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Canada's National Quantum Strategy Survey

Final Report

Prepared for Innovation, Science and Economic Development Canada (ISED)

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Ce rapport est aussi disponible en français.

Canada

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Prepared for Innovation, Science and Economic Development Canada (ISED) by Nanos Research

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Table of Contents

About this report

This report begins with an executive summary outlining key findings and conclusions, followed by a detailed analysis of the quantitative results. A detailed set of “banner tables” is provided under a separate cover; this presents results for all survey questions by key segments such as region, size of organization and time in business/sector.

The quantitative results are expressed as percentages unless otherwise noted.

Detailed findings are presented in the sections that follow. Overall results are presented in the main portion of the narrative and are typically supported by graphic or tabular presentation of results. Net results cited in the text may not exactly match individual results shown in the charts due to rounding. Results may not add to 100% due to rounding or multiple responses.

The bullets under the charts also note any significant differences between sub-groups of respondents in different demographic groups.

The survey consisted of two streams: Stream 1: Industry/Non-profits and Stream 2: Academics. The following report contains findings from the two streams, and it is noted throughout whether the findings relate to the Industry stream and/or the Academic stream. Section 1 contains questions only asked of Stream 1 respondents, Section 2 contains questions only asked of Stream 2 respondents and Section 3 contains questions asked of both streams.

Details of the methodology and sample characteristics can be found in Appendix A. The final survey instrument can be found in Appendix B.

Executive summary

A. Background and objectives

Quantum science, an emerging field at the forefront of research and innovation, holds immense potential to revolutionize various industries. From developing life-saving drugs to creating next-generation batteries, quantum technologies are set to reshape how we design and develop many things. Canadian scientists and entrepreneurs are poised to capitalize on these opportunities and become leaders in this fast-growing field.

The National Quantum Strategy (NQS) is an initiative to bolster Canada's quantum sector and ensure its prominent position among global frontrunners. The NQS revolves around three key pillars: research, talent and commercialization. Through strategic investments and targeted support, the NQS endeavours to achieve key missions in quantum computing hardware and software, communications and sensors.

Launched on January 13, 2023, the NQS aims to catalyse the growth of Canada's quantum sector and solidify its leadership in this transformative field. Specifically, the NQS seeks to amplify Canada's existing strength in quantum research, foster growth of quantum technologies and establish Canada as a global leader.
To fulfil its responsibilities and ensure the effectiveness of the strategy, the NQS Secretariat has committed to addressing data gaps and tracking progress. The NQS Secretariat hired Nanos Research to conduct a quantitative survey, targeting two key groups: Canadian businesses operating in the quantum field and academics specializing in quantum. The primary objective of this research is to gain deeper insights into the Canadian quantum ecosystem.

Objectives

- Filling identified data gaps and tracking key performance indicators;
- Assessing critical aspects of the quantum ecosystem, such as inter-sector collaboration, quantum products and service adoption, the evolving quantum job market and quantum community awareness of NQS programming; and,
- Providing a more comprehensive and data-driven understanding of the quantum landscape in Canada.

B. Methodology

The survey was conducted online and was deployed to a list provided by ISED and a total of 112 individuals participated. The sample included 66 individuals in businesses/non-profits in the quantum sector (46 unique businesses) and 46 academics (23 unique universities/institutes) in the quantum sector. For business/not-for-profits, only one response per organization was included. The survey had a response rate of 26%.

The survey consisted of two streams: Stream 1: Industry/Non-profits and Stream 2: Academics. The questionnaire consisted of separate modules for each stream with questions asked that are relevant to each, as well as several core questions which were the same for both streams.

The fieldwork was conducted between February 21st and March 1st, 2024. Details on the rate of participation can be found in Appendix A, and the questionnaire is provided in Appendix B.

C. Contract value

The contract value was $73,746.31 (HST included).

Supplier name: Nanos Research
PWGSC contract number: CW2343345
Original contract date: 2024-12-27
For more information, contact ISED at publicopinionresearch-recherchesurlopinionpublique@ised-isde.gc.ca

D. Political neutrality statement and contact information

I hereby certify, as a Representative of Nanos Research, that the deliverables fully comply with the Government of Canada political neutrality requirements outlined in the Government of Canada's Policy on Communications and Federal Identity and Directive on the Management of Communications. Specifically, the deliverables do not include information on electoral voting intentions, political party preferences, party standings with the electorate, or ratings of the performance of a political party or its leaders.

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E. Key findings

The survey consisted of two streams: Stream 1: Industry/Non-profits and Stream 2: Academics. The following key findings and report contain findings from the two streams, and it is noted throughout which stream the findings relate to.

Research and collaborations

Industry and academic respondents most often report they or their organization conducts research and development related to all of the quantum areas, in roughly similar proportions. Quantum sensors was identified as an area of R&D for 48% of academics; and 39% of industry respondents, quantum communications and cryptography by 44% each of academics and industry respondents, and quantum computing hardware (41% of academics; and 46% of industry respondents) and quantum materials (37%).

Almost all industry (95%) and academic (96%) respondents report collaboration with other players in the ecosystem. Academic respondents most often report collaborating with universities and colleges in Canada the most (87%), followed by universities and colleges in other countries (78%), companies located in Canada (67%), and Canadian research institutes (61%). Only four percent of academics report they do not collaborate with any of these entities. Similarly, industry respondents most often report collaborating with universities and colleges in Canada (85%), as well as companies located in Canada (77%), companies located outside of Canada (71%) and Canadian federal government laboratories (64%). Just five percent of industry respondents report their organization does not collaborate with any of these entities.

Both industry and academic respondents rate collaborations with universities and colleges in Canada as important (academics: mean score of 8.5 out of 10; industry: mean score of 7.9), however, industry respondents also rate companies inside (mean of 8.2) and outside of Canada (mean of 8.1) as most important. Academics are more likely to think collaborations with universities and colleges outside of Canada is important (mean of 7.9) than industry respondents (mean of 6.1).

In terms of the main benefits to these collaborations, both academic and industry respondents often mention innovation, advancing knowledge and the sharing of new ideas as the primary benefits (35% of academics; 37% of industry respondents). Additionally, both groups mention that the main output from these collaborations has been ongoing research collaboration or just ongoing collaboration (93% of academics; 79% of industry respondents).

Talent

Fifty-seven per cent of academic respondents report their department has tried to hire a new faculty member in quantum in the past six months, while more than two in three industry/non-profit respondents report their organization has tried to fill positions in the last six months for which a quantum science and technology background is important (69%). Industry respondents report the search took place primarily within Canada (89%), followed by the US (44%) or Europe (40%) and close to eight in ten say their organization is likely (61%) or somewhat likely (18%) to hire candidates in the next six months.

Sixty-one per cent of industry respondents report their organization found qualified Canadian candidates that met their needs (61%), and 64% report their organization filled some (42%) or all (22%) of the positions they were hiring for. Industry respondents said the most effective recruiting tools were social media (including LinkedIn) (64%), job posting websites (i.e., monster.ca, Indeed) (38%) and a recruiting agency (27%).

When industry respondents were asked what the biggest barriers are to hiring for their organization, top responses included a lack of qualified candidates (36%), candidate expectations (i.e., salary and benefits) (27%) and immigration barriers (22%). Industry respondents feel the biggest shortages of qualified candidates in the sector are in quantum computing hardware (49%), quantum communications and cryptography (47%), quantum software (46%) and quantum sensors (44%).

Industry respondents noted women were the top reported underrepresented group present in their organization's workforce (86%), followed by racialized persons (72%) and the 2SLGBTQIA+ community (49%). The biggest challenges to have a diverse workforce included: few diverse candidates available to fill jobs and a lack of qualified candidates in a field that is already not diverse (43%), and that skills and talent are more important (19%).

