offers fast processing speeds but depends on highly specialised cryogenic systems.	8-9
Neutral Atom	Uses laser-controlled atoms. Scalable architecture, but still in early commercial stages.	5-7
Photonic	Uses particles of light (photons) to carry and process quantum information. Large-scale computing performance is limited due to technical challenges.	6-8
Diamond (Nitrogen-Vacancy Centers)	Uses defects in diamond to store and control quantum states. Very long coherence at room temperature, but difficult to scale into large processors.	3-5
Semiconductor Spins	Uses electron or hole spins in semiconductor quantum dots. Compact and compatible with existing chip manufacturing but maintaining coherence and control is challenging.	4-6

Source: The Quantum Insider powered by Resonance, Prepared for NZIAT (2026).

31 United Nations Educational, Scientific and Cultural Organization (UNESCO). (2026). *Global quantum initiative*. https://www.unesco.org/en/global-quantum-initiative

32 NZIAT (2026). *New Zealand Quantum Tech Advisory Panel: Advice and Feedback*. Prepared by NZIAT.

New Zealand faces an important moment in the global quantum tech landscape and with the establishment of NZIAT. The quantum tech discovery process and stakeholder engagement underscored that small, advanced economies, like NZ, must specialise in one or several strategic 'quantum tech niches' to compete globally. This also reflects the playbooks of comparable economies, such as Norway, Portugal, and Czech Republic (identified as pre-commercial ecosystems), as well as Denmark, Ireland, and Singapore (identified as early commercialisation ecosystems). These countries have strategically positioned themselves as specialised providers of enabling technologies, quantum components, or niche quantum services rather than becoming end- to-end system developers.

Box 4: International quantum ecosystem benchmarking

Countries progressing from research to commercialisation typically combine government-led coordination, focused investment programmes in the hundreds of millions, and specialisation in a limited number of quantum niches rather than pursuing the full value chain.

Non-exhaustive

Country	Commercialization stage	Quantum focus	National programmes	Coordination model	Talent / Workforce
Norway	Pre-commercialisation	**Sensing** (defence & maritime); early computing and comms R&D	**NOK 1.1B national initiative** (Aug 2025); Gemini Centre SINTEF/NTNU/UiO (2024-2028)	**Industry-anchored via Kongsberg**; Norwegian Quantum Cluster (Aug 2025); Oslo-Trondheim dual hubs	**Solid physics base**; no quantum PhD programme; brain drain risk
Portugal		**Software & algorithms** (pharma, materials); QKD & quantum-safe comms; early sensing	**€50M via PRR** (2024-2029); Portugal QCI QKD network; FCT/INL PhD scholarships (2nd call 2025)	**EU-anchored; no standalone strategy**; PQI as de facto coordinator; Lisbon dominant, Porto emerging	**Fewer than 200 researchers**; FCT PhD pipeline growing; broad Lisbon tech talent adjacent
Czech Republic		**QKD & quantum comms** (most advanced); quantum-HPC integration; optics & materials	**VLQ 24-qubit computer at IT4Innovations** (Sept 2025); CZQCI QKD backbone (Apr 2026); QIC IBM university consortium	**EU-infrastructure-led**; strategy in development; Prague-Brno-Ostrava triangle; 8-university QIC consortium	**Strong engineering and optics base**; live hardware access mitigates brain drain
Denmark	Early commercialisation	**Photonics** (dominant); QKD & comms; hardware R&D; sensing; software & algorithms	**National Strategy €161M (2024-2027)**; NQCP €200M (2022-2034); QuNorth €80M; NATO DIANA Lab	**Government-led; Copenhagen cluster**; grants→philanthropy→VC→pension capital stack; 70+ partner community	**World-class research; 70+ PhD students** (19 nationalities); MSc programmes expanding commercial pipeline
Ireland		**Silicon Quantum Computing** (Equal1); photonics & semiconductors (Tyndall); QKD	**Quantum 2030 (Oct 2023); IrelandQCI €10M**; Trinity Quantum Alliance (IBM, Microsoft); IPIC / CONNECT SFI centers	**Government-led; multinational anchor model** (Intel, Google, IBM); Dublin-Cork dual hubs	**#1 EU STEM graduates per capita**; MNC presence boosts commercial quantum talent
Singapore		**QKD & comms** (dominant); Quantum Computing & processors (NQPI); sensing	**NQS S$300M (2024-2029)**; QEP 3.0 S$96.6M; NQPI processor initiative; NQSN+ QKD testbed	**Government-led via NQO at A*STAR**; CQT elevated to national flagship (2025); public funding dominant	**350+ researchers over 15 years**; NQSS scholarships active; commercial talent gap remains key bottleneck

Source: The Quantum Insider powered by Resonance, Prepared for NZIAT (2026).

Finland's commercial success story, Bluefors, was mentioned repeatedly through the discovery process. Bluefors provides advanced cryogenic measurement systems and high-performance cryocoolers to support "physicists and scientists around the world… to conduct research at temperatures colder than outer space."[33] From its early research work at the Low Temperature Laboratory (then at Helsinki University of Technology), Finland has found a strategic niche in quantum cryogenic measurement hardware and now occupies an essential piece of the global quantum supply chain that nearly every quantum startup or researcher advancing quantum technology relies on.

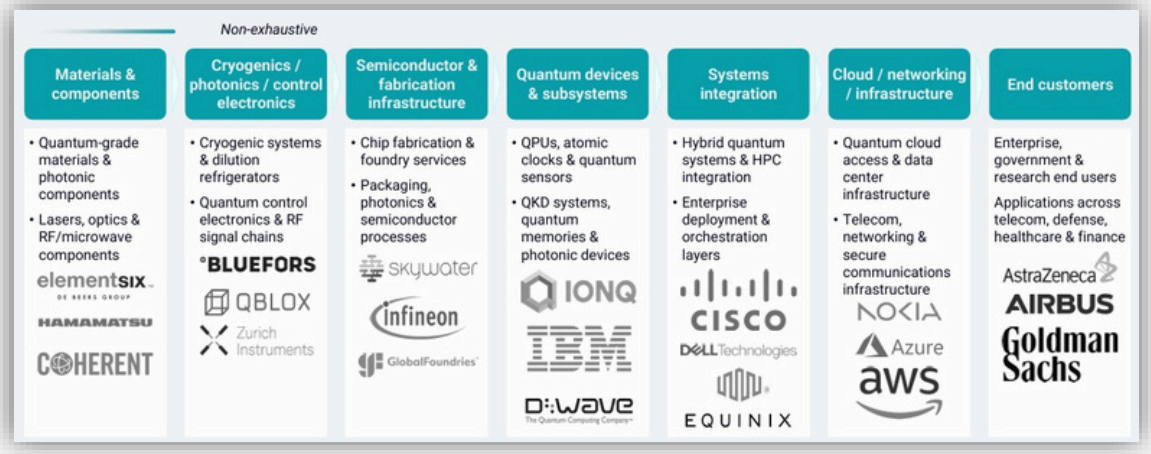
The ambition for New Zealand could look similar to that of Finland and Bluefors. NZ does not have the financial resources and capability to invest in capital-intensive, "full stack" quantum tech computing systems in one or multiple modalities, like the U.S., the UK, Canada, or Australia. But New Zealand can set a goal of commercialising and delivering differentiated quantum technologies to global value chains. Participation could be highly selective and focused, but with enough flexibility to adjust as the global quantum market changes and matures.

33 Bluefors. (n.d.). Company Info. https://bluefors.com/company/

Other countries besides Finland have also built strategic quantum niches. Accenture highlighted Switzerland and Israel as similar exemplars for New Zealand, becoming laser-focused and well-known on the global quantum stage for specific quantum tech areas[34]. Switzerland is building on its precision manufacturing heritage, focusing on enabling technologies, precision engineering, and quantum manufacturing, while Israel is leveraging its cybersecurity and defence expertise "to specialise in quantum control systems, orchestration software, and security-critical layers of the quantum stack."

Box 5: Quantum technology stack

The term "quantum tech stack" refers to the layers of the quantum value chain, from materials and hardware devices to cloud computing infrastructure and end customers.



Source: The Quantum Insider powered by Resonance, Prepared for NZIAT (2026).

Identifying targeted areas in global supply chains could help develop research capability around a national mission or challenge with clear commercial objectives and a focus on return on investment. In considering suitable targets for smaller economies, Accenture identified seven "nodes" of emerging global market opportunity through a market analysis of the global value chain[35], which included:

1. radio frequency (RF) & microwave components
2. photonic parts
3. cryo-CMOS (Cryogenic Complementary Metal-Oxide-Semiconductor) control electronics
4. quantum error correction (QEC) & compilers
5. neutral atom
6. hybrid classical-quantum computing platforms
7. post-quantum cryptography (PQC).

These global market opportunity areas were extracted through commonalities across what quantum technology is scaling first, where long-term value is being built, where the technology has crossed into early industrial deployment, where a competitive advantage can be built from "pick-and-shovel"

34 Accenture Research. (2026). *From Qubits to GDP: Unlocking New Zealand's Quantum Economy – The New Quantum Growth Frontier*. Prepared by Accenture for NZIAT.
35 Ibid.

solutions (i.e., the infrastructure and hardware systems everyone relies on), and lastly, where successful participation depends on global supply chain positioning (i.e., Finland), as opposed to investment across the full quantum tech stack (i.e., United States). While they were developed as globally informed, generic strategic options, not specifically tailored to New Zealand's capability, they are a valuable reflection on possible approaches for smaller players to "find a foothold" in the emerging global landscape.

3. NZIAT Due Diligence

The case for an NZIAT quantum technologies research platform is based on an evidence-led discovery process designed to test New Zealand's readiness and the suitability of a platform investment approach as the delivery model.

3.1 Scientific Merit

Criteria
Scientific Merit Considers whether New Zealand's quantum and enabling technology research demonstrates world-class quality, relevance, depth, and distinctiveness compared with global benchmarks, international quantum tech ecosystems, and global market opportunities.

Quantum tech research in New Zealand spans multiple organisations

New Zealand has some fundamental research capabilities that underpin the development of quantum technologies, including photonics, optics, cryogenics, condensed matter physics, materials science, engineering, and computer science. This quantum tech expertise is concentrated across a handful of domestic entities. Based on responses to MBIE/NZIAT's Information Request and later discussions with additional academic stakeholders, New Zealand's quantum tech ecosystem is organised around a small number of research centres, plus universities:

- the Te Whai Ao-Dodd-Walls Centre for Photonic and Quantum Technologies
- the Paihau-Robinson Research Institute at Victoria University Wellington
- the MacDiarmid Institute for Advanced Materials and Nanotechnology
- the Measurement Standards Laboratory of New Zealand (MSL) (set to integrate with ESNZ),
- the major universities (University of Auckland, Auckland University of Technology, Massey University, Victoria University of Wellington, University of Canterbury, and University of Otago)
- plus capabilities and interest at Earth Sciences New Zealand (ESNZ) and Bioeconomy Science Institute (BSI). [36]

Of these entities, the Dodd-Walls Centre is the primary vehicle through which NZ conducts and coordinates its photonics- and quantum-related research. It represents a nationally distributed network of faculty members and researchers that are affiliated with multiple NZ universities and organisations as well as hosting the Quantum Technologies Aotearoa (QTA) initiative. At last count, it numbered 59 Investigators (including the Director and Deputy Director) and 49 other researchers, with PhD students comprising 38% of the total membership.[37] In addition to the associated researchers, its annual operating expenditure was reported at NZD 3.5 million, with about one third of which is

36 Ministry of Business, Innovation and Employment and NZIAT. (2026). *Request for Information (RFI) Response Findings Summary*. Prepared by NZIAT.

37 Te Whai Ao – Dodd-Walls Centre for Photonic and Quantum Technologies. (2025). *Dodd-Walls Centre annual report 2025*. View report.

dedicated to research expenditure and scholarships.[38] Dodd-Walls is a designated Centre of Research Excellence (CoRE), with its funding running from July 2021 to June 2028.

Alongside the Dodd-Walls Centre, the MacDiarmid Institute and Robinson Research Institute provide critical enabling technology capabilities in materials science, superconducting materials, and cryogenics. These capabilities provide valuable synergies to the quantum research community as they can directly support the design and development of specialised quantum components and hardware that rely on advanced materials, ultra-low-temperature environments, and precision engineering. One example is research led by the Robinson Research Institute that includes the development of cryogenic memory systems and microwave components designed for integration with superconducting quantum modalities.[39]

Quantum-specific funding is narrowly directed

Public funding for quantum tech research in New Zealand is primarily directed through the Dodd- Walls Centre, which administers the Beacons Programme and hosts the QTA initiative supporting international collaboration, alongside support through Catalyst Strategic funding (e.g. Korea research partnerships). While other institutions, such as the MacDiarmid Institute, Robinson Research Institute, and MSL, undertake relevant research within their broader research programmes, this adjacent work is not typically designated as quantum tech specific.

The largest chunks of quantum tech funding include the Dodd-Walls Centre's 7-year, NZD 36.75m CoRE grant as well as the QTA programme 5-year, NZD 12m Catalyst Strategic grant. At the project level, quantum tech research is supported by more than 10 Marsden-funded research projects and 1 Endeavour project, typically between NZD 100,000-313,000 annually. These projects are spread across institutions such as the University of Auckland, the University of Otago, and Victoria University Wellington, covering topics in photonics, superconducting materials, quantum optics, and quantum software. Collectively, this accounts for roughly NZD 10+ million in quantum-related funding per year.[40] These investments demonstrate a distributed but visible funding base across quantum and enabling technologies.