Nine in ten academic respondents say they are likely (80%) or somewhat likely (11%) to remain in Canada in the next five years to pursue their research and say funding opportunities (mean score of 8.9 out of 10) and quality of life (mean of 8.8) are the top factors that are most important when choosing where to conduct their research. Similarly, a majority of industry respondents say their company or organization is likely (71%) or somewhat likely (14%) to remain in Canada for the next five years.

Regarding underrepresented groups included in the workforce of their academic department, respondents most often report that women are represented in their department (58%), followed by racialized persons (42%), 2SLGBTQIA+ community members (33%), and persons with disabilities (22%), while 27% report none of these groups are represented.

In terms of the main challenges related to hiring a more diverse workforce, the top response for both industry and academics is that there are few diverse candidates available to fill jobs and a lack of applications (43% of industry respondents; 41% of academics).

Commercialization of research

Over half (55%) of the respondents in both industry and academic streams report they have filed a patent related to quantum technology. Additionally, more than three in four industry and academic respondents report they have engaged potential end users of their product and/or service within the past year (78%), with industry respondents more likely to report having done this (88%) than academic respondents (64%).

When asked about the level of interest potential end users have in adopting quantum technologies, nearly all industry and academic respondents say end users are interested (63%) or somewhat interested (34%), but they are less likely to say end users are comfortable (20%) or somewhat comfortable (49%) with adopting quantum products or services.

Examining barriers to end users adopting quantum solutions, industry respondents most often said that use cases are still being proven and not adopted widely yet (21%), it is too early for adoption, and their work or

technology is not ready yet (20%) and that there is a lack of knowledge and understanding of the technology by end users (20%). When academics were asked about barriers preventing the commercialization of their research, a similar sentiment was shared, as they also often said that it is too early and the work or technology is not ready yet (27%), followed by not being interested in commercializing it (18%).

Awareness and use of federal programs

Overall, both industry and academic respondents rate themselves as knowledgeable (71%, score of 7-10) of how federal programming can support quantum research and development (mean of 7.4 out of 10).

Survey respondents indicated a high level of awareness of many federal quantum related programs supporting commercialization, for example, a majority of industry and academic respondents report having heard of the NRC Industrial Research Assistance Program (IRAP) (87%), followed by the NRC Challenge Program (84%) and the Innovation for Defence Excellence and Security (IDEaS)(81%). Industry and academic respondents who had heard of these programs were most likely to report having applied for and received funding from IRAP (37%), Innovative Solutions Canada (ISC) (36%) and Regional Development Agency funding (30%). Industry and academic respondents noted that the application or approval process for these federal programs supporting commercialization are too long or complex (20%) and there are too many requirements, and they should be relaxed (10%).

In terms of federal programs that support research, both industry and academic respondents were most likely to report having heard of the NSERC Alliance Quantum federal program(87%), while two in three report they have heard of the Canadian Institute for Advanced Research (67%) and just over one in ten report awareness of the Bank of Canada PIVOT program (12%). One in three of industry and academic respondents who have heard of the NSERC Alliance Quantum program report they applied for and received funding (32%; 21% report they have applied, and the decision is pending), while two in ten say the same for the Canadian Institute for Advanced Research (20%). When asked for comments on their engagements with these federal programs, industry and academic respondents mentioned the Alliance program doesn't fund companies or the private sector (24%) and nine percent said CIFAR doesn't have open calls for funding, and it is invitation only.

For federal programs that support talent, nearly all industry and academic respondents reported having heard of the Mitacs program (98%), while more than three in four had heard of NSERC Create (77%). More than half of industry and academic respondents who have heard of Mitacs report they have applied for and received funding (59%), while three in ten have received funding from NSERC Create (31%; 11% report they applied but did not receive funding). One in four industry and academic respondents each commented that the federal programs supporting talents are good programs and they have applied successfully (25%), that the programs are difficult to apply for or have too many requirements (25%), that the programs don't apply to industry and they must go through academia to apply (25%).

Views on the National Quantum Strategy (NQS)

Nearly all industry and academic respondents (98%) reported being aware of that Canada released its National Quantum Strategy (NQS) in January 2023, with close to one in two of those aware of the strategy, saying they are satisfied with the three main aspects of the NQS: making Canada a world leader in the continued development, deployment and use of quantum computing hardware and software (54% satisfied, score of 7-10), ensuring the privacy and cyber security of Canadians in a quantum enabled world, through a national secure quantum communications network and a post-quantum cryptography initiative (51% satisfied) and enabling the government and key industries to be developers and early adopters of new quantum technologies (47% satisfied).

Over two in three industry and academic respondents who have heard of the NQS agree (22%) or somewhat agree (47%) that the NQS missions create clear priorities for quantum in Canada, while one in four somewhat disagree (16%) or disagree (10%). When asked why they have that opinion (either positive or negative), industry and academic respondents mentioned the objectives being very broad (26%), not enough funding or issues with funding (13%) and the implementation being slow or having issues with implementation (12%).

A majority of industry and academic respondents aware of the NQS (86%) report they have received information from the Federal Government concerning events related to the NQS, including workshops, roundtables and missions.

Detailed findings

Section 1 – Quantum Businesses

A. General questions

This section included general questions to help profile responding organizations.

Industry respondents most often reported their head offices were located in Ontario (54%), the West (27%) or Quebec (20%). The majority (56%) reporting having offices in other locations, including in Canada, especially Ontario (29%) or Quebec (20%). Almost a third (32.3%) reporting having offices abroad, including in the USA (8.5%) and UK (5.1%). In addition, respondents identified that their remote workers were located Ontario (48%) or Quebec (32%), while 27 per cent report their organization has no remote employees.

Half of business respondents (50%) responded that their organization has 1 to 9 full time staff (including themselves) employed in Canada working on quantum technologies, while 20% have 10 to 19 full-time employees, and 15% report 20 to 29 employees. About one third of respondents report their organization has been in business for less than 5 years (32%) or for 5 to 9 years (34%), while 20% responded that their organization has been in business 20 years or more.

Other office locations

Q4 – Does your organization have offices in other provinces and territories that work on quantum technologies? (please specify) Select all options that apply.

Location(s) of other offices

Location	Total (n=59)
No other locations	44.1%
Ontario	28.8%
Quebec	20.3%
Alberta	13.6%
British Columbia	13.6%
U.S.A	8.5%
U.K.	5.1%
Several countries/worldwide	5.1%
Europe	3.4%
Japan	3.4%
Manitoba	1.7%
New Brunswick	1.7%
Newfoundland and Labrador	1.7%
Nova Scotia	1.7%
Northwest Territories	1.7%
Nunavut	1.7%
Prince Edward Island	1.7%
Saskatchewan	1.7%
Yukon	1.7%
Germany	1.7%
Ireland	1.7%
Hong Kong	1.7%
France	1.7%

Base: Individuals in industry or non-profits in the quantum sector, n=59, based on multiple mentions.

Location of employees working remote

Q5 – Does your organization have remote employees in any of the following provinces and territories that work on quantum technologies? (please specify) Select all options that apply.

Location of remote employees

Location	Total (n=59)
Ontario	47.5%
Quebec	32.2%
No remote employees	27.1%
British Columbia	22.0%
Alberta	18.6%
U.S.A	13.6%
UK	6.8%
Global/several countries	5.1%
Japan	3.4%
New Brunswick	1.7%
Nova Scotia	1.7%
Saskatchewan	1.7%
Romania	1.7%
Poland	1.7%
India	1.7%
France	1.7%
Europe	1.7%
Germany	1.7%
Belgium	1.7%
China	1.7%

Base: Individuals in industry or non-profits in the quantum sector, n=59, based on multiple mentions.

Number of full-time employees in Canada

Q6 – Including yourself, approximately how many full-time staff does your organization employ in Canada that work on quantum technologies?

Number of full-time employees

Number	Total (n=66)
1 to 9	50.0%
10 to 19	19.7%
20 to 29	15.2%
30 to 39	3.0%
40 to 49	1.5%
100 or more	10.6%

Base: Individuals in industry or non-profits in the quantum sector, n=66

Number of years organization has been in business

Q7 – How many years has your organization been in business?

Years in business

Years	Total (n=65)
Less than 5 years	32.3%
5 to 9 years	33.8%
10 to 14 years	10.8%
15 to 19 years	3.1%
20 years or more	20.0%

Base: Individuals in industry or non-profits in the quantum sector, n=65

B. Research and development

Industry respondents most often report their organization conducts research and development related to quantum computing hardware (46%), quantum communication cryptography (44%), quantum sensors (39%) and quantum software (35%).

In terms of collaboration with various entities, industry respondents report their organization collaborates with universities and colleges in Canada the most (85%), followed by companies located in Canada (77%), companies located outside of Canada (71%) and Canadian federal government laboratories (64%). Just five percent report their organization does not collaborate with any of these entities.

The highest level of importance for collaborations with their organization was given to companies located inside (mean of 8.2 out of 10) or outside of Canada (mean of 8.1 out of 10), followed by universities and colleges in Canada (mean of 7.9). Although, still more likely to be seen as important rather than not important, collaborations with universities and colleges in other countries received a relatively lower importance score (mean of 6.1 out of 10).

Main benefits to collaborations were seen as innovation and advancing research and development in Canada (37%), followed by a knowledge and information exchange (18%) and access to talent (16%). In addition, those who report their organization collaborates said that the main outputs from these collaborations are ongoing collaboration (79%), an expanded network (70%), a prototype (54%), a market ready product or service (51%), a publication (46%) and a conference presentation (43%).

Areas of research and development in quantum technologies

Q8 – In which areas does your organization conduct research and development in quantum technologies? [SELECT ALL THAT APPLY]

Areas of research and development

Area	Total (n=66)
Quantum computing hardware	45.5%
Quantum communications and cryptography	43.9%
Quantum sensors	39.4%
Quantum software	34.8%
Quantum materials	13.6%
Quantum technologies (general)	4.5%
Market Research	1.5%
AI	1.5%
Photonics	1.5%
Banking sector	1.5%
Deep Technology	1.5%
Fibre optics	1.5%
Quantum training and education	1.5%
Economic development	1.5%
Investments in quantum	1.5%

Base: Individuals in industry or non-profits in the quantum sector, n=66, based on multiple mentions

Collaborations with various entities

Q9 – Does your organization collaborate with the following entities? [RANDOMIZE] [SELECT ALL THAT APPLY]

Collaborating with entities

Type of entity	Total (n=66)
Universities/colleges in Canada	84.8%
Companies located in Canada	77.3%
Companies located outside of Canada	71.2%
Canadian Federal government laboratories such as the National Research Council	63.6%
Canadian research institutes such as the Institute for Quantum Computing	54.5%
Universities/colleges in other countries	48.5%
Government laboratories or international research institutes in other countries, such as the U.S. Department of Energy	42.4%
None of the above	4.5%

Base: Individuals in industry or non-profits in the quantum sector, n=66, based on multiple mentions

Importance of collaborating with various entities

Q10-16 – On a scale from 0 to 10, where 0 is not at all important and 10 is very important, how important is it for your organization to collaborate with the following entities to advance your research interests? [RANDOMIZE]

Importance of collaborations

Type of entity (n=66)	Mean	Not important (0-3)	Neutral (4-6)	Very Important (7-10)
Companies located in Canada	8.2	3.1%	14.1%	78.1%
Companies located outside of Canada	8.1	6.3%	9.4%	78.1%
Universities/colleges in Canada	7.9	9.2%	9.2%	80.0%
Canadian Federal government laboratories such as the NRC	7.4	9.4%	15.6%	70.3%
Canadian research institutes such as the Institute for Quantum Computing	7.3	11.1%	17.5%	63.5%
Government laboratories or international research institutes in other countries, such as the U.S. Department of Energy	7.1	12.9%	21.0%	59.7%
Universities/colleges in other countries	6.1	22.6%	25.8%	48.4%

Base: Individuals in industry or non-profits in the quantum sector, n=66

Benefits and output from collaboration

Q17 – [IF COLLABORATES WITH ANY ORGS IN Q8] What is the main benefit for your organization, if any, of these collaborations? [OPEN]

Main benefits of collaboration

Benefit	Total (n=51)
Innovation/Advance research and development	37.3%
Knowledge/Information exchange	17.6%
Access to talent	15.7%
Building an ecosystem	7.8%
Risk management	7.8%
Revenue	5.9%
Reducing workload	2.0%
Validation of technology	2.0%
Other	3.9%

Base: Individuals in industry or non-profits in the quantum sector, n=51 respondents who collaborate with at least one type of entity.

Q18 – [IF COLLABORATES WITH ANY ORG IN Q8] What has been the main output of these collaborations? [SELECT ALL THAT APPLY] [RANDOMIZE]

Main output from collaborations

Output	Total (n=63)
Ongoing collaboration	79.4%
Expanded network	69.8%
Prototype	54.0%
Market-ready product or service	50.8%
Publication	46.0%
Conference Presentation	42.9%
Patent	30.2%
Sales	3.2%
Promoting business success	1.6%
Hiring	1.6%
White paper	1.6%

Base: Individuals in industry or non-profits in the quantum sector, n=63 respondents who collaborate with at least one type of entity, based on multiple mentions.

Barriers to collaboration

Q19 – [IF DOES NOT COLLABORATE WITH ANY ORGS IN Q8] What is the main barrier, if any, preventing your organization from collaborating? [OPEN]

NOTE: This data has been suppressed due to a sample size of less than 30.

C. Talent

More than two in three industry/non-profit respondents report their organization has tried to fill positions in the last six months for which a quantum science and technology background is important (69%), with the search taking place primarily within Canada (89%), followed by the US (44%) or Europe (40%). In addition, close to eight in ten say their organization is likely (61%) or somewhat likely (18%) to hire candidates in the next six months.

More than three in five report their organization found qualified Canadian candidates that met their needs (61%), and a similar proportion report their organization filled some (42%) or all (22%) of the positions they were hiring for, while another one in five say the process is still ongoing (22%).

Respondents said the most effective recruiting tools were social media (including LinkedIn) (64%), job posting websites (i.e., monster.ca, Indeed) (38%) and a recruiting agency (27%). When asked what the biggest barriers are to hiring for their organization, top responses included a lack of qualified candidates (36%), candidate expectations (i.e., salary and benefits) (27%) and immigration barriers (22%).

Examining areas where respondents feel there are the biggest shortages of qualified candidates in the sector, top responses were quantum computing hardware (49%), quantum communications and cryptography (47%), quantum software (46%) and quantum sensors (44%).

Women were the top reported underrepresented group present in their organization's workforce (86%), followed by racialized persons (72%) and the 2SLGBTQIA+ community (49%). When asked what the biggest challenges are to have a diverse workforce, respondents most often mentioned there are few diverse candidates available to fill jobs and a lack of qualified candidates in a field that is already not diverse (43%), and that skills and talent are more important (19%).

Likelihood of organization remaining in Canada in next five years

Q20 – How likely or unlikely is your organization to remain in Canada in the next five years?