New Zealand has world-class capabilities in quantum-related research

Through the RFI process, academic stakeholders identified several quantum tech areas of research excellence:

- optical sensing, Free-Space Optical Communications (FSOC), optoelectronic technologies, spectroscopy, and imaging technologies that enable high-precision measurement electronic control systems and sub-components
- materials science and condensed matter physics
- photonics-enabled technologies that underpin emerging quantum systems and advanced sensing applications
- quantum communication networks and quantum memory systems
- superconducting and cryogenic electronics subsystems for quantum tech supply chains.

38 Te Whai Ao – Dodd-Walls Centre for Photonic and Quantum Technologies. (2025). *Dodd-Walls Centre annual report* 2025. View report.

39 Paihau-Robinson Research Institute. (n.d.). *Quantum technologies projects*. Victoria University of Wellington. Retrieved July 2, 2026, from https://www.wgtn.ac.nz/robinson/research/quantum-technologies/projects

40 NZIAT calculation based on data retrieved from: Ministry of Business, Innovation and Employment. (2026, June 8). *Who got funded*. www.mbie.govt.nz/science-and-technology/science-and-innovation/funding-information-and-opportunities/investment-funds/who-got-funded.

Bibliometric analysis by NZIAT also shows that New Zealand is outperforming OECD benchmarks for both research quantity and quality in some areas of quantum-related research. Using New Zealand publication data from 2020 to 2025, the analysis measured where New Zealand publications are cited more frequently than OECD averages for the field; and where New Zealand publishes proportionally more than OECD averages. In effect, these measures act as proxies for volume-leading and quality-leading research areas.

In quantum-related fields, New Zealand's strongest performance was in sensing, timing and navigation. Publications on sonar and acoustic sensors, atomic clocks, and multispectral and hyperspectral imaging sensors were above OECD averages on both volume and quality. Other areas, including magnetic field sensors, radar, photonic sensors, and gravitational force sensors, were identified as quality-leading but volume-lagging,[41] meaning New Zealand is producing highly cited work even where the publication base is smaller. The same pattern extends to post-quantum cryptography (PQC), which was also identified in the bibliometrics as quality-leading but volume-lagging. This is important because it suggests that New Zealand's research engine contains differentiated areas of excellence.

International collaboration is well developed

New Zealand's quantum tech and enabling technology researchers are collaborating frequently with leading international ecosystems. Responses to the RFI also highlighted the international connectivity of New Zealand's quantum research ecosystem. For example, the Dodd-Walls Centre reported partnerships with leading organisations including the Max Planck Institutes (Germany), NASA, the German Aerospace Center (DLR), Singapore's Centre for Quantum Technologies, the UK's National Physical Laboratory, Japan's Science and Technology Agency, the French National Research Agency, and multiple Australian universities and centres of excellence in photonics and quantum technologies."[42] In addition, a separate NZIAT publication mapping exercise that explored the "number of researchers collaborated with," showed the strongest international links were with the U.S. and Australia, followed by the UK, France, and Germany.

Research is ready to accelerate to market

According to New Zealand academic and research stakeholders, several research areas have potential for global market impact. Using a global market framework proposed by Accenture, participants in a targeted roundtable identified "high potential" areas where New Zealand could accelerate research to market, as well as "selective plays" where New Zealand could position early before the global quantum tech market matures. The results of the activity are provided in Annex 5.

41 MBIE analysis based on custom bibliometric data from Digital Science obtained in 2025.

42 Te Whai Ao – Dodd-Walls Centre for Photonic and Quantum Technologies. (2026). *DWC - MBIE RFI response.*

Areas identified by roundtable participants under the "accelerate to market" and the "selective plays" categories included (non-exhaustive):

- microcombs (photonic parts) for quantum communications
- sensors for sustainable agriculture
- advanced materials
- transduction (microwave-optical)
- statistical testing of random number generators
- environmental sensing using subsea cables
- quantum-adjacent photonics translation (bio photonics, spectroscopy, sensing, etc.)
- quantum light sources
- cryocooling tech
- Adiabatic Demagnetisation Refrigeration (ADR)
- cryo-CMOS control electronics (cryogenic wiring + optics)
- space instrumentation
- single atom magnetometers.[43]

Participants also noted these quantum tech areas have end-user applications spanning communications, networking, agriculture, medical, space, and environmental monitoring. Overall, the exercise provided an important signal for NZIAT, suggesting that key research stakeholders see New Zealand's strongest quantum tech opportunities arising from a strategic approach that concentrates investment on a small number of areas where scientific capability is already demonstrating commercialisation potential.

New Zealand's quantum community shows critical mass, not only isolated sparks

New Zealand has an active and engaged quantum research community with projects spanning quantum computing, sensing, and communications. One estimate obtained through the RFI process pointed to roughly 17 to 24 academics working directly in quantum science and technology across the country. That estimate included approximately 8 to 10 academic staff at the University of Otago, 3 to 5 at the University of Auckland, 3 to 4 at Victoria University of Wellington, 2 to 3 at the University of Canterbury, and 1 to 2 at Massey University. [44]

In addition to this estimate, an NZIAT publication mapping exercise of quantum and enabling technology researchers identified 49 researchers linked to the University of Auckland, 34 to the University of Otago, 17 to Victoria University of Wellington, 9 to Auckland University of Technology, and 7 to the University of Canterbury, with smaller counts across the MacDiarmid Institute for Advanced Materials and Nanotechnology, University of Waikato, Massey University, and MSL. Within the same analysis, ten-year publication data detected roughly 151 unique papers across quantum sensing, computing, communication, and enabling technologies that were published by NZ researchers.[45] Within these publications, there are several identifiable pockets of depth and capability, spanning photonics, quantum memories and transduction, quantum sensing and precision measurement, quantum many-body theory, optical materials, photonic devices for quantum and classical technologies, optical sensing, and laser physics and photonic instrumentation.

Ministry of Education data suggest there is a healthy pipeline of doctoral students in relevant fields (Figure 3) that could be engaged through a platform investment. While the talent pool is modest compared to international counterparts, New Zealand has a pipeline of expertise across several academic disciplines relevant to quantum technologies, including optical physics, condensed matter physics, materials science, software engineering, electrical engineering, and mathematics. This provides a solid foundation for future quantum tech capability and research engagement.

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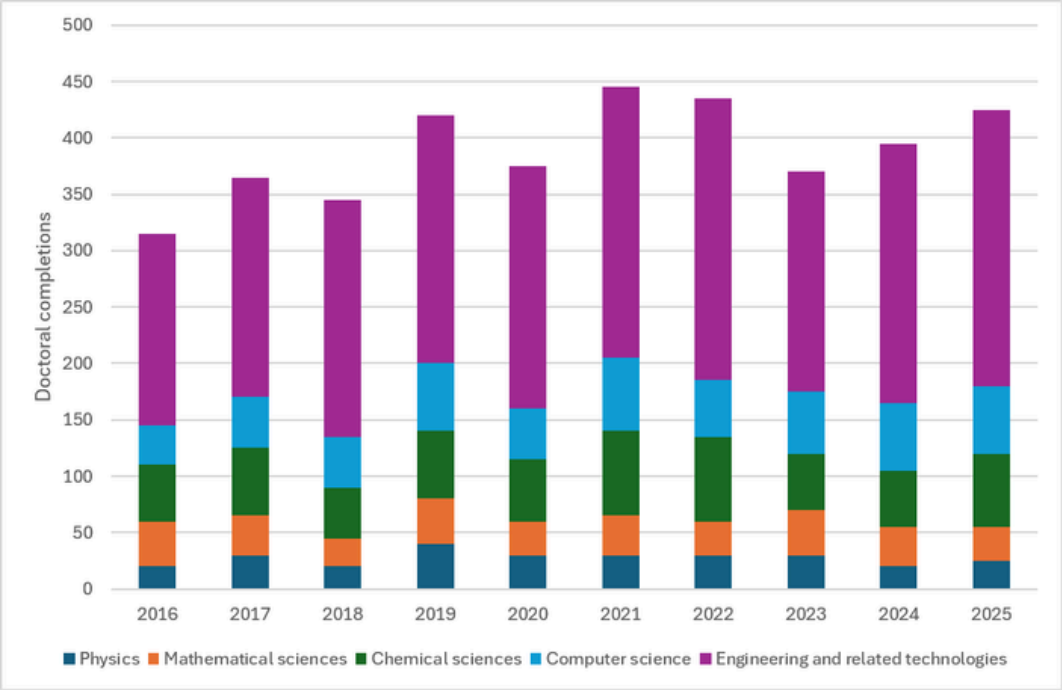
43 Refer to Annex 5 and NZIAT (2026). *Quantum Technology Stakeholder Roundtable Summary* (Christchurch, 28 May 2026). Prepared by NZIAT.

44 Ministry of Business, Innovation and Employment and NZIAT. (2026). *Request for Information (RFI) Response Findings Summary*. Prepared by NZIAT for the Quantum Technology Discovery Process.

45 Data was extracted from OpenAlex using NZIAT definitions to drive keyword searches.

Figure 3: Domestic and international students completing PhD qualifications, selected fields



Source: Education Counts (2026)

Beyond New Zealand's research activities at its major universities, other entities combine to form a national quantum community. ESNZ, BSI, and MSL identified several capabilities that extend into applied research and testing, materials science, metrology, and assurance services, including the development of quantum-grade materials and advanced sensor calibration and assurance. One example provided by MSL was "using quantum standards to realise base electrical units, which are then disseminated to customers through our calibration services." These capabilities could directly enhance the development of quantum technologies, particularly in areas such as quantum-grade materials, quantum sensing calibration, and testing in real-world environments.

This critical mass was well represented at NZIAT's stakeholder workshops, which brought together 86 participants across discovery workshops in Dunedin (22), Wellington (28), and Auckland (36), and helped reconfirm New Zealand's established research strengths and capabilities.[46]

The downside of not investing in quantum technology research

Across the discovery process, stakeholder feedback and expert advice cautioned potentially significant strategic consequences if New Zealand chooses not to participate directly in the global quantum technologies landscape. These concerns ranged from a reduced ability to access global partnerships and shared quantum tech infrastructure, a loss of talent and expertise to overseas ecosystems, and a growing exposure to quantum-related security risks and industry readiness challenges. Observations from the Quantum Australia conference also pointed to a risk of declining interoperability and capability with strategic partners.

46 The Distillery and NZIAT (2026). *The Distillery-NZIAT Quantum Discovery Workshops Summary*. Prepared by the Distillery for NZIAT.

QTA's Commercialising Quantum Technologies in New Zealand report[47] complements these perspectives by arguing that without additional investment, New Zealand "does not simply delay participation — it likely forfeits it. Quantum capability is path dependent, relying on early accumulation of skills, infrastructure, and international positioning that cannot be rapidly rebuilt later. In a counterfactual of no investment, NZ becomes structurally dependent on foreign quantum infrastructure, misses spillovers into climate, health, and primary industries, exports its talent, and loses influence over emerging global standards."

Criteria	Finding
Scientific Merit	New Zealand holds a scientifically credible and internationally connected quantum and enabling technologies research base with room to grow and drive impact.

47 Quantum Technologies Aotearoa (QTA). (2026). *Commercialising quantum technologies in New Zealand*. View Report.

3.2 Commercial Viability

Criteria
Commercial Viability Considers whether there is potential to translate New Zealand's research into commercial activity and building a sustainable, scalable niche in global supply chains.

New Zealand has a "pre-commercial" quantum tech ecosystem.
New Zealand's quantum ecosystem is characterised by strong research capability but limited downstream commercial activity. The ecosystem is almost entirely research-led, with activity concentrated across the universities and research centres, particularly the Dodd-Walls Centre, which underpins much of the programme and grants administration for the country's leading quantum research.

The Quantum Insider powered by Resonance ("TQI") analysis pointed to the predominance of research funding centred on QTA and the Dodd-Walls Centre, with a limited track record of commercialisation and a small number of quantum tech and quantum-adjacent firms.[48] In its RFI submission, the Dodd-Walls Centre similarly identified a handful of commercialisation activities. New Zealand's quantum profile reflects an ecosystem that is anchored in public research funding rather than private industry investment and contains a small number of quantum and quantum-adjacent firms.

Overall, this resulted in TQI classifying NZ as a pre-commercial ecosystem: strong upstream research combined with limited commercialisation and private capital. Portugal, Norway, and the Czech Republic were similarly classified. International benchmarking by TQI suggests that ecosystems at this "pre-commercial" stage require a coordinated national strategy, targeted investment, and a focused niche to transition toward commercialisation.

RFI findings were consistent with this observation, showing that New Zealand's quantum tech research and commercialisation activity is currently concentrated in early-stage quantum science and foundational physics at Technology Readiness Levels (TRL) 1 to 3, alongside a small but important band of mid-level TRL activity in quantum communications, quantum sensing, and photonics at TRL 4 to 6.[49]

Universities and research centres described having a significant amount of research at TRLs 1 to 3, with some company spinouts hovering around TRLs 3 through 6. There were few examples of activity progressing to TRL 7+. Industry responses to the RFI indicated they were mostly operating in the TRL 3 to 6 range and trying to move into commercialisation at TRL 7+. ESNZ and MSL described some active applied research and development (R&D) projects at TRL 3 to 6 with MSL noting testing, metrology, and assurance capabilities that could serve TRLs 6 to 9. In its RFI submission, the Dodd-Walls Centre also noted "most of our projects are at TRL 3 (33%), with a strong pipeline of projects in total (46). Just over 50% of projects are either TRL 2 or 3."[50]

48 The Quantum Insider powered byResonance.(2026). NZIAT NZ Quantum Ecosystem Study. Prepared by The Quantum Insider for NZIAT.
49 Ministry of Business, Innovation and Employment and NZIAT. (2026). Request for Information (RFI) Response Findings Summary. Prepared by NZIAT.
50 Ibid.