Likelihood of remaining in Canada

Likelihood	Total (n=66)
Likely	71.2%
Somewhat likely	13.6%
Somewhat unlikely	4.5%
Unlikely	1.5%
Unsure	9.1%

Base: Individuals in industry or non-profits in the quantum sector, n=66

Filling positions requiring quantum science and technology background

Q21 – In the past six months, has your organization tried to fill positions for which a quantum science and technology background is important?

Tried to fill position in last six months

Tried to fill position	Total (n=65)
Yes	69.2%
No	26.2%
Unsure	4.6%

Base: Individuals in industry or non-profits in the quantum sector, n=66

Q22 – Where was your organization's search mainly conducted? [SELECT ALL THAT APPLY]

Primary location of search

Location	Total (n=45)
Domestic (in Canada)	88.9%
USA	44.4%
Europe	40.0%
Asia	13.3%
Global	4.4%

Base: Individuals in industry or non-profits in the quantum sector, n=45 respondents whose organization has tried to fill a position in the last six months, based on multiple mentions

Q23 – Were there any qualified Canadian candidates that met your organization's needs?

Qualified Canadian candidates meeting needs of organization

Qualified Canadian candidates	Total (n=44)
Yes	61.4%
No	25.0%
Unsure	13.6%

Base: Individuals in industry or non-profits in the quantum sector, n=44 respondents whose organization has tried to fill a position in the last six months.

Q24 – What recruiting tools were the most helpful for your organization to find qualified candidates? [SELECT ALL THAT APPLY]

Effective recruiting tools used in search

Tools	Total (n=45)
Social media [LinkedIn]	64.4%
Job posting websites [monster.ca, Indeed, etc.]	37.8%
Recruiting agency	26.7%
Personal network/ Personal connection	15.6%
Internal recruiters	4.4%
Research organization [MITACS]	2.2%
Online research	2.2%
Word of mouth	2.2%
Our website	2.2%
Unsure	6.7%

Base: Individuals in industry or non-profits in the quantum sector, n=45 respondents whose organization has tried to fill a position in the last six months, based on multiple mentions

Q25 – What was the result of the hiring process? [select one]

Result of hiring process

Result	Total (n=45)
My organization filled some of the positions we were hiring	42.2%
My organization filled all of the positions we were hiring	22.2%
The process is still ongoing	22.2%
My organization did not fill any of the positions we were hiring	8.9%
Unsure	4.4%

Base: Individuals in industry or non-profits in the quantum sector, n=45 respondents whose organization has tried to fill a position in the last six months.

Q26 – What was the main barrier, if any, to hiring someone to work at your organization? [RANDOMIZE][select one]

Main barrier to hiring

Barrier	Total (n=45)
Lack of qualified candidates	35.6%
Candidate expectations (e.g., salary, benefits)	26.7%
Immigration barriers	22.2%
Candidates unwilling to relocate	6.7%
None	2.2%
Unsure	6.7%

Base: Individuals in industry or non-profits in the quantum sector, n=45 respondents whose organization has tried to fill a position in the last six months.

Q27 – In the next six months, how likely or unlikely is your organization to hire people for positions where a quantum science and technology background is important?

Likelihood of hiring in the next six months

Likelihood	Total (n=66)
Likely	60.6%
Somewhat likely	18.2%
Somewhat unlikely	9.1%
Unlikely	9.1%
Unsure	3.0%

Base: Individuals in industry or non-profits in the quantum sector, n=66

Shortage of skilled people in quantum technologies in Cand

Q28 – From the list below, please identify areas of quantum technologies for which there is a shortage of skilled people in Canada. [select all that apply] [RANDOMIZE]

Area(s) with shortage of skilled people in Canada

Area	Total (n=66)
Quantum computing hardware	48.5%
Quantum communications and cryptography	47.0%
Quantum software	45.5%
Quantum sensors	43.9%
Quantum materials	33.3%
Engineering/Technology	7.6%
Market research/product development	4.5%
Cryogenics	3.0%
Biology	1.5%
Unsure	15.2%

Base: Individuals in industry or non-profits in the quantum sector, n=66, based on multiple mentions

Representation of underrepresented groups in organization workforce

Q29 – Which of the following groups, if any, are represented in your organization's workforce? [RANDOMIZE]

Groups in organization's workforce

Group	Total (n=66)
Women	86.2%
Racialized persons [persons, other than Aboriginal peoples, who are non-Caucasian in race or non-white in colour]	72.3%
2SLGBTQIA+ community	49.2%
Persons with disabilities	27.7%
Indigenous people	16.9%
None of the above	6.2%
Unsure	4.6%

Base: Individuals in industry or non-profits in the quantum sector, n=66, based on multiple mentions.

Q30 – What is the biggest challenge, if any, for your organization when hiring a more diverse workforce? [OPEN]

Challenges to hiring a more diverse workforce

Challenges	**Total (n=42)**
Few diverse candidates available to fill jobs/lack of qualified candidates/field is not diverse	42.9%
Skills/talent and experience are more important	19.0%
Not a challenge/no issues	7.1%
Immigration concerns (speed of arrival)	4.8%
Connecting to Indigenous communities/finding Indigenous candidates	4.8%
Diversity is not always visible/we do not ask (ex. Sexual orientation)	4.8%
Money	4.8%
We have a strong DEI policy/ensure we abide by it	4.8%
Other	4.8%
Unsure	2.4%

Base: Individuals in industry or non-profits in the quantum sector, n=42

Section 2 – Quantum Academics

A. General questions

This section included general questions related to the role, tenure and demographics of academic respondents.

Academic respondents were located in Quebec (38%), followed by Ontario (33%) and the West (27%), with 2% from Atlantic Canada.

Regarding underrepresented groups included in the workforce of their department, respondents most often report that women are represented in their department (58%), followed by racialized persons (42%), 2SLGBTQIA+ community members (33%), and persons with disabilities (22%), while 27% report none of these groups are represented.

In terms of their role within academia, most respondents are a Professor (83%), followed by a researcher (4%) or a graduate student (2%), and they most have been in the field of quantum technologies for 20 years or more (69%).

Role within academia

Q31 – What is your role within academia?

Role within academia

Role	Total (n=46)
Professor (include Associate, Assistant, Professor)	82.6%
Researcher	4.3%
Graduate student	2.2%
Other	10.9%

Base: Individuals in academia in the quantum sector, n=46

Time working or studying in the field

Q33 – How many years have you been working/studying in this field?

Number of years spent in the field

Years	Total (n=45)
5 to 9 years	11.1%
10 to 14 years	11.1%
15 to 19 years	8.9%
20 years or more	68.9%

Base: Individuals in academia in the quantum sector, n=45

Underrepresented groups in department workforce

Q34 – Which of the following groups, if any, are represented in your department's workforce? [RANDOMIZE]

Groups in department's workforce

Group	Total (n=45)
Women	57.8%
Racialized persons [persons, other than Aboriginal peoples, who are non-Caucasian in race or non-white in colour]	42.2%
2SLGBTQIA+ community	33.3%
Persons with disabilities	22.2%
Indigenous people	6.7%
None of the above	26.7%
Unsure	13.3%

Base: Individuals in academia in the quantum sector, n=45, based on multiple mentions.

B. Research

Respondents in the academia stream most often report conducting research and development related to quantum sensors (48%), quantum communications and cryptography (44%), quantum computing hardware (41%) and quantum materials (37%).

Regarding collaborations, academic respondents most often report collaborating with universities and colleges in Canada (87%), followed by universities and colleges in other countries (78%), companies located in Canada (67%) and Canadian research institutes (61%). Only four percent report they do not collaborate with any of these entities.

Academic respondents rate collaboration with universities and colleges in Canada as the most important type of collaboration (mean score of 8.5 out of 10), followed by universities and colleges in other countries (mean of 7.9), Canadian research institutes (mean of 7.4) and companies located in Canada (mean of 7.4).