NZ's commercialisation track record in quantum tech is limited. Dodd-Walls Centre identified one example of Quantifi Photonics (acquired by TERADYNE), which emerged from Southern Photonics, built on photonics research developed at the University of Auckland. The DWC response further noted that Southern Photonics has recently established two sister companies: Southern Sensing, which is working on temperature monitoring equipment for superconducting temperatures in collaboration with Robinson Research Institute and OpenStar, and Southern Fibre Lasers, which is targeting specialist laser equipment used in quantum technologies worldwide. Other spinouts from Auckland's Photon Factory include Engender Technologies, Orbis Technologies, and Luminoma. Lastly, three recent university spinouts include Probentis, Whitika Ltd (now BiFrost), and Reservoir Computing.[51]

There is an opportunity to capture niches in global supply chains

Evidence from the RFI and TQI suggests New Zealand has research with commercial potential sitting in the middle TRLs, predominately clustered around photonics, quantum devices, quantum optics, materials science, cryogenics, quantum networking, where activity is stepping beyond fundamental science into early translational work. Two examples of quantum tech research with "strong commercial potential" identified by TQI in the market scan were:

- **Conversion between microwave and optical photons**: A QTA project focusing on microwave-to-optical transduction, which addresses a key bottleneck in scaling quantum computing at room-temperature.
- **Rare-earth materials for quantum devices**: Two QTA projects, focusing on rare-earth materials for energy-efficient quantum devices, including materials for optical memory and transduction and rare-earth nitride π-Josephson junctions for superconducting logic.[52]

TQI also highlighted that the transduction research direction has been validated by an external commercial proof point, with QphoX (Netherlands) already moving from the lab into a commercial product. QphoX was spun out of TU Delft Quantum Nanoscience and has progressed through 3 rounds of venture capital fundraising. It indicates there are realistic pathways in international markets and that areas of quantum tech research in New Zealand have potential to progress beyond open-ended research. TQI regarded the QTA transduction project as the most mature, targeting a specific device, building on proven groundwork, and designed with international validation in mind.[53]

Looking to the future, when stakeholders were asked "what types of new businesses and / or spinouts could emerge," the following areas were common across responses:

- high-end optical components and electronics companies
- manufacturing of cryogenic memory and other components for QC
- quantum sensing for defence and precision measurement
- QC software startups and quantum simulation software platforms
- hardware device developers and operators of sensing services for energy, environment, hazards, communications
- businesses focused on testing, validation, and specialised engineering services
- system integrators that test and deploy quantum tech for tough conditions.[54]

51 Ministry of Business, Innovation and Employment and NZIAT. (2026). *Request for Information (RFI) Response Findings Summary*. Prepared by NZIAT.

52 The Quantum Insider powered by Resonance. (2026). *NZIAT NZ Quantum Ecosystem Study*. Prepared by The Quantum Insider for NZIAT.

53 Ibid.

54 Ministry of Business, Innovation and Employment and NZIAT. (2026). *Request for Information (RFI) Response Findings Summary*. Prepared by NZIAT.

Domestic sector engagement could support entry into global markets

New Zealand can leverage the experience of its existing quantum and quantum-adjacent firms as having significant global clients and capabilities that could support entry into global supply chains. Opportunities for domestic sector engagement were identified through the discovery process and extend across a collection of enabling and adjacent technology capabilities. NZ-based industry partners and entrepreneurs pointed to collective capabilities that could support the design and development of quantum tech hardware, components, subsystems, and products, including transducers, quantum sensors, quantum inspired health products, and quantum software. Specific capabilities mentioned that could support future quantum tech commercialisation and supply chain participation, were:

- project engineering and design, assurance and product certification, hardware and systems integration, TRL assessments
- research and development, experimentation, use case development, and proof-of-concept
- quantum-related hardware, networking components, health products, and materials development
- quantum software development
- deep tech venture capital for quantum technologies.

Discovery inputs also indicate that while New Zealand's quantum and enabling technologies industry base is small, it is high potential. The quantum technology ecosystem is supported by roughly two dozen highly capable and specialised firms operating in quantum-adjacent and enabling technology domains.[55] A number of these firms have advanced technology and innovation capabilities across precision engineering, advanced manufacturing, photonics, cryogenic systems and hardware, and advanced instrumentation. Firms such as Fabrum and Quantifi Photonics (acquired by Teradyne) were repeatedly identified as examples of export-oriented, niche players, with TQI considering these firms exemplars of quantum-relevant capabilities that can underpin successful participation in global quantum supply chains. Other firms with general capabilities in advanced manufacturing and advanced tech R&D (such as Fisher & Paykel Healthcare) were also highlighted.

Fabrum specifically illustrates a niche strength in cryogenic cooling systems and advanced manufacturing, with additional R&D capabilities that are directly relevant to quantum tech systems that operate at extremely low temperatures. RFI submissions and stakeholder feedback identified cryogenic systems and electronic instrumentation, including cryo-CMOS (Cryogenic Complementary Metal-Oxide-Semiconductor) control systems for quantum devices, as a key enabling layer for multiple quantum applications, including sensing, networking, and superconducting computing systems. This type of capability aligns strongly with global market demand for specialised infrastructure and mirrors successful international models (e.g. providing dilution refrigeration hardware to quantum supply chains). Quantifi Photonics, by contrast, represents a distinct but complementary domestic strength in photonics testing and measurement. Stakeholders consistently identified quantum photonics as a foundational capability in NZ, with applications spanning the full quantum tech stack, including computing, communications, and sensing.

MSL is another critical asset within NZ's quantum tech ecosystem, offering metrology and assurance capabilities that can support the development and commercialisation of quantum tech hardware, sensors, and devices.

55 Technology Scotland (2026). *Quantum Technology Discovery Workshops Report and Reflections*. Prepared by Technology Scotland for NZIAT.

56 The Distillery and NZIAT (2026). *The Distillery NZ Quantum Discovery Workshops Summary*. Prepared by the Distillery for NZIAT.

For example, through the QTA initiative, MSL has been tapped for five quantum- related R&D projects across seismic sensing, statistical testing of quantum random number generators, quantum electrical metrology and more.

In addition to New Zealand's quantum and enabling tech capabilities, Tech NZ's establishment of the NZ Quantum Tech Forum represents an important step in strengthening pathways from research to commercial impact by providing a coordinated and industry-led forum at a national-level.[57] If successful, it could enable and foster collaboration between industry and academia, signal priority areas for quantum tech development and adoption, and improve national visibility for local investors and partners. Assuming it operates in a similar fashion to the AI Forum, it will provide NZ's quantum community annual events, working groups, regional networking, and resources to improve national connectivity and collaboration. Future industry coordination through Tech NZ and NZIAT could provide a credible starting point for integration into global quantum supply chains even if New Zealand's domestic market remains small and early-stage.

New Zealand can differentiate its quantum tech offerings

New Zealand's differentiation in quantum technologies will not come from scale, but from a distinct combination of high-quality research capabilities and "rugged" environmental conditions that few other countries can replicate. Across the discovery process, a consistent theme was that NZ's quantum-relevant strengths are closely linked to established research capability in photonics, materials science, sensing, and precision measurement, alongside national strengths in earth sciences, space, oceans, agriculture and agritech, and environmental monitoring.

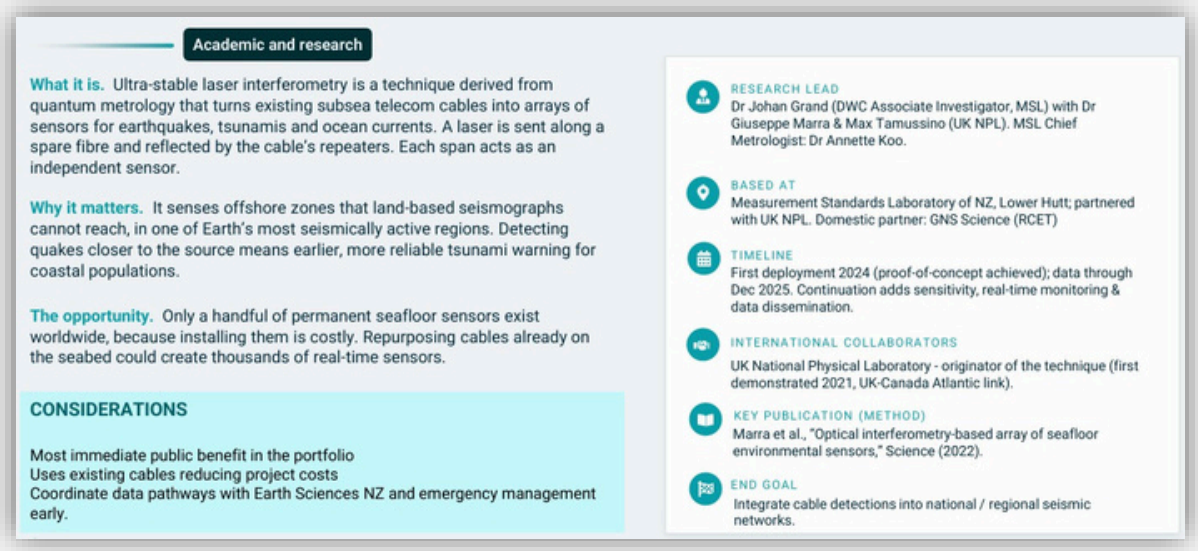
NZ's infrastructure and natural environment further reinforce these strengths. During the stakeholder workshops, "NZ as a testbed" was a recurring theme, with examples spanning subsea cable networks, seismically active zones, geothermal systems, and a growing space capability. These characteristics provide unique opportunities to design, test, and deploy quantum technologies in complex, real-world conditions that are not readily accessible to other nations.

One existing example is the QTA seafloor project that uses quantum-enabled laser interferometry on existing subsea telecommunications cables to turn them into large-scale environmental sensors. The project addresses a critical environmental monitoring gap: traditional seismographs cannot effectively capture offshore events, and installing dedicated seafloor sensors is costly and limited in coverage. This approach enables real-time monitoring of earthquakes and tsunamis closer to their source, improving early warning capability for coastal communities.

New Zealand could create a genuinely differentiated model of quantum tech innovation. Rather than focusing on the development of large-scale quantum computing systems, NZ is better positioned to pursue application-led development, where technologies can be tested, validated, and iterated rapidly in real-world environments. Stakeholder input reinforced this direction. Quantum sensing was consistently identified as a high-potential commercial pathway, as it can be developed in partnership with industry and tailored to specific use cases onshore, leveraging NZ's environmental conditions and sector strengths to create differentiated products and services.

57 The Distillery and NZIAT (2026). *The Distillery-NZIAT Quantum Discovery Workshops Summary*. Prepared by the Distillery for the Quantum Technology Discovery Process.

Box 6: QTA projects: seafloor cable-based sensing for hazard monitoring



Source: The Quantum Insider powered by Resonance, Prepared for NZIAT (2026).

Quantum tech IP creation and patent activity is limited

Globally, there has been a sharp acceleration in quantum patent activity relative to all other technology domains, particularly from the mid-2010s onward. While overall patent growth in all other technology domains remained steady, quantum-related IP activity began to grow significantly after 2014, indicating a change in global investment and strategic focus. Between 2005 and 2014, quantum patent growth tracked broadly in line with global trends, with a compound annual growth rate (CAGR) of 3%; but from 2014 onward, this trajectory shifted to more than 6 to 7 times higher than other tech categories by 2023.[58]

IP creation and patent activity in NZ's quantum tech domain is fairly limited to date. New Zealand's IP base was identified by TQI as small and largely concentrated in the enabling technology domains, such as cryogenics, control systems, and superconducting.

Yet, RFI data indicated that some plausible commercial models for quantum tech are already visible in the ecosystem, even if they remain early stage. Across responses, universities and research centres largely described quantum tech commercialisation through IP generation, patents, licensing, startup spinouts, and joint research contracts. Industry respondents were more focused on product development, engineering services, licensing university-developed IP, and product certification pathways. The CRIs and Crown agencies, by contrast, pointed to applied R&D services, contract research, and the use of national facilities, testing, and standards-aligned assurance to support research translation.[59]

58 Organisation for Economic Co-operation and Development (OECD). (2025). *Mapping the global quantum ecosystem*. https://link.epo.org/web/publications/studies/en-mapping-the-global-quantum-ecosystem.pdf

59 Ministry of Business, Innovation and Employment and NZIAT. (2026). *Request for Information (RFI) Response Findings Summary*. Prepared by NZIAT.

Local IP activity in quantum tech is driven by approximately 24 identifiable patent families spanning both pure quantum tech and enabling technologies. The current activity is led by less than 10 organisations, including University of Otago / Otago Innovation Ltd, HTS-110 Ltd, Tuatara QRNG, Fabrum, Victoria University Wellington, OpenStar Technologies and Callaghan Innovation. Over 10 patents are associated with Victoria University of Wellington, Robinson Research Institute and HTS-110 Ltd, primarily in cryogenics, magnets, and superconducting systems.[60]

Infrastructure gaps are surmountable

NZ's quantum research maturity profile points to a common commercialisation problem in deep tech and science-based translation: promising research often sits between roughly TRL 3 and TRL 6, where university-led science can struggle to progress toward investable and commercially relevant products without the right infrastructure and technical expertise. During the quantum technology discovery workshops, participants frequently pointed to a "Valley of Death" between university prototypes and the availability of quantum tech infrastructure, such as fabrication and testing facilities.[61] Survey data obtained through the RFI process also identified access to infrastructure and equipment, talent and workforce capability, and early-stage investment funding as the top 3 barriers to commercialisation in NZ.[62] In other words, capturing commercial potential of NZ's existing research is less about whether the promising science exists, but more about whether specific research projects can be supported through the middle TRL stages of validation, development, and early market deployment effectively.

Quantum tech infrastructure access is increasingly being addressed through international partnerships and collaboration. TQI explicitly identified limited dedicated quantum tech facilities and infrastructure as a core gap in NZ's quantum ecosystem, particularly in areas such as fabrication, semiconductors, and quantum computing access. In response to this, NZ is already demonstrating a partnership model to access fabrication capability. Through the NZ-Korea Catalyst Strategic programme, researchers are actively collaborating with institutions such as Korea Advanced Institute of Science and Technology (KAIST), enabling access to infrastructure that does not exist domestically. These collaborations involve specific technical areas, such as on-chip quantum light sources, quantum memory integration, and photonic circuits development, reinforcing that access to offshore infrastructure is critical to advancing NZ quantum tech research.[63]At the same time, engagement and collaboration with Australian partners is emerging. While the specific details of quantum tech infrastructure access are still developing (i.e., with Queensland as an example), smaller ecosystems nearly always rely on shared access to infrastructure, testbeds, and facilities to support R&D activity.

Talent gaps may present a constraint to growth

Feedback from the Christchurch roundtable reinforced that New Zealand's quantum ecosystem has a strong but small talent base. Participants pointed to a high-quality pipeline of PhD students and researchers, particularly in photonics,-optics, and quantum adjacent fields, supported by research grants and scholarships through organisations such as the Dodd-Walls Centre.

However, this talent base remains largely concentrated in academia, with limited opportunities for absorption into quantum tech startups and industry roles. A central concern raised by stakeholders was the risk of quantum tech talent leakage or "brain drain", particularly at

60 The Quantum Insider powered by Resonance. (2026). *NZIAT NZ Quantum Ecosystem Study*. Prepared by The Quantum Insider for NZIAT.

61 The Distillery and NZIAT (2026). *The Distillery-NZIAT Quantum Discovery Workshops Summary*. Prepared by the Distillery for NZIAT.

62 Ministry of Business, Innovation and Employment and NZIAT. (2026). *Request for Information (RFI) Response Findings Summary*. Prepared by NZIAT.

63 The Quantum Insider powered by Resonance. (2026). *NZIAT NZ Quantum Ecosystem Study*. Prepared by The Quantum Insider for NZIAT.

the postdoctoral and early-career stage. Without clear domestic pathways into applied research, startups, or industry-led projects, researchers could be drawn to overseas ecosystems that can offer access to infrastructure, capital, and commercial opportunities. In addition, roundtable participants also highlighted a gap in applied and technical skillsets for quantum, including engineering, product development, and technician-level capabilities (i.e., "quantum tradies"). While NZ's research capability is strong, there is a lack of workforce depth in the roles required to move new technologies from laboratory to commercialisation, particularly across TRLs 4 to 6, where prototyping, engineering, and testing are needed.

Discovery process inputs also highlighted potential NZ talent constraints in senior commercialisation leadership, startup experience, and advanced manufacturing know-how that is required to translate research into globally competitive, deep tech firms. While this is not quantum-specific, this challenge is further compounded by the need for individuals who can operate across multiple domains, including government, academia, industry, and startup, requiring rare combinations of technical, commercial, and public sector expertise that are not typically well-developed at scale within NZ.

However, there may be scope to draw on New Zealand's diaspora or overseas talent. Discussions at a Queensland-New Zealand Quantum Collaboration Workshop revealed that several quantum and photonics technology leaders based overseas were educated and trained in New Zealand. At present, several NZ-trained researchers hold leadership positions in internationally recognised quantum and photonics research organisations and centres of research excellence. Members of the broader research community have also received international recognition for their scientific contributions, highlighting the quality of New Zealand's research talent and its influence within the global quantum ecosystem.

Investor interest and investment scale is required for success

Investor interest in quantum technologies has increased significantly in recent years, reflecting growing confidence in the long-term commercial potential of the sector. Internationally, quantum- related companies have attracted more than USD 20 billion in funding deals over the past decade. Several New Zealand researchers reported active discussions with potential international investors and commercialisation partners, indicating that globally relevant quantum technologies developed in New Zealand can attract external interest and investment. Fabrum, Southern Photonics, Rakon, Buckley Systems, HTS-110, and OpenStar Technologies were identified by TQI as exemplars of this, having attracted international capital and/or partnerships.[64]

Nevertheless, domestic stakeholders acknowledged that there is a limited availability of local venture capital and early-stage investment that could present a constraint on commercialisation. With substantial deep tech venture capital funds existing internationally, stakeholders noted there would be substantial value in national coordination that improves international visibility in quantum tech, strengthens connections with overseas investors and industry partners, and supports commercialisation pathways.[65]

64 The Quantum Insider powered by Resonance. (2026). *NZIAT NZ Quantum Ecosystem Study*. Prepared by The Quantum Insider for NZIAT.

65 Ministry of Business, Innovation and Employment and NZIAT. (2026). *Request for Information (RFI) Response Findings Summary*. Prepared by NZIAT.

Box 7: New Zealand's commercial ecosystem comprises a small number of quantum and quantum-adjacent companies

Quantum companies — *Non-exhaustive*

Company	Business	Clients & Sectors	Capital Raised	Notable Events
Fabrum	• Designs and manufactures **cryogenic cooling systems** • **Patented dual-diaphragm pressure wave generator** and large-scale linear pulse tube technology	• **Quantum Computing infrastructure** • **Medical, space & defence, and industrial** gas	• **Series A:** NZD $23M (2025)	• **Founded 2004, Christchurch** • **Callaghan Innovation R&D grant** recipient
QUANTIFI PHOTONICS	• **Develops benchtop and modular photonic test** instruments • **Specialises in coherent optical communications** and optical transceiver testing	• **Semiconductor and cloud AI / data** center operators • Multinational technology companies	• **Series A:** NZD $3M (2017) • **Series C:** NZD $25M (2022)	• **Founded 2012 as University of Auckland spinout** • **Acquired by Teradyne** (US$16.7B market cap) March 2025 - NZ's largest deep tech exit
rakon	• Designs and manufactures **frequency control products** • **Crystal oscillators** for GPS, telecom, space & defence	• **Satellite and GPS manufacturers worldwide** • **Space & defence contractors**; telecoms operators	• **2006 IPO:** NZD 66 million raised	• **Founded 1967, Auckland** • **Supplies 90%+ of global GPS chip oscillator market** • **Acquired by Bourns Inc. May 2026**
	• **Precision electromagnets, ion beam physics hardware** • **Components for semiconductor fabs**, medical and particle accelerators	• **Semiconductor chip manufacturers (90%+ of global chip output)** • Medical imaging, particle accelerator labs, defence	• N/A	• **Founded 1986, Auckland**
HTS-110	• **Cryogen-free magnets for NMR**, beamlines, sensing and research	• **Universities, national labs, industrial R&D globally** • Metrology, MRI, and synchrotron beamlines	• N/A	• **Founded 2004, IRL spinout** • **Supplied magnets to Brookhaven National Lab (USA)** • **2026: launched 3Tracer 2.0 benchtop NMR** with Stelar (Italy)
OPENSTAR	• **Levitated dipole fusion reactor** using HTS superconducting magnets • **"Inside-out" design** modelled on planetary magnetic fields	• **Pre-revenue**; government and clean energy focus • **NZ clean energy strategy alignment**; future utility sector	• **NZD $10M seed (2022)** • **NZD $35M government loan** (Reg. Infrastructure Fund, 2026) • **Targeting US$120-150M raise**	• **Founded 2021, Wellington** • **Nov 2024: achieved First Plasma in "Junior" prototype** • **Feb 2026: world-first levitated magnet** demonstration before PM Luxon

Source: The Quantum Insider powered by Resonance, Prepared for NZIAT (2026).

Finally, evidence gathered across the discovery process suggested that the scale of investment required for success should be considered relative to New Zealand's intended role in the global quantum landscape.

Criteria	Finding
Commercial Viability	The ecosystem is undertaking more than fundamental scientific discovery but is not yet mature enough for commercial outcomes to emerge at scale without deliberate intervention and support.

3.3 Economic Impact

Criteria
Economic Impact Considers where there is potential for strengthening NZ's economic performance through innovation, high-value exports, productivity gains, investment attraction, and overall value creation.

Quantum's potential global impact is substantial

McKinsey & Company estimates that the three pillars of quantum tech – quantum computing, quantum communication, and quantum sensing – could together generate as much as USD 97 billion in annual revenue by 2035. The same analysis suggests the total market could reach USD 198 billion by 2040, indicating that a sizeable global industry is already taking shape.[66]

This positive picture is reflected by capital investment flows and global startup growth. Global funding into quantum and enabling technology start-ups reached USD 6.9 billion in 2025, up from USD 3.4 billion in 2024, even though the number of deals fell from 333 to 319. By March 2026, funding reached USD 4.9 billion through 61 deals. Cumulative funding over the last 5 years, 2021 to 2025 (plus 3 months in 2026), reached USD 24 billion, with Lumentum, Coherent, IonQ, and PsiQuantum driving the largest deals. Further to this, the number of quantum and enabling technology start-ups grew from just under 500 globally in 2021, to over 700 in 2026, representing 55% growth over the last 5 years.[67]

Crucially, the market is still early enough for new players and smaller economies to establish meaningful supply chain positions. Accenture research delivered to NZIAT shows that the sector remains early-stage, with only 1% of quantum-related start-ups classified as "established," while 5% were "emerging," 19% "validating," 52% "deploying," and 23% "scaling." Most firms in the global market are still extremely early in their commercial journey, which means the value chain is far from consolidated.

Timelines may be longer than other technology domains

Deep tech, science-based companies generally take longer to scale and produce returns. A recent Boston Consulting Group (BCG) analysis found deep tech firms take around 35% longer than software companies to grow revenues from USD 1 million to 5 million. Return on investment from quantum technologies is expected over long time horizons, potentially much longer than other advanced technology categories. Feedback from the Advisory Panel indicates that commercialisation and economic impact will likely unfold over several decades.

At the same time, there is a growing expectation that quantum technologies are approaching an inflection point. Experts and consulting firms in the quantum field anticipate a "breakthrough deployment" phase within the next few years. TQI notes that "companies differ in their definitions of useful, but they typically agree on 2030 as a crucial breakthrough year for quantum computing."[68]

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66 McKinsey & Company. (2025, June 23). *The year of quantum: From concept to reality in 2025.* McKinsey & Company. https://www.mckinsey.com/capabilities/tech-and-ai/our-insights/the-year-of-quantum-from-concept-to-reality-in-2025

67 Accenture Research. (2026). *From Qubits to GDP: Unlocking New Zealand's Quantum Economy – The New Quantum Growth Frontier.* Prepared by Accenture for NZIAT.

68 The Quantum Insider powered by Resonance. (2026). *NZIAT NZ Quantum Ecosystem Study.* Prepared by The Quantum Insider for NZIAT.

Within this broader landscape, there is a clear distinction in timelines across sub-categories. Quantum sensing and communications, for example, are generally seen as near-term opportunities, with some industrial deployment already emerging. By contrast, quantum computing is still viewed as a few years to a decade away from delivering measurable economic and productivity gains.

There is potential for frontier firms and enduring competitive advantage

Globally, there are just over 700 quantum-related companies, with around half located in the US, UK, or Canada.[69] This relatively concentrated landscape offers an opportunity for NZ to establish a foothold and gain market share. Even 10 new quantum-related startups or spinouts would represent around a 1% increase in share of the global quantum ecosystem. While this is small in absolute terms, it would be a significant achievement relative to New Zealand's current position and compared to other advanced economies that have invested more heavily and over longer periods of time.

The question for New Zealand is not how large the global quantum technology market might become, but how a small, advanced economy can capture meaningful economic value by building an enduring competitive advantage in one or two layers of the quantum tech stack. This approach will require developing and scaling high-performing frontier firms, underpinned by a sustained pipeline of research, talent, and innovation activity.

Credible pathways to frontier firms and sustainable competitive advantage do exist and realising economic impact is about building defensible and early positions in quantum supply chains. The clearest example identified through the discovery process is Finland's Bluefors, which Accenture described as the leading supplier of dilution refrigerators and cryogenic infrastructure for quantum computing. Bluefors generated an estimated EUR 200 million in revenue in 2024 alone with more than 15,000+ cryocoolers and 1,700+ cryogenic measurement systems delivered globally.[70] Bluefors holds a position so critical within the global quantum supply chain, that most quantum computers cannot run without its hardware.