The main benefits to these collaborations, according to respondents, are the advancement of knowledge, sharing new ideas, and enabling breakthroughs (35%) and complementary and specialized expertise (24%). Meanwhile, those who do collaborate said the main outputs from these collaborations are ongoing research collaboration (93%), a publication (84%), a conference presentation (68%) and an expanded network (66%).

Conducting research and development in quantum technologies

Q35 – In which areas do you conduct research and development in quantum technologies? [select all that apply][RANDOMIZE]

Area(s) of research and development

Area	Total (n=46)
Quantum sensors	47.8%
Quantum communications and cryptography	43.5%
Quantum computing hardware	41.3%
Quantum materials	37.0%
Quantum software	32.6%
Quantum information and theories	4.3%
Not Applicable/I do not conduct research	2.2%
Economics	2.2%
Quantum Simulation	2.2%
Quantum Algorithms	2.2%

Base: Individuals in academia in the quantum sector, n=46, based on multiple mentions.

Q36 – What department in the university/college are you with?

Department at university/college

Area	Total (n=46)
Physics	41.3%
Mathematics	15.2%
Engineering	15.2%
Administration/Policy	8.7%
Institute/Central	8.7%
Chemistry	6.5%
Computer Science	4.3%

Base: Individuals in academia in the quantum sector, n=46

Collaborations with various entities

Q37 – In quantum research, do you collaborate with the following entities? [RANDOMIZE] [SELECT ALL THAT APPLY]

Collaborating with entities

Type of entity	Total (n=46)
Universities/colleges in Canada	87.0%
Universities/colleges in other countries	78.3%
Companies located in Canada	67.4%
Canadian research institutes such as the Institute for Quantum Computing	60.9%
Companies located outside of Canada	47.8%
Canadian Federal government laboratories such as the National Research Council	47.8%
Government laboratories or international research institutes in other countries, such as the U.S. Department of Energy	43.5%
None of the above	4.3%

Base: Individuals in academia in the quantum sector, n=46, based on multiple mentions.

Importance of collaborating with various entities

Q38-44 – On a scale from 0 to 10, where 0 is not at all important and 10 is very important, how important is it for you to collaborate with the following entities to advance your research interests? [RANDOMIZE]

Importance of collaborations

Type of entity (n=44)	Mean	Not important (0-3)	Neutral (4-6)	Very Important (7-10)
Universities/colleges in Canada	8.5	2.2%	11.1%	82.2%
Universities/colleges in other countries	7.9	8.7%	8.7%	80.4%
Canadian research institutes such as the Institute for Quantum Computing	7.4	13.3%	20.0%	62.2%
Companies located in Canada	7.4	9.1%	18.2%	70.5%
Government laboratories and international research institutes in other countries, such as the U.S. Department of Energy	6.8	14.0%	20.9%	58.1%
Canadian Federal government laboratories such as the NRC	6.4	19.6%	21.7%	52.2%
Companies located outside of Canada	5.8	23.3%	20.9%	53.5%

Base: Individuals in academia in the quantum sector, n=44

Benefits and output from collaboration

Q45 – [IF COLLABORATES WITH ANY ORG IN Q36] What is the main benefit for you, if any, of these collaborations? [OPEN]

Main benefits to collaboration

Benefit	Total (n=37)
Advancement of knowledge/sharing new ideas/enabling breakthroughs	35.1%
Complementary/specialized expertise	24.3%
Bigger scale/cutting edge research/bigger source of sample	16.2%
Access to funding	8.1%
Access to technology	8.1%
Publications/recognition	5.4%
Ownership of IP	2.7%

Base: Individuals in academia in the quantum sector, n=37 respondents who collaborates with at least one type of entity.

Q46 – [IF COLLABORATES WITH ANY ORG IN Q36] What has been the main output of these collaborations? [SELECT ALL THAT APPLY] [RANDOMIZE]

Main output from collaborations

Output	Total (n=44)
Ongoing research collaboration	93.2%
Publication	84.1%
Conference Presentation	68.2%
Expanded network	65.9%
Patent	25.0%
Prototype	18.2%
Market-ready product or service	15.9%
Training/student exchange	4.5%
Other	2.3%
Unsure	2.3%

Base: Individuals in academia in the quantum sector, n=44 respondents who collaborates with at least one type of entity, based on multiple mentions

Barriers to collaboration

Q47 – [IF DOES NOT COLLABORATE WITH ANY ORG IN Q36] What is the main barrier, if any, preventing you from collaborating? [OPEN]

NOTE: This data has been suppressed due to a sample size of less than 30.

C. Talent

Nine in ten academic respondents say they are likely (80%) or somewhat likely (11%) to remain in Canada in the next five years to pursue their research, mentioning funding opportunities (mean score of 8.9 out of 10) and quality of life (mean of 8.8) as the top factors that are most important when choosing where to conduct their research.

Close to three in five academic respondents (57%) report their department has tried to hire a new faculty member in quantum in the past six months.

In terms of challenges related to hiring a more diverse workforce, the top response was there are few diverse candidates available to fill jobs and a lack of applications (41%), while 13 percent each mentioned a lack of diversity in hiring committee and competition from other fields.

Likelihood of remaining in Canada in next five years to pursue research

Q48 – How likely or unlikely are you to remain in Canada in the next five years to pursue your research?

Likelihood of remaining in Canada

Likelihood	Total (n=45)
Likely	80.0%
Somewhat likely	11.1%
Somewhat unlikely	4.4%
Unsure	4.4%

Base: Individuals in academia in the quantum sector, n=45

Importance of factors when deciding where to conduct research

Q49-56 – On a scale from 0 to 10, where 0 is not at all important and 10 is very important, how important or not important are the following factors to you when choosing where to conduct your research? [RANDOMIZE]

Importance of factors

Factors (n=45)	Mean	Not important (0-3)	Neutral (4-6)	Very Important (7-10)
Funding opportunities	8.9	2.2%	4.3%	93.5%
Quality of life	8.8	-	6.7%	93.3%
Reputation of institution	8.3	2.2%	6.5%	89.1%
Strength of the local quantum community	8.2	2.2%	15.2%	82.6%
Professional connections	8.1	6.5%	6.5%	87.0%
Salary	7.8	2.2%	13.3%	84.4%
National Moonshot programs	6.1	22.2%	17.8%	46.7%

Base: Individuals in academia in the quantum sector, n=45

Hiring new faculty member in quantum

Q57 – Has your department attempted to hire a new faculty member in quantum in the past six months?

Tried to fill position in last six months

Tried to fill position	Total (n=46)
Yes	56.5%
No	39.1%
Unsure	4.3%

Base: Individuals in academia in the quantum sector, n=46

Result of hiring process

Q58 – What was the result of the hiring process? [select one]

NOTE: This data has been suppressed due to a sample size of less than 30.

Main barrier to hiring

Q59 – What was the main barrier, if any, to hiring a new faculty member to work in your department? [RANDOMIZE][select one]

NOTE: This data has been suppressed due to a sample size of less than 30.

Q30 – What is the biggest challenge, if any, for your organization when hiring a more diverse workforce? [OPEN]

Challenges to hiring a more diverse workforce

Challenges	Total (n=32)
Few diverse candidates available to fill jobs/lack of applications	40.6%
Lack of diversity in hiring committee	12.5%
Competition from other fields	12.5%
No issue	9.4%
Toxic work environment, colleagues	6.3%
Lack of qualified candidates/not as many people in the field	6.3%
No strategy in place	3.1%
Salary	3.1%
Lack of capacity for training	3.1%
Not a desirable location	3.1%

Base: Individuals in academia in the quantum sector, n=32

D. Academia commercialization

Academic respondents were more likely to report engaging in both fundamental and applied research (48%) than mainly on fundamental (35%) or applied (17%) by themselves. Just over half of respondents reported they do not work at a quantum company (57%), while close to one in four report they work at one as an Executive or a Board Member (26%).