In effect, Finland and Bluefors did not try to compete across the full quantum stack, they developed a position within a key hardware infrastructure layer and, by doing so, secured what Accenture described as a "quantum tech supply chain chokepoint." Despite relatively low production volumes, each unit from Bluefors commands significant economic value due to its technical complexity, high customisation, and essential function of enabling ultra low temperatures for quantum technologies.

It serves as an excellent exemplar of a frontier firm that provides high-value exports to the global economy and supports high-tech jobs in a local region.

This international case study example aligns with the experiences of NZ-based firms, Fabrum and Quantifi Photonics, as highly capable, export-oriented suppliers that are already operating in quantum-adjacent and enabling technology supply chains. While they do not represent a Bluefors-like "chokepoint" in global quantum supply chains, they show that NZ has already generated successful and scalable startup firms with the technical depth, advanced manufacturing capability, and international market orientation that this kind of approach would require. In both cases, the firms were launched partly based on frontier research at the University of Canterbury/Callaghan Innovation and the University of Auckland.[71]

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69 Accenture Research. (2026). *From Qubits to GDP: Unlocking New Zealand's Quantum Economy – The New Quantum Growth Frontier*. Prepared by Accenture for NZIAT.

70 Bluefors. (n.d.). *Company Info*. https://bluefors.com/company/

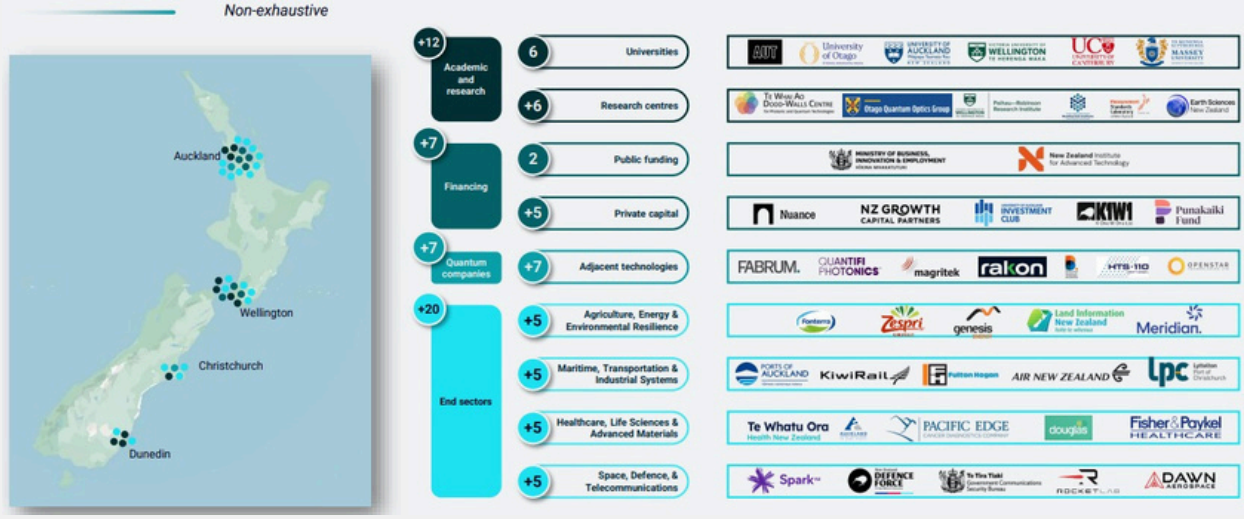
71 Te Whai Ao – Dodd-Walls Centre for Photonic and Quantum Technologies. (2026). *DWC - MBIE RFI response*.

However, the availability of deep tech venture capital in New Zealand will be a key challenge for research translation and commercialisation. There is limited availability of local growth capital in NZ that can support quantum technology companies through long product development timelines, high capital intensity, and technical risks. The Advisory Panel saw access to venture capital as a key factor in "thriving quantum ecosystems" in addition to international partnerships, the talent pipeline, and local industry partners to pilot, test, and adopt new technologies. While this should be a key concern for a "viable quantum ecosystem," it remains a factor in all emerging technology areas for NZ, such as medtech, cleantech, agritech, and space technologies and is not unique to quantum technologies.

Potential applications for quantum are presenting in growing, high-value sectors

Discovery process participants suggested success for New Zealand in quantum technology is also about anchoring a quantum tech investment in areas of "domestic relevance and economic strengths" to solve hometown problems through innovation and industry adoption. Across the Advisory Panel engagements, emerging market opportunities were pointed out across sensing, PNT (positioning, navigation, and timing), and adjacent agri-technologies, where quantum-inspired approaches could be uniquely suited and demonstrated in real-world settings. In addition to agriculture-related opportunities, space, underwater ocean sensing and monitoring, biosciences, and climate applications were identified as areas where New Zealand could have a unique quantum advantage.[72] TQI identified end-user sectors that could be promising for quantum technologies in New Zealand (Box 8).

Box 8: New Zealand combines distributed research clusters with strong academic and end sector capabilities



Source: The Quantum Insider powered by Resonance, Prepared for NZIAT (2026)

Quantum technologies present a pathway to both economic diversification and strengthening of NZ's existing economic sectors. Embedding new tech capabilities into areas of domestic relevance, such as agriculture and agritech, space, environmental monitoring, and the biosciences, could support the development of new export-oriented firms, produce higher-value products and services, and enable deeper integration into global supply chains. The Dodd-Walls Centre's "Quantum Meets" workshop series in 2025 that brought together industry, government, and researchers in targeted economic

72 NZIAT (2026). New Zealand Quantum Tech Advisory Panel: Advice and Feedback. Prepared by NZIAT for the Quantum Technology Discovery Process.

sectors, including infrastructure, space and sustainability, health, and agriculture helped surface potential commercial applications and use cases through industry engagement and identify where quantum technologies could address real-world challenges.[73] These engagements, supported by Australia's former Chief Scientist Dr. Cathy Foley and documented in the Centre's 2025 Annual Report, demonstrate that domestic interest in potential quantum tech applications does exist within NZ's key domestic sectors.

Becoming a trusted partner in supply chains is key

Success in quantum tech is increasingly shaped by participation in complex, international supply chains rather than "going it alone." For New Zealand, this creates an opportunity to position as a trusted, high-quality R&D partner within allied networks, particularly through contributions in specialised quantum components, enabling technologies, and unique testing environments. Success will depend on leveraging New Zealand's unique strengths, aligning with international partners on emerging technology standards, understanding security expectations, as well as procurement channels. At the same time, this supply chain approach will require careful management of trade- offs, particularly managing the risk that offshore partners retain downstream value creation and poach top talent.

Criteria	Finding
Economic Impact	Quantum technologies are a growing market globally. A compelling economic opportunity exists if a global supply chain position can be captured and sustained by New Zealand.

73 Te Whai Ao – Dodd-Walls Centre for Photonic and Quantum Technologies. (2025). *Dodd-Walls Centre annual report 2025*. View report.

3.4 Social Benefits

Criteria
Social Benefits Considers whether there is potential for social benefits, including workforce development, societal resilience, and contributions to public good outcomes.

Emerging applications of quantum technologies suggest there is potential for widespread societal impact

The latest wave of quantum technologies remains in the early stages of development and deployment. But while many applications have yet to be commercialised at scale, international evidence suggests quantum technologies could deliver a broad range of social benefits. Beyond contributing to economic growth, quantum technologies enable solutions to complex societal challenges.

The OECD has pointed to a range of areas where quantum technologies could advance the UN Sustainable Development Goals, including through smart agriculture, solutions for water management and quality, improved urban planning, better prediction of natural disasters, and development of renewable energy options.[74] Similarly, the UK's National Quantum Strategy explicitly links technological development to societal benefit. It frames quantum technologies not only as drivers of economic growth and national security, but as tools to "improve the lives of everyone," citing examples such as enhanced healthcare outcomes (e.g. improved brain imaging and drug discovery) and climate resilience (e.g. improved environmental modelling).[75] Canada's National Quantum Strategy includes particular emphasis on privacy and cybersecurity improvements for its citizens, highlighting the role of quantum communications technologies in protecting sensitive data, applications, and critical infrastructure.[76]

Workforce development is emerging as one of the most tangible early social benefits

While many quantum technology applications remain longer term outcomes, workforce development is already generating measurable social and economic benefits across international ecosystems. Global labour market analytics by Accenture show that demand for quantum and enabling technology skills is accelerating, with quantum-related job demand increasing from approximately 190,000 roles in January 2025 to 230,000 in March 2026. The share of global job postings requiring quantum-related skills also approximately doubled between 2021 and 2026. Quantum computing accounts for the largest share of demand, followed by photonics, communications, sensing, and cryogenics. Talent remains concentrated in the U.S., India, and Europe, with demand strongest for scientists, engineers, software developers, and technicians. [77]

Recognising workforce capability as a critical enabler of success in quantum tech, many OECD countries have incorporated education, training, and public awareness initiatives into their national quantum strategies.[78]

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74 OECD (2025). A quantum technologies policy primer, *OECD Digital Economy Papers*, No. 371, January.
75 Department for Science, Innovation and Technology (DSIT). (2023). *UK National Quantum Strategy*.
76 Innovation, Science and Economic Development Canada (ISED). (2022). *Canada's national quantum strategy*. Government of Canada. View report.
77 Accenture Research. (2026). *From Qubits to GDP: Unlocking New Zealand's Quantum Economy – The New Quantum Growth Frontier*. Prepared by Accenture for NZIAT.
78 OECD (2025), An overview of national strategies and policies for quantum technologies, *OECD Digital Economy Papers*, No. 379, December.

These efforts reflect a growing consensus that progress in quantum technologies depends not only on technical advances but also on broader societal readiness. For instance, the UK.'s National Quantum Strategy recognises that increasing quantum literacy and cross-fertilisation with domain expertise in the economy overall, particularly in end-use sectors, is essential to grow the sector. Efforts at Chicago Quantum Exchange (CQE) offer a regional example of how workforce development is being structured for quantum tech. Its 2026 workforce plan estimates that the Illinois-Wisconsin-Indiana region could generate 80,000 to 191,000 quantum-related jobs by 2035, spanning research, engineering, manufacturing, and technical occupations, with more than 70% of roles accessible without a graduate degree.[79] Notably, the CQE-led strategy explicitly aims to broaden participation and build social licence through awareness and accessibility, including Kindergarten and Grade 12 education programmes, community college pathways, shared training infrastructure, and apprenticeship models.

Similar approaches are evident elsewhere. Korea is expanding graduate education and international collaborations with the goal of increasing its specialised quantum workforce from fewer than 400 experts in 2022 to more than 2,500 by 2035. Australia's Sydney Quantum Academy brings together four universities to train scientists and engineers while facilitating industry placements and internships. These examples clearly demonstrate that workforce development is increasingly viewed as both an economic objective and a means of strengthening public legitimacy and embedding quantum technologies within wider society.

Social benefit for New Zealand may emerge first through workforce capability

Evidence from NZIAT's discovery process suggests that a workforce capability uplift represents an initial pathway through which public value could be realised from quantum technology investment. While many broader societal benefits remain dependent on successful commercialisation and research translation, investment in workforce development could help build a more resilient, productive, and future-focused economy.
Potential benefits identified through the discovery process include:

- high-value job creation
- improved retention of domestic talent and attraction of international expertise
- diffusion of quantum-related skills and business capability into adjacent sectors, including telecommunications, agriculture, infrastructure, and finance.

Through domestic stakeholder engagement, workforce development was consistently highlighted as both a significant opportunity and a current constraint. Participants highlighted the importance of strengthening capability across the entire talent pipeline, from PhD students and postdoctoral researchers through to engineers, technicians, apprentices, and interns. There was strong support for practical and vocational training models to enable wider participation and support future workforce needs.[80]

Importantly, the workforce capability uplift generated by any future platform investment will depend on the technology areas prioritised. For example, a focus on quantum sensing applications is likely to increase demand for engineering, technical, and an applied

79 Chicago Quantum Exchange. (2026). Advancing Together: A unified strategy for scaling Midwest quantum talent. View report.

80 The Distillery and NZIAT (2026). The Distillery-NZIAT Quantum Discovery Workshops Summary. Prepared by the Distillery for NZIAT.

"quantum-tradie" skill set, while a greater emphasis on quantum computing and fundamental research would place relatively more weight on scientific and software expertise.

Building social licence could support success

Alongside workforce development, discovery process evidence highlighted the importance of gaining and sustaining public trust and acceptance of quantum technologies. During the stakeholder roundtable in Christchurch, a key observation was that quantum technologies are "not generally well understood and trusted by the public", and that gaining "social licence" through ongoing public engagement would help build legitimacy for a large investment.[81] New Zealand's trust in advanced technologies such as AI is relatively low, and could spill over to quantum technologies. Stakeholders suggested a clear national quantum strategy could help to identify socially beneficial applications of quantum tech and tangible societal outcomes for a quantum investment. A mission-led investment design process would support this. Public engagement could also help demonstrate that quantum tech is not a scientific-only endeavour and can deliver public good outcomes.

Criteria	Finding
Social Benefits	Social benefits are most likely to be realised over longer time horizons through workforce and capability development and potential use cases in areas such as health and climate resilience. Challenges may exist around social licence and a dependency on commercial outcomes.

81 NZIAT (2026). *Quantum Technology Stakeholder Roundtable Summary (Christchurch, 28 May 2026)*. Prepared by NZIAT.

3.5 Platform Potential

Criteria
Intervention Suitability and NZIAT Value Add Considers whether a large-scale platform investment is an appropriate policy intervention and how NZIAT could add value to New Zealand's quantum ecosystem through investment.

An NZIAT platform can bring coordination and scale

Across the discovery process, success for NZ was most often defined as building and sustaining a globally relevant quantum tech capability in a few specific areas or "strategic quantum niches", with a public investment anchored in domestic sectors of relevance and competitive advantage.

The discovery process also suggested that the core challenge for success in quantum technology in New Zealand is not a lack of scientific capability, but the absence of national coordination, scale, and clear pathways from research to commercialisation. Current research activity and capability remain distributed across institutions, disciplines, and funding mechanisms, with limited alignment around a shared national mission or clearly defined commercial outcomes.

Stakeholders consistently pointed to a platform investment being most useful in improving collaboration and coordination domestically and internationally; providing access to shared quantum infrastructure, labs, and computing; bringing together researchers, industry, investors, and government stakeholders; providing significant funding for new and innovative quantum tech R&D projects that are strategically significant for NZ's key domestic sectors; and connecting NZ into international quantum value chains and positioning NZ researchers as a trusted provider/partner in niche areas.[82] Across the stakeholder workshops, RFI responses, roundtable discussions, and international expert advice, (100+ participants across the discovery process), there was a strong convergence on what a platform investment could deliver for NZ's quantum ecosystem (Table 1).

Table 1: Stakeholder perspectives: what an investment could achieve

Theme	Summary of Stakeholder Perspectives
Quantum ecosystem coordination and connectivity	• Improve research collaboration and coordination domestically and internationally • Bring together researchers, industry, investors, and government • Create a more cohesive national quantum ecosystem
Access to shared quantum infrastructure	• Facilitate access to shared quantum tech infrastructure, fabrication, labs, and testing facilities, both domestically and internationally • Remove barriers to participation in quantum tech across institutions and firms

82 The Distillery and NZIAT (2026). *The Distillery-NZIAT Quantum Discovery Workshops Summary*. Prepared by the Distillery for NZIAT.

Accelerate commercialisation and global market pathways	• Support translation from research to market application • Connect researchers to industry demand, venture capital, and global markets • Enable startup formation, IP development, and patent creation
Strategic funding for high-impact research	• Fund new and innovative research projects that are aligned to New Zealand's key domestic sectors and global market opportunities
Integration into global value chains	• Connect New Zealand into international quantum tech supply chains • Position NZ researchers and firms as trusted partners in niche capability areas

Source: NZIAT analysis of RFI and Stakeholder Workshop Summary (2026)

The discovery process evidence suggested New Zealand's ecosystem-level challenges are unlikely to be resolved through business-as-usual funding as current funding mechanisms are insufficient to:

- align national capability and investment around a clear strategic vision and mission
- connect researchers with industry, venture capital, and global market opportunities
- provide access to shared infrastructure and international partnerships.

An NZIAT platform can provide a focal point for industry

A key limitation for NZ is the absence of large domestic demand anchors and corporate partners. Compared to other countries investing in quantum tech, NZ has very few large industrial buyers that can act as domestic 'technology pull' anchors to drive future development, adoption, and commercial deployment. Moreover, limitations in domestic demand anchors are not driven by New Zealand's size and scale alone. The rapid growth and deployment of AI is capturing significant industry attention and investment, reducing both the urgency and capacity of firms to explore and adopt emerging quantum technologies.

In many leading quantum nations, defence and national security agencies act as early adopters, deep tech product development partners, and "first customers" for quantum researchers and startups, providing both funding and commercialisation pathways. Looking at procurement and deployment pathways in NZ may offer opportunities for early-stage validation, development, and future adoption of quantum technologies. During Advisory Panel engagements, Panel members stated that "countries and regions that are accelerating quantum tech investments are gaining traction due to a strategic focus on defence and national security" and challenged NZIAT to consider defence as "an area that needs to be in sharper focus for quantum."[83]

International examples also show that momentum is being built when and where quantum technologies are linked to real-world use cases in sectors such as logistics, healthcare, finance, advanced materials, energy, and digital infrastructure. Denmark recently published a series of use cases to communicate how quantum tech research is moving into translation and commercial activity.[84]

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83 NZIAT (2026). *New Zealand Quantum Tech Advisory Panel: Advice and Feedback*. Prepared by NZIAT for the Quantum Technology Discovery Process.

84 Danish Business Authority, & Danish Quantum Community. (2024). *16 Danish quantum use cases: Practical insights into applications of quantum technologies across industries*. https://dqc.dk/wp- content/uploads/2024/12/16-Danish-Quantum-Use-Cases-December-2024.pdf

Based on the Danish examples, NZ-relevant quantum tech use cases could potentially include:

- precision agriculture and biosecurity (quantum sensing)
- environmental and climate monitoring (quantum sensing)
- infrastructure resilience and geohazards, including detecting underground structures and seismic activity (quantum sensing)
- secure communications (quantum communications)
- optimisation in logistics, energy, and transport (quantum computing)
- improved imaging, diagnostics, and drug discovery in biosciences (quantum computing and sensing).

TQI suggested that New Zealand's best potential anchor organisations are within agriculture, space, telecommunications, defence, and transportation and infrastructure (e.g., Fonterra, Spark, Fisher & Paykel Healthcare, KiwiRail, the New Zealand Defence Force [NZDF]) (Box 9). While these entities have limited resources and scope relative to international counterparts, a platform could help draw partners together, give visibility to quantum opportunities and use cases, and deepen industry- academic collaboration.

Box 9: New Zealand's largest industries offer multiple pathways for quantum adoption

End sectors — Detailed in Appendix

Industry	Est. Size & % of GDP (2025)	Quantum Computing Use Cases	Quantum Sensing Use Cases	Quantum Communications Use Cases	Adjacent / Hardware Use Cases	Companies
Agriculture, Energy & Environmental Resilience	• **Agriculture, forestry & fishing**: NZD $21.8B (5.1%) • **Electricity, gas, water & waste**: NZD $10.8B (2.5%)	Supply chain and logistics optimization; energy grid optimization; crop yield and soil molecular modelling	Gravity sensing for groundwater and geophysical surveying; quantum-enhanced environmental and emissions monitoring; precision agriculture sensing	Quantum-secure data transmission for critical energy infrastructure	Cryogenic sensing components; quantum gravimeters for land surveying	Fonterra, Zespri, genesis, Meridian, Land Information New Zealand
Maritime, Transportation & Industrial Systems	• **Manufacturing**: NZD $34.2B (7.9%) • **Transport, postal & warehousing**: NZD $18B (4.2%) • **Construction**: NZD $27.8B (6.4%)	Rail network and fleet scheduling optimisation; port logistics and route optimisation; air traffic and fleet management	Quantum inertial navigation for maritime and aviation; Quantum Sensing for infrastructure inspection and materials testing; underwater and coastal monitoring	Quantum-secure communications for port and maritime operations	Quantum gyroscopes for navigation; cryogenic cooling for industrial systems	Ports of Auckland, KiwiRail, Air New Zealand, Fletcher Building, lpc
Healthcare, Life Sciences & Advanced Materials	• **Health care & social assistance**: NZD $29.5B (6.8%)	Quantum simulation for drug and biomarker discovery; genomics and personalised medicine; molecular modelling for crop and food science	Quantum Sensing for medical imaging and diagnostics; biosensing for disease detection and characterisation	Quantum-safe encryption for national health data infrastructure; secure patient data transmission	Quantum dot and nanocrystal materials for diagnostics; photonic sensing instruments	Te Whatu Ora, douglas, Fisher & Paykel Healthcare, Auckland, Pacific Edge
Space, Defence & Telecommunications	• **Information media & telecoms**: NZD $17.8B (4.1%) • **Public administration & safety**: NZD $20.8B (4.8%)	Quantum Computing for signals intelligence and data processing; satellite data optimization	Quantum Sensing for defence navigation and positioning; quantum radar and RF field sensing	Post-quantum cryptography migration for national telecoms; Five Eyes quantum-secure communications; space-based QKD payloads	Space quantum experiment platforms; quantum-safe hardware for critical national infrastructure; photonic test equipment for satellite comms	Spark, New Zealand Defence Force, Te Pūnaha Matatini, Rocket Lab, DAWN Aerospace

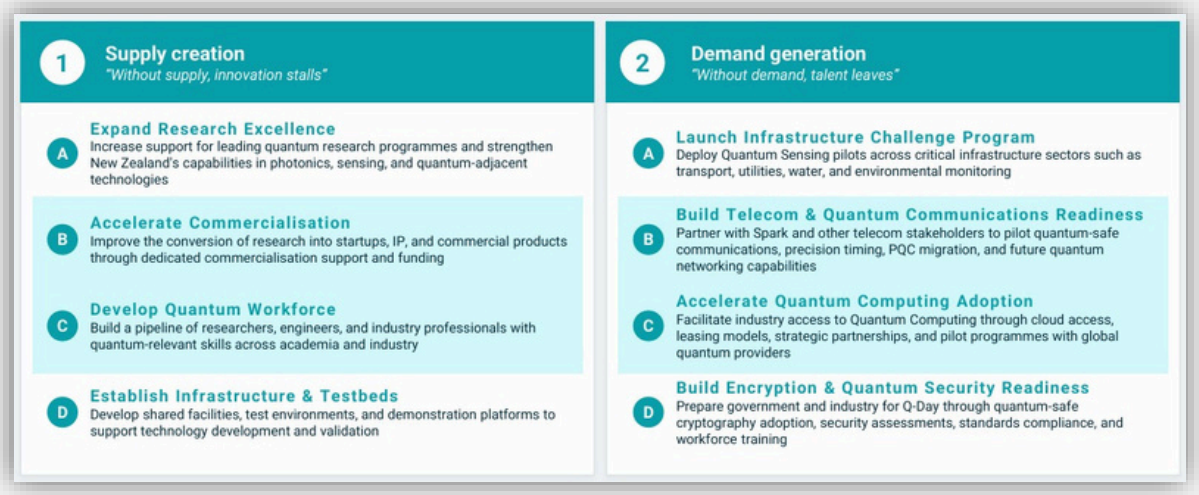
Source: The Quantum Insider powered by Resonance, Prepared for NZIAT (2026).

An NZIAT platform can activate supply creation and demand generation in quantum tech

New Zealand's quantum tech ecosystem development challenge is fundamentally a dual-sided problem of "supply creation and demand generation", requiring coordinated action across the research community, startups, and industry. TQI concluded that supply creation alone is insufficient for success ("without supply, innovation stalls"), and demand generation is equally critical ("without demand, talent leaves"), signalling the need for a systems-level intervention and strategic approach (Box 10).

Box 10: Quantum tech ecosystem development through coordinated action

New Zealand can accelerate quantum ecosystem development through a coordinated "supply- and-demand strategy."



Source: The Quantum Insider powered by Resonance, Prepared for NZIAT (2026).

On the supply side, New Zealand's focus according to TQI should be strengthening the foundations of quantum tech capability, including expanding research excellence in core areas such as photonics, materials science, sensing, and enabling technologies, accelerating commercialisation pathways, developing shared infrastructure and testbeds, and building a quantum workforce pipeline. On the demand side, emphasis must be placed on developing real-world use cases and industry pull, enabling access to quantum computing, and building quantum communications and security readiness within industry.[85] These are all tasks best suited to a large-scale platform investment.

Criteria	Findings
Intervention Suitability	The core challenge for success in quantum technologies is not a lack of scientific capability, but the absence of national coordination, scale, and clear pathways from research to commercialisation. An NZIAT platform is a valid intervention given its purpose of research translation and national capability building.
NZIAT Value Add	Quantum tech research activity remains distributed across institutions, disciplines, and funding mechanisms, with limited alignment around a shared national mission or clearly defined commercial outcomes. NZIAT is positioned to help overcome these challenges as an active investor.

85 The Quantum Insider powered by Resonance. (2026). *NZIAT NZ Quantum Ecosystem Study*. Prepared by The Quantum Insider for NZIAT.

3.6 Summary of Due Diligence

The sentiment from the discovery process is that New Zealand has the scientific capability to participate in the global quantum tech ecosystem, but current research efforts are fragmented and not yet translating into commercial, social, or economic outcomes at scale. The research base is strong and internationally connected, though New Zealand's quantum ecosystem remains early-stage from a commercialisation perspective. A platform investment was considered a credible path to help accelerate the translation of frontier quantum tech research.

Findings for each of the due diligence areas are set out in Table 2 below.

Table 2: Assessment against due diligence framework

Criteria	Findings
Scientific Merit	New Zealand holds a scientifically credible and internationally connected quantum and enabling technologies research base with room to grow and drive impact.
Commercial Viability	The ecosystem is undertaking more than fundamental scientific discovery but is not yet mature enough for commercial outcomes to emerge at scale without deliberate intervention and support.
Economic Impact	Quantum technologies are a growing market globally. A compelling economic opportunity exists if a global supply chain position can be captured and sustained by New Zealand.
Social Benefits	Most likely to be realised over longer time horizons through workforce and capability development and potential use cases in areas such as health and climate resilience. Challenges may exist around social licence and a dependency on commercial outcomes.
Intervention Suitability	The core challenge for success in quantum technologies is not a lack of scientific capability, but the absence of national coordination, scale, and clear pathways from research to commercialisation. An NZIAT platform is a valid intervention given its purpose of research translation and national capability building.
NZIAT Value Add	Quantum tech research activity remains distributed across institutions, disciplines, and funding mechanisms, with limited alignment around a shared national mission or clearly defined commercial outcomes. NZIAT is positioned to help overcome these challenges as an active investor.