Q61 – Are you primarily engaged in fundamental or applied research?

Type of research engaged in

Type of research	Total (n=46)
Both fundamental and applied research	47.8%
Fundamental research	34.8%
Applied research	17.4%

Base: Individuals in academia in the quantum sector, n=46

Q62 – In addition to your primary work in academia, do you also currently play any role for a quantum company? [select one]

Role in quantum company

Role	Total (n=45)
No, I do not work at a quantum company	56.5%
Yes, I work at a quantum company as an Executive or Board Member	26.1%
Yes, I work at a quantum company as a consultant	15.2%
Yes, I work at a quantum company as an employee	2.2%

Base: Individuals in academia in the quantum sector, n=45

Section 3 – Quantum business and academia

A. Commercialization of technologies

Over half of respondents in both industry and academic streams report they have filed a patent related to quantum technology (55%; 46% report they have not). Additionally, more than three in four respondents report they have engaged potential end users of their product and service within the past year, with industry respondents more likely to report having done this (88%) than academic respondents (64%).

When asked about the level of interest potential end users have in adopting quantum technologies, nearly all respondents say they are interested (63%) or somewhat interested (34%). Despite this interest, respondents are a bit less likely to say end users are comfortable (20%) or somewhat comfortable (49%) with adopting quantum products or services.

In terms of barriers to end users adopting quantum solutions, industry respondents most often mentioned that use cases are still being proven and not adopted widely yet (21%), it being too early, and the work or technology is not ready yet (20%) and a lack of knowledge and understanding of the technology (20%). When asked about barriers preventing the commercialization of their research, academic respondents also often mention that it is too early and the work or technology is not ready yet (27%), followed by not being interested in commercializing it (18%).

Filed a patent related to quantum technologies

Q63 – Have you/your organization ever filed a patent related to quantum technologies?

Previously filed a patent related to quantum technology

Filed patent	Total (n=112)	Academia (n=46)	Industry/non-profit (n=66)
Yes	54.5%	56.5%	53.0%
No	45.5%	43.5%	47.0%

Base: Individuals in industry/non-profit or academia in the quantum sector, n=112

Engaging end users with adopting quantum technologies

Q64 – Have you/your organization engaged with potential end users of your product or service within the past year?

Previously engaged potential end users

Engaged with end users	Total (n=110)	Academia (n=45)	Industry/non-profit (n=65)
Yes	78.2%	64.4%	87.7%
No	21.8%	35.6%	12.3%

Base: Individuals in industry/non-profit or academia in the quantum sector, n=110

Q65 – How interested or not interested are potential end users in adopting quantum technologies?

Interest in potential end users to adopt quantum technologies

Level of interest	Total (n=86)	Academia (n=29)*	Industry/non-profit (n=57)
Interested	62.8%	-	70.2%
Somewhat interested	33.7%	-	29.8%
Somewhat not interested	1.2%	-	-
Not interested	-	-	-
Unsure-	2.3%	-	--

**NOTE: This data has been suppressed due to a sample size of less than 30.*
Base: Individuals in industry/non-profit or academia in the quantum sector, n=86 respondents who have engaged with potential end users in the past year.

Q66 – How comfortable or not comfortable are potential end users with adopting quantum products or services?

Comfort of potential end users with adopting quantum technologies

Level of comfort	Total (n=85)	Academia (n=29)*	Industry/non-profit (n=56)
Comfortable	20.0%	-	28.6%
Somewhat comfortable	49.4%	-	48.2%
Somewhat not comfortable	14.1%	-	12.5%
Not comfortable	5.9%	-	7.1%
I don't know	10.6%		3.6%

**NOTE: This data has been suppressed due to a sample size of less than 30.*
Base: Individuals in industry/non-profit or academia in the quantum sector, n=85 respondents who have engaged with potential end users in the past year.

Q67 – [ASK INDUSTRY ONLY] What is the main barrier, if any, preventing end users from adopting quantum solutions? [OPEN]

Barriers to end users adopting quantum solutions

Barrier	Industry/non-profit (n=56)
Use cases still being proven/not adopted widely yet	21.4%
It is too early/work/technology isn't ready yet	19.6%
Lack of knowledge of the technology/lack of understanding	19.6%
Costs/price of technology	8.9%
Risk aversion	7.1%
No urgency/incentive for it	5.4%
None/no barriers	3.6%
Lack of funding	3.6%
Cannot currently compete with classical solutions	3.6%
Other	7.1%

Base: Individuals in industry/non-profit in the quantum sector, n=56 respondents

Q68 – [ASK ACADEMICS ONLY] What is the main barrier, if any, preventing the commercialization of your research? [OPEN]

Barriers preventing commercialization of research

Barrier	Academics (n=33)
It is too early/work/technology isn't ready yet	27.3%
Not interested in commercializing it	18.2%
Not applicable/doing fundamental research	9.1%
Lack of capital	6.1%
Lack of understanding/confusion on what quantum technology is/how to use it	6.1%
Industry is not ready/lack of demand	6.1%
Lack of standardization	3.0%
Need policy pressure to push adoption	3.0%
Need support for IP processes	3.0%
The competition	3.0%
Need additional equipment/technology	3.0%
Difficult to translate academic advances into deployable technology	3.0%
Issues within my organization	3.0%
Other	3.0%
Unsure	3.0%

Base: Individuals in academia in the quantum sector, n=33 respondents

Q69 – Do you/does your organization have a market-ready quantum product or service?

Market-ready quantum product or service

Has product or service	Total (n=112)	Academia (n=46)	Industry/non-profit (n=66)
Yes	48.2%	23.9%	65.2%
No	40.2%	52.2%	31.8%
I don't know	11.6%	23.9%	3.0%

Base: Individuals in industry/non-profit or academia in the quantum sector, n=112 respondents.

B. Awareness and use of federal programming

Overall respondents rate themselves as knowledgeable (71%, score of 7-10) of how federal programming can support quantum research and development (mean of 7.4 out of 10).

Prompting on awareness of federal programs supporting commercialization, industry and academic respondents were most likely to report having heard of the NRC Industrial Research Assistance Program (IRAP) (87%), followed by the NRC Challenge Program (84%) and the Innovation for Defence Excellence and Security (IDEaS)(81%). They were most likely to report having applied for and received funding from IRAP (37%), Innovative Solutions Canada (ISC) (36%), and Regional Development Agency (30%). Industry and academic respondents noted that the application or approval process for these federal programs supporting commercialization is too long or complex (20%), and there are too many requirements, and they should be relaxed (10%).

Regarding federal programs supporting research, industry and academic respondents were most likely to have heard of the NSERC Alliance Quantum stream (87%), followed by the Canadian Institute for Advanced Research (67%) and the Bank of Canada PIVOT programs (12%). One in three industry and academic respondents who have heard of the NSERC Alliance Quantum program report they applied for and received funding (32%; 21% report they have applied, and the decision is pending), while two in ten say the same for the Canadian Institute for Advanced Research (20%). When asked for comments on their engagements with these federal programs, industry and academic respondents mentioned the Alliance program does not fund companies or the private sector (24%) and nine percent said CIFAR does not have open calls for funding, and it is invitation only.

For federal programs that support talent, nearly all industry and academic respondents report having heard of the Mitacs program (98%), while more than three in four had heard of NSERC Create (77%). More than half of industry and academic respondents who have heard of Mitacs report they have applied for and received funding (59%), while three in ten have received funding from NSERC Create (31%; 11% report they applied but did not receive funding). One in four industry and academic respondents commented that the federal programs supporting talents are good programs and that they have applied successfully (25%), that the programs are difficult to apply for or have too many requirements (25%) and that the programs do not apply to industry, and they must go through academia to apply (25%).