4. Designing an Effective Platform

Moving ahead with a platform investment requires careful design and a coherent policy environment.

4.1 Platform Focus Areas

Discovery process evidence suggested the strongest potential focus areas of a national quantum technology platform are across quantum sensing, quantum communications, and quantum-enabling technologies that could unlock global opportunities within the quantum value chain, though each would require further refinement during a platform design phase.

Quantum sensing
Quantum sensing stood out across NZIAT discovery inputs as a strong near-term opportunity. It aligns closely with New Zealand's existing research capability, particularly in materials science, cryogenics, photonics and optics, superconducting devices, and applied research, which underpin the development of quantum sensors and enabling technologies. Sensing also offers several areas of domestic relevance for industry-led technology development and application (i.e., within agriculture, medtech, space, environmental monitoring, and critical infrastructure). These characteristics provide the clearest pathway to early commercialisation and initial economic impact relative to other quantum tech areas.

Quantum communications
Quantum communications and networking also present a significant opportunity for New Zealand. Existing strengths in quantum devices, including quantum memories and transducers, combined with a national space launch capability and unique land and subsea environments, create favourable conditions for developing, testing, and deploying next-generation quantum communication technologies. New Zealand's growing space sector further strengthens this opportunity, as satellite- enabled approaches are increasingly seen as critical to achieving long-distance quantum communications and the development of future quantum networks. These advantages offer the potential to build on existing research strengths while participating in a rapidly evolving global market.

Quantum-enabling technologies
Quantum-enabling technologies are another compelling opportunity and one in which New Zealand already possesses world-class capabilities. Photonics, optics, cryogenics, advanced magnet and superconducting technologies, and rare-earth nitrides underpin the development of quantum technologies and align closely with areas of existing research and commercial strength.

Several New Zealand firms already operate in these enabling technology domains, providing an immediate and robust foundation for participation in global quantum supply chains and the capture of near-term economic value. Evidence from the discovery process frequently identified photonics, optics, cryogenics, and advanced magnet and superconducting technologies as areas of internationally recognised expertise. These capabilities are supported by a mature research base and established firms already supplying advanced components, systems, and highly specialised expertise into global markets.

Quantum computing

Developing end-to-end quantum computing systems was rarely deemed a compelling opportunity for New Zealand, despite representing the largest global market opportunity. The scale, capital requirements, and competitive dynamics of this segment pose a financial hurdle and significant risk of diluting an investment away from the areas where New Zealand may have a competitive advantage.

While not seeking to build a full stack quantum computing capability, New Zealand could focus on developing quantum computing hardware, components, and subsystems, as well as quantum computing software, standards, and simulation. To support this, a platform could leverage and facilitate a range of shared access models, such as vendor-managed quantum computing as a service models (QCaaS) or reserved capacity, to match different needs and stages of research maturity (Box 11). This would enable domestic researchers and firms to engage with global quantum computing models and platforms, test ideas and applications, and develop niche capabilities within computing. However, given the global competition and resources required, these activities would need to be tightly scoped and coupled with clear commercialisation and export pathways.

Box 11: Cloud-based access models provide the most practical pathway for New Zealand to develop quantum computing capabilities

Strategic recommendations for NZ

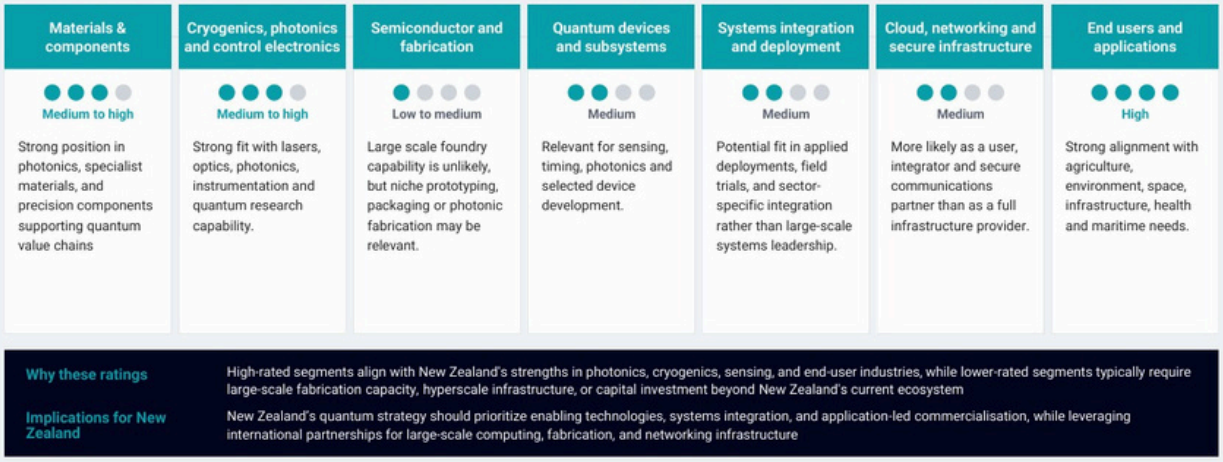
Model family	What it provides	Operating model	Best suited to
QCaaS	**Remote job submission on shared systems**, with no hardware ownership	**The provider handles calibration**, maintenance, uptime, upgrades and scheduling	**Learning, benchmarking, early R&D** and trying multiple modalities
Reserved capacity	**A specific machine or block of time**, held exclusively	**Vendor-operated cloud**, with the customer reserving the window	**Queue-sensitive work, demos, workshops** and time-sensitive runs
Premium / co-design	**Cloud access** plus vendor scientists and application support	**Vendor-operated,** with onboarding and workflow assistance	**Teams needing expert** help to build and deploy applications
Lease	**A temporary right to use hardware** or capacity	**An on-prem physical lease**, or a multi-year capacity agreement	**Fixed-term access** without an outright purchase
On-prem managed	**A system sited close to the customer** and vendor-serviced	**Between lease or purchase and QCaaS**; the vendor remains heavily involved	**Proximity and control without the full ownership** burden
Colocation / sovereign	**Direct, secure or region-specific access**, without owning the machine	**Vendor hardware hosted** in a neutral or in-region data centre	**Latency, security or data-residency requirements**
Purchase	**Hands-on access**, local security and deep stack control	**Customer owns and operates**; requires facilities, integration and staff	**Workforce development and strategic ownership** of the stack

Source: The Quantum Insider powered by Resonance, Prepared for NZIAT (2026).

Strategic positioning within global supply chains

Taking a slightly different lens, TQI identified three high-value segments of the quantum tech stack for New Zealand to consider, given the current strengths in photonics, cryogenics, sensing, and end users that offer pathways for quantum adoption (Box 12). End users and applications were classified as a high potential area and materials and components and cryogenics, photonics, and control electronics were classified as medium to high. The lower-rated segments were those that typically require large- scale fabrication capacity or significant infrastructure investments beyond what NZIAT could offer through a platform investment approach.

Box 12: New Zealand should focus on selective positions within the global quantum value chain



Source: The Quantum Insider powered by Resonance, Prepared for NZIAT (2026).

"NZ as a test bed"

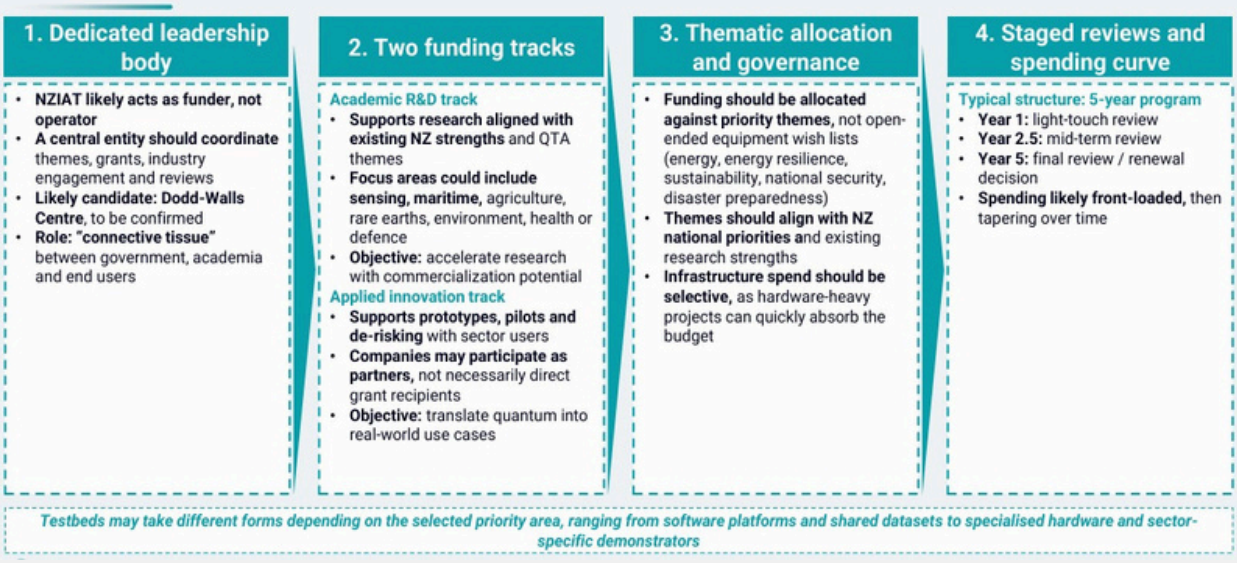
Stakeholders and expert advice also aligned around the concept of New Zealand positioning itself as a "living testbed for quantum technologies," leveraging its research strengths, geography, and end users, including:

- agriculture, energy & environmental resilience
- maritime, transportation & industrial systems
- healthcare, life sciences & advanced materials
- space, defence & telecommunications.

New Zealand's high-trust regulatory environment, unique geography, diverse datasets, and a willingness to support pilot projects could enable rapid prototyping, real-world testing, and iteration across sectors such as energy, agriculture, and logistics. By acting as a quantum testbed, New Zealand could accelerate commercialisation pathways, attract international partners, and build domestic capability while de-risking adoption of emerging quantum applications.

According to TQI analysis, a testbed programme could help bridge the gap between academic research and industry-led commercialisation by providing coordinated support for development, validation, and adoption. A hypothetical example identified NZIAT as the funder of a testbed model, while a dedicated national coordinating entity (e.g., a platform host) would oversee thematic activities, industry engagement, and funding allocation (Box 13). Testbeds could take a variety of forms in New Zealand, including access to shared software platforms, open datasets, specialised research infrastructure, or sector-specific technology demonstrations, and will depend on the quantum tech focus area(s) selected.

Box 13: A testbed programme should bridge academic R&D and sector-led commercialization, under a dedicated coordinating entity



Source: The Quantum Insider powered by Resonance, Prepared for NZIAT (2026).

4.2 National Strategy for Quantum Technology

A consistent theme across the discovery process, spanning stakeholder workshops, RFI responses, expert advice, and international engagements, was that a national quantum strategy could play a valuable role for New Zealand to signal intent and create momentum for success in quantum technologies. Evidence repeatedly pointed to the importance of national coordination for aligning research activity, industry engagement, and international collaboration.

The growing geopolitical importance of quantum technologies was another common theme. Their dual-use nature and national security implications were raised in both domestic and international engagements, including Advisory Panel engagements. A policy framework was seen as an essential component to help New Zealand secure a supply chain position, align with international standards, and engage effectively with global partners.

These perspectives were reinforced by international comparison. The OECD notes that 18 OECD countries have published "national and supranational quantum strategies over the past decade" to "outline priorities for technological development, risk management, stakeholder engagement, and desired policy outcomes." [86]

Strategies have typically followed large government funding announcements or commitments. Examples include the U.S. National Quantum Initiative (NQI) (launched 2018), the UK National Quantum Strategy (launched 2023), EU Quantum Flagship (launched 2018), Canada's National Quantum Strategy (launched 2023), the Australia National Quantum Strategy (launched 2023), the Switzerland Quantum Strategy (launched 2023), the Finland Quantum Strategy (launched 2023), and the Denmark Quantum Strategy (launched in 2023)[87]. Across these strategies, the common areas of alignment and intent are:

- commitment to long-term government funding of quantum technology and quantum science
- a push toward commercialisation and industry adoption
- national coordination mechanisms to avoid fragmentation of research efforts
- areas for international collaboration
- alignment with international technology standards
- a stance on national security or sovereignty
- workforce development pathways.

Strategies can provide international visibility to attract talent and new sources of capital. Most national strategies were launched recently. New Zealand has an opportunity to be a fast follower and strategically position its research capabilities within the global quantum supply chain.[88]

86 Organisation for Economic Co-operation and Development (OECD). (2025). *Mapping the global quantum ecosystem*. https://link.epo.org/web/publications/studies/en-mapping-the-global-quantum-ecosystem.pdf

87 Entangled Future. (n.d.). *National quantum programs & government investment*. https://entangledfuture.com/government/

88 NZIAT (2026). *New Zealand Quantum Tech Advisory Panel: Advice and Feedback*. Prepared by NZIAT.

Annexes

Annex 1: NZIAT Quantum Tech Advisory Panel

NZIAT formed an international quantum tech advisory panel to stress-test the discovery process with independent experts with deep experience in building quantum tech ecosystems, translating research through to commercialisation, and contributing to government-led investment processes.