Knowledge of federal programming in support of quantum research and development

Q70 – On a scale from 0 to 10, where 0 is not knowledgeable at all and 10 is very knowledgeable, to what extent are you knowledgeable of how federal programming can support quantum research and development?

Level of knowledge of federal programming

Level of knowledge (score out of 10)	Total (n=112)	Academia (n=46)	Industry/non-profit (n=66)
Mean	7.4	7.6	7.2
Not knowledgeable (0-3)	7.1%	8.7%	6.1%
Average (4-6)	21.4%	13.0%	27.3%
Knowledgeable (7-10)	71.4%	78.3%	66.7%

Base: Individuals in industry/non-profit or academia in the quantum sector, n=112 respondents.

Awareness and use of federal programs supporting commercialization

Q71-79 Have you heard or not heard of the following federal programs that support commercialization? [RANDOMIZE]

Awareness of federal programs supporting commercialization

Programs (n=112)	Heard	Not heard
NRC Industrial Research Assistance Program (IRAP)	87.4%	12.6%
NRC Challenge Programs	83.9%	16.1%
Innovation for Defence Excellence and Security (IDEaS)	81.1%	18.9%
Regional Development Agency (Canada Economic Develop for Quebec Regions, Federal Economics Development Agency for Southern Ontario, Prairies Economic Development Canada, Pacific Economic Development Canada)	75.9%	24.1%
Strategic Innovation Fund (SIF)	75.0%	25.0%
Business Development Bank of Canada Deep Tech Fund	64.9%	35.1%
Innovative Solutions Canada (ISC)	64.9%	35.1%
Global Innovation Clusters	40.9%	59.1%

Base: Individuals in industry/non-profit or academia in the quantum sector, n=112 respondents.

Q80-88 – Have you/your company ever applied for or received assistance (including grants, contributions or contracts) from any of the following programs that support commercialization? [SHOW ONES HEARD OF IN Q71-79]

Use of federal programming supporting commercialization

Programs	Yes, applied for but did not receive assistance/ funding	Yes, applied for and received assistance/ funding	Yes, applied for, but decision is pending	No did not apply for or receive assistance/ funding	Unsure
NRC Industrial Research Assistance Program (IRAP) (n=95)	8.4%	36.8%	5.3%	40.0%	9.5%
NRC Challenge Programs (n=92)	13.0%	26.1%	7.6%	42.4%	10.9%
Innovation for Defence Excellence and Security (IDEaS) (n=89)	19.1%	28.1%	2.2%	40.4%	10.1%
Regional Development Agency (n=83)	4.8%	30.1%	9.6%	45.8%	9.6%
Strategic Innovation Fund (SIF) (n=83)	9.6%	18.1%	3.6%	60.2%	8.4%
Business Development Bank of Canada Deep Tech Fund (n=71)	15.5%	5.6%	-	70.4%	8.5%
Innovative Solutions Canada (ISC) (n=72)	13.9%	36.1%	5.6%	36.1%	8.3%
Global Innovation Clusters (n=44)	2.3%	20.5%	4.5%	61.4%	11.4%

Base: Individuals in industry/non-profit or academia in the quantum sector, n=95 respondents who have heard of at least one of the programs

Q89 – Do you have any specific comments on your engagements with any of these federal programs that support commercialization? [OPEN]

Comments on engagements with federal programs supporting commercialization

Comment	Total (n=59)
Application/approval process too long/complex	20.3%
Too many requirements/relax requirements	10.2%
Not enough funding/scale too small	8.5%
Evaluation is too subjective/evaluators lack understanding of quantum	8.5%
Canada has fallen behind/programs are not enough	6.8%
Programs are good/useful/great experience	5.1%
Nothing/no	5.1%
Strengthen early adoption programs	5.1%
Difficult to get funders to engage/commit to funding	5.1%
Less focus on commercialization	3.4%
BDC is risk adverse/does not support non-hardware companies	3.4%
Technology isn't ready/not at that stage yet	3.4%
We need more basic research/training/education	3.4%
Other	11.9%

Base: Individuals in industry/non-profit or academia in the quantum sector, n=59 respondents.

Awareness and use of federal programs supporting research

Q90-93 – Have you heard or not heard of the following federal programs that support research?

Awareness of federal programs supporting research

Programs (n=112)	Heard	Not heard
NSERC Alliance Quantum	86.6%	13.4%
Canadian Institute for Advanced Research	67.0%	33.0%
Bank of Canada PIVOT program	11.7%	88.3%

Base: Individuals in industry/non-profit or academia in the quantum sector, n=112 respondents.

Q94-97 – Have you/your company ever applied for or received assistance (including grants, contributions or contracts) from any of the following federal programs that support research? [SHOW ONES HEARD OF IN Q90-93]

Use of federal programming supporting research

Programs	Yes, applied for but did not receive assistance/ funding	Yes, applied for and received assistance/ funding	Yes, applied for, but decision is pending	No did not apply for or receive assistance/ funding	Unsure
Bank of Canada PIVOT program (n=13)*	-	-	-	-	-
Canadian Institute for Advanced Research (n=74)	2.4%	20.3%	-	66.2%	10.8%
NSERC Alliance Quantum (n=96)	6.3%	32.3%	20.8%	34.4%	6.3%

**NOTE: This data has been suppressed due to a sample size of less than 30.*
Base: Individuals in industry/non-profit or academia in the quantum sector, n=96 respondents who have heard of at least one of the programs.

Q98 – Do you have any specific comments on your engagements with any of these federal programs that support research? [OPEN]

Comments on engagements with federal programs supporting research

Comment	Total (n=33)
Alliance does not fund companies or private sector/only research/we are not eligible	24.2%
Nothing else/nothing to add	12.1%
CIFAR does not have open calls for funding/invitation only	9.1%
NSERC Alliance funds basic research/cannot discuss science	6.1%
I have had a positive experience with Alliance	6.1%
Good programs overall/recommend them	6.1%
Applications take time/haven't had time to apply	3.0%
Programs support development of a quantum device/not a service	3.0%
Alliance requirements for collaborators are not realistic	3.0%
Was not aware of CIFAR funding	3.0%
Need flexible funding calls	3.0%
These exclude non-profits from receiving funding	3.0%
Industry needs more funding programs	3.0%
We have supported/are supporting funding applications	3.0%
NSERC wants industry funding contributions with no control of use	3.0%
Other	9.1%

Base: Individuals in industry/non-profit or academia in the quantum sector, n=33 respondents.

Awareness and use of federal programs supporting talent

Q99-101 – Have you heard or not heard of the following federal programs that support talent? [RANDOMIZE]

Awareness of federal programs supporting talent

Programs (n=112)	Heard	Not heard
Mitacs	98.2%	1.8%
NSERC Create	76.8%	23.2%

Base: Individuals in industry/non-profit or academia in the quantum sector, n=112 respondents.

Q102-104 – Have you/your company ever applied for or received assistance (including grants, contributions or contracts) from any of the following federal programs that support talent? [SHOW ONES HEARD OF IN Q99-101]

Use of federal programming supporting talent

Programs	Yes, applied for but did not receive assistance/ Funding	Yes, applied for and received assistance/ funding	Yes, applied for, but decision is pending	No did not apply for or receive assistance/ funding	Unsure
Mitacs (n=108)	2.8%	59.3%	2.8%	31.5%	3.7%
NSERC Create (n=85)	10.6%	30.6%	2.4%	48.2%	8.2%

Base: Individuals in industry/non-profit or academia in the quantum sector, n=108 respondents who have heard of at least one of the programs.