Advisory Panel Members



Dr. Ian Walmsley

Professor, University of Oxford and Director, Oxford Quantum Institute (OQI)

- Brings over 20 years of experience leading quantum science and engineering programmes and shaping large-scale research initiatives. Has a strong track record in translating fundamental research into coordinated national and international efforts. His expertise includes the application of light to quantum information processing, spanning areas such as sensing, communications, and computing.



Dr. Kate Timmerman

CEO, Chicago Quantum Exchange (CQE)

- Brings over 20 years of experience building and scaling innovation ecosystems at the intersection of science, industry, and policy. Has led major multi-institutional partnerships connecting research capability with industry collaboration, workforce development, and economic outcomes. Her expertise focuses on ecosystem development, industry engagement, and market-led approaches to emerging technologies.

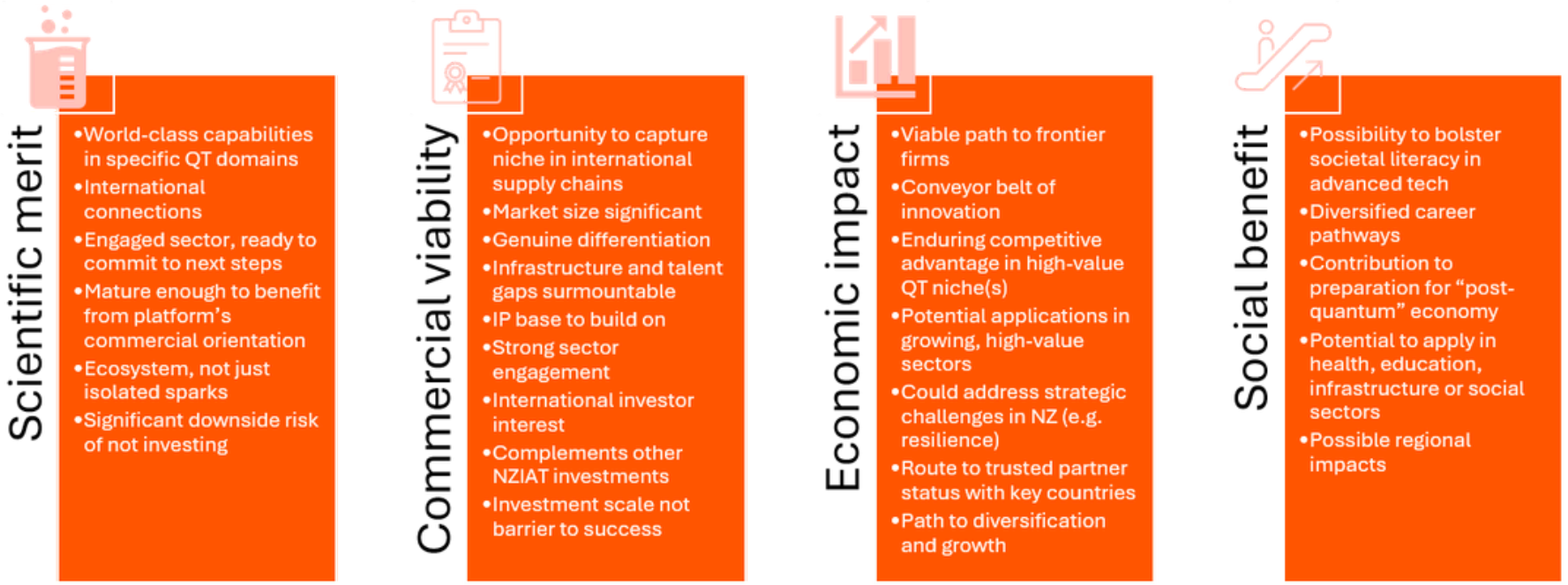


Dr. Miles Padgett

Professor, University of Glasgow and Co-Founder, MicroEndo

- Brings over 20 years of experience leading experimental physics and quantum research programmes, and is internationally recognised for advancing optical and quantum sensing technologies. His work bridges research and commercialisation, converting promosing science market-ready applications and contributing to global scientific collaborations.

Annex 2: Quantum Tech Discovery Process Due Diligence Framework



Annex 3: Quantum Tech Discovery Process Inputs

Type	Description	Reference
Public Request for Information (RFI)	In February 2026, MBIE and NZIAT released a public information request on quantum technology to understand NZ's quantum tech research activity, capabilities, commercialisation pathways, and barriers. 20 stakeholders responded, representing a mix of industry, universities, public research organisations, and individuals/entrepreneurs.	Input 1: **NZIAT Request for Information (RFI) Findings Summary** Reference: NZIAT and Ministry of Business, Innovation and Employment. (2026). Request for Information (RFI) Response Findings Summary. Prepared by NZIAT. Input 2: **Quantum Technology Discovery Workshops Agenda and Pre-Read Materials** Reference: NZIAT (2026). *Quantum Technology Discovery Workshops Agenda and Pre-Read Materials*. Prepared by NZIAT.
Stakeholder Workshops	NZIAT, in partnership with Tech NZ, held 3 quantum tech discovery workshops across NZ in March 2026 (Dunedin, Wellington, and Auckland) with 86 participants from industry, academia and the public sector to collect feedback on a potential Quantum Technology Research Platform.	Input 3: **The Distillery-NZIAT Quantum Discovery Workshops Summary** Reference: The Distillery and NZIAT (2026). *The Distillery-NZIAT Quantum Discovery Workshops Summary*. Prepared by the Distillery.
Stakeholder Roundtable	NZIAT hosted a targeted stakeholder roundtable in Christchurch to bring together key quantum tech discovery process inputs and discuss realistic "where to play" areas for New Zealand.	Input 4: **Quantum Technology Stakeholder Roundtable Summary (Christchurch, 28 May 2026)** Reference: NZIAT (2026). *Quantum Technology Stakeholder Roundtable Summary (Christchurch, 28 May 2026)*. Prepared by NZIAT.
International Visiting Experts	NZIAT hosted Dr. Alison McLeod, Director - Photonics Scotland (Technology Scotland) for 2 weeks to gain an international	Input 5: **Technology Scotland "Quantum Tech Discovery Workshops Report and Reflections"**

	perspective on global quantum tech ecosystems. Dr. McLeod provided an external, independent and practitioner-led perspective on how other small, advanced economies have built globally connected photonics and quantum tech ecosystems.	Reference: Technology Scotland (2026). *Quantum Technology Discovery Workshops Report and Reflections*. Prepared by Technology Scotland.
Quantum Market Intelligence	To complement stakeholder-led inputs, NZIAT commissioned two investment-grade, global quantum tech market scans to test global demand signals and capture international market dynamics. • **Stage 1 scan:** Accenture provided a global market scan of quantum technology opportunities for New Zealand, focusing on where international opportunities exist to create value in supply chains. • **Stage 2 scan**: The Quantum Insider powered by Resonance provided additional insight on investment trends, international supply chain opportunities, and global ecosystem benchmarking across leading quantum regions.	Input 6 – Stage 1 Scan: **Accenture "From Qubits to GDP: Unlocking New Zealand's Quantum Economy – The New Quantum Growth Frontier"** Reference: Accenture Research. (2026). *From Qubits to GDP: Unlocking New Zealand's Quantum Economy – The New Quantum Growth Frontier*. Prepared by Accenture for NZIAT. Input 7 – Stage 2 Scan: **The Quantum Insider powered by Resonance "NZIAT NZ Quantum Ecosystem Study"** Reference: The Quantum Insider powered by Resonance. (2026). *NZIAT NZ Quantum Ecosystem Study*. Prepared by The Quantum Insider for NZIAT.
International Advisory Panel	NZIAT established an international advisory panel to provide independent expertise to complement and challenge the NZIAT's findings and recommendations, such as themes from the RFI, stakeholder workshops, and market intelligence reports.	Input 8: **NZIAT Quantum Tech Advisory Panel Advice and Feedback** Reference: *NZIAT (2026). New Zealand Quantum Tech Advisory Panel: Advice and Feedback*. Prepared by NZIAT.
Domestic and Global Engagement	NZIAT undertook sustained domestic and international engagement to support a robust evidence base, including discussions with New Zealand public research institutions and firms, industry partners, and engagement with overseas policy and ecosystem leaders to	Input 9: **Summary of International Engagements.** Reference: Annex 4 and NZIAT. (2026). *Summary of International Engagements*. Prepared by NZIAT.

	understand how quantum strategies are evolving globally.	Input 10: **Summary of Domestic Stakeholder Engagements.** Reference: NZIAT (2026). Summary of Domestic Stakeholder Engagements. Prepared by NZIAT.
International Conference Participation by NZIAT	NZIAT staff participated in the Quantum Australia conference in Adelaide on 29-30 April, followed by the Sydney Quantum Showcase on 1 May, to understand more about the Australian quantum tech landscape and hear about the latest developments.	Input 11: **Quantum Australia Conference 2026 Summary** Reference: NZIAT (2026). *Quantum Australia Conference Summary*. Prepared by NZIAT.
Additional Solicited Discovery Process Inputs	NZIAT held additional conversations with Massey University and Auckland University of Technology (AUT) to better understand research activity, current focus areas, experience with commercialisation, and future opportunities to inform the discovery process.	Input 12: **Auckland University of Technology Quantum Research Capability** Reference: *Auckland University of Technology Quantum Research Capability*. Prepared by AUT for NZIAT. Input 13: **Massey University Quantum Research Capability** Reference: Massey University (2026). *Massey University Quantum Research Capability*. Prepared by Massey University for NZIAT.
Additional External Discovery Process Inputs	NZIAT participated in a Queensland- New Zealand Quantum Tech Workshop, led by Queensland's Department of the Environment, Tourism, Science and Innovation (DETSI), to identify potential areas for Trans-Tasman research collaboration as well as shared quantum tech infrastructure.	Input 14: **Queensland Government Department of the Environment, Tourism, Science and Innovation (DETSI) QLD-NZ Quantum Presentation - Wednesday 10 June 2026**

Annex 4: International Engagements

INTERNATIONAL ENGAGEMENT	
Date Held	**Organisation**
January 9	OECD – Global Forum on Technology
January 14	UK National Physical Laboratory (NPL), with British High Commission
January 15	IBM
January 21, June 3	UK Office for Quantum
March 13	U.S. National Science Foundation (NSF)
March 13	U.S. Office of Science and Technology Policy (OSTP)
March 23-April 2	Technology Scotland
April 9	Canada Innovation, Science and Economic Development (ISED) Office
April 10	U.S. Department of Energy – Office of Science
April 21, April 22, April 24, May 5, May 7, May 22, June 17	Chicago Quantum Exchange (CQE) Oxford Quantum Institute (OQI) University of Glasgow
April 28-30	Quantum Australia Conference
April 28	Beca Australia University of Adelaide
April 29, June 10	Department of Environment, Tourism, Science and Innovation (DETSI) - Queensland Government
April 29	Australian Economic Accelerator
May 1	Quantum Australia Sydney Showcase at the University of New South Wales (UNSW)
May 5	Université Marie et Louis Pasteur

Annex 5: Identifying New Zealand Quantum Tech Research Ready for Commercialisation

NZIAT hosted a targeted stakeholder roundtable in Christchurch on 28 May 2026 with 10 representatives from key public research institutions. Using a framework suggested by Accenture, they identified examples of research with potential for commercialisation.

POSITIONING NZ'S QUANTUM TECH RESEARCH		
Accelerate to market High global market demand + strong NZ advantage	**Selective plays** Position early while the market emerges	**Leverage don't lead** Plug into supply chains through partnerships and influence
Current opportunities/capabilities: • Microcombs (photonic parts) for quantum communications • Prevent national disaster with quantum sensing, algorithms, and communications • Low-resource medical sensing • Sensors for sustainable agriculture • Advanced materials • Transduction (microwave-optical) • Statistical testing of random number generators • Environmental sensing using subsea cables • Quantum-adjacent photonics translation (biophotonics, spectroscopy, sensing, etc.) Rydberg atom sensors • Quantum sensing-as-a-service to quantum computing-as-a-service • Quantum memories for light • Rare earth nitrides (REN) cryo-memories • Rare-earth nitride (REN) microwave circulator	**Current opportunities/capabilities:** • Quantum light sources • Cryocooling tech • Adiabatic Demagnetisation Refrigeration (ADR) • Cryo-CMOS control electronics (cryogenic wiring + optics) Space instrumentation • Single atom magnetometers	**Current opportunities/capabilities:** • Plugging into international government and defence procurement • Global market validation partnerships (NZ as a testbed for quantum tech) • AI + Quantum (computing simulation) • Free-Space Optical Communications (FSOC), quantum key distribution (QKD), and quantum networks • Leverage REANNZ (NESI) platform
Future opportunities: • Simulation of complex biological systems and interaction with environment • Software for high computational demands or using systems approach to select for sustainable production (animals, plants)	**Future opportunities:** • Applied quantum sensor technologies in agritech sector • Intersection of AI, big data, and quantum computing algorithms	**Future opportunities:** • Quantum testbeds in NZ (i.e., MSL) • Hybrid-classical QC and subscribe to existing QC capability • Leverage Australian and/ international quantum computing infrastructure • Design of single electron systems with fabrication overseas • Widen quantum tech access and partner with the Australian National Fabrication Facility Limited (ANFF)



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