Q105 – Do you have any specific comments on your engagements with any of these federal programs that support talent? [OPEN-ENDED]

Comments on engagements with federal programs supporting talent

Comment	Total (n=32)
Good programs/we have applied successfully	25.0%
Programs are difficult to apply / too many requirements	25.0%
Programs do not apply to industry/have to go through academia to apply/difficult for commercialization	25.0%
Funding is not enough to be worth it/need more programs funded	15.6%
Not hiring at the moment/might apply in the future	6.3%
Other	3.1%

Base: Individuals in industry/non-profit or academia in the quantum sector, n=32 respondents.

C. National Quantum Strategy (NQS) Public Opinion

Nearly all industry and academic respondents reported being aware of that Canada released its National Quantum Strategy (NQS) in January 2023 (98%), with similar levels of satisfaction among those aware with the different aspects of the NQS: making Canada a world leader in the continued development, deployment and use of quantum computing hardware and software (54% satisfied, score of 7-10), ensuring the privacy and cyber security of Canadians in a quantum enabled world through a national secure quantum communications network and a post-quantum cryptography initiative (51% satisfied), and enabling the government and key industries to be developers and early adopters of new quantum technologies (47% satisfied)

Close to two in three industry and academic respondents who have heard of the NQS agree (22%) or somewhat agree (47%) that the NQS' missions create clear priorities for quantum in Canada, while one in four somewhat disagree (16%) or disagree (10%). When asked why they have that opinion, industry and academic respondents mentioned the objectives being very broad (26%), that there is not enough funding or issues with funding (13%), and the implementation being slow or having issues with implementation (12%).

A majority of industry and academic respondents aware of the NQS (86%) report they have received information from the Federal Government concerning events related to the NQS, including workshops, roundtables and missions.

Awareness Canada released a national quantum strategy

Q106 – Prior to today, were you aware or not aware that Canada released a national quantum strategy (NQS) in January 2023?

Awareness of NQS

Awareness	Total (n=112)	Academia (n=46)	Industry/non-profit (n=66)
Aware	98.2%	100.0%	97.0%
Not aware	1.8%	-	3.0%

Base: Individuals in industry/non-profit or academia in the quantum sector, n=112 respondents.

Satisfaction with aspects of NQS

Q107-109 – [IF AWARE OF NQS] On a scale from 0 to 10, where 0 is not at all satisfied and 10 is very satisfied, how satisfied are you with the following aspects of the NQS's missions? [RANDOMIZE]

Satisfaction with NQS

Aspects of NQS (n=109)	Mean	Not satisfied (0-3)	Neutral (4-6)	Satisfied (7-10)	Unsure
Enable the Government of Canada and key industries to be developers and early adopters of new quantum sensing technologies.	6.7	12.8%	22.9%	46.8%	17.4%
Make Canada a world leader in the continued development, deployment and use of quantum computing hardware and software—to the benefit of Canadian industry, governments and citizens.	6.7	17.4%	16.5%	54.1%	11.9%
Ensure the privacy and cyber-security of Canadians in a quantum-enabled world through a national secure quantum communications network and a post-quantum cryptography initiative.	6.7	13.8%	18.3%	51.4%	16.5%

Base: Individuals in industry/non-profit or academia in the quantum sector, n=109 respondents who have heard of the NQS

Q110 – Do you agree, somewhat agree, somewhat disagree or disagree that the NQS missions create clear priorities for quantum in Canada?

Agreement that NQS missions create clear priorities

Awareness	Total (n=109)	Academia (n=45)	Industry/non-profit (n=64)
Agree	22.0%	31.1%	15.6%
Somewhat agree	46.8%	42.2%	50.0%
Somewhat disagree	15.6%	15.6%	15.6%
Disagree	10.1%	6.7%	12.5%
Unsure	5.5%	4.4%	6.3%

Base: Individuals in industry/non-profit or academia in the quantum sector, n=109 respondents who have heard of the NQS

Q111 – Why do you have that opinion? [OPEN-ENDED]

Reason for level of agreement that NQS missions create clear priorities

Awareness	Total (n=76)	Academia (n=30)	Industry/non-profit (n=46)
Very broad objectives	26.3%	30.0%	23.9%
Not enough funding/issues with funding	13.2%	13.3%	13.0%
Implementation is slow/issues with implementation	11.8%	10.0%	13.0%
Priorities not clearly defined	9.2%	10.0%	8.7%
Mission/priorities are clear	7.9%	13.3%	4.3%
Missing the societal (social sciences) aspect such as adoption and integration	6.6%	3.3%	8.7%
Missing important opportunities (sensing, encryption, quantum materials	5.3%	-	8.7%
Not engaged with quantum community	3.9%	3.3%	4.3%
Priorities don't align with priorities of government	2.6%	-	4.3%
Not sufficiently long-term	1.3%	3.3%	-
Too soon to tell	1.3%	3.3%	-
Other	9.2%	10.0%	8.7%
Unsure	1.3%	-	2.2%

Base: Individuals in industry/non-profit or academia in the quantum sector, n=76 respondents who have heard of the NQS

Q112 – Have you ever received information from the federal government (e.g., NQS Secretariat) concerning events related to the national quantum strategy, such as workshops, roundtables, missions, etc.?

Received information from the federal government about NQS events

Received information	Total (n=110)	Academia (n=46)	Industry/non-profit (n=64)
Yes	86.4%	91.3%	82.8%
No	10.9%	6.5%	14.1%
Unsure	2.7%	2.2%	3.1%

Base: Individuals in industry/non-profit or academia in the quantum sector, n=110 respondents.

Appendix A: Methodology

The survey is comprised of 66 individuals in businesses/non-profits in the quantum sector (46 unique businesses) and 46 academics (23 unique universities/institutes) in the quantum sector. The survey was conducted online and was deployed to a list provided by ISED and a total of 112 individuals participated.

The fieldwork was conducted between February 21st and March 1st, 2024. Details on the rate of participation can be found in Appendix A and the questionnaire is provided in Appendix B.

Respondent Profile

The following table outlines the composition for the survey.

Demographic	All (n=112)	Academics (n=46)	Industry/Non-profit (n=66)
Gender			
Male	66%	65%	67%
Female	21%	20%	21%
Prefer not to answer	12%	13%	11%
Other	2%	2%	2%
Location of head office/ research			
Atlantic	1%	2%	-
Quebec	30%	38%	20%
Ontario	42%	33%	54%
West	27%	27%	26%
Special populations			
Person with disabilities	4%	2%	5%
Racialized persons	12%	18%	8%
2SLGBTQIA+ community	6%	7%	5%
None of the above	75%	68%	80%
Unsure	7%	7%	6%

Fieldwork Dates

Fieldwork was conducted between February 21st to March 1st, 2024.

Margin of error

No margin of error is applicable to this survey.

Questionnaire design

Innovation, Science and Economic Development Canada (ISED) provided Nanos with a draft questionnaire. Nanos Research then reviewed the draft questionnaire and advised on best practices in question design. Upon approval of the English questionnaire, Nanos Research translated the questionnaire into French which was then reviewed by ISED.

Nanos programmed the questionnaire into our system, then thoroughly tested the programming in English and French to ensure accuracy ahead of the pre-test and rollout. This procedure ensured that the survey logic accurately reflected the questionnaire and data was collected properly. The final survey questionnaire is included in Appendix B.

Survey Duration

The average survey length was 27 minutes, 49 seconds and ranged from 4.75 minutes to 4 hours as respondents self-administered the survey online at their own pace.

Quality Controls

Prior to launching the survey, a pre-test was conducted with 16 individuals (13 English, 3 French). ISED provided a list of 23 individuals for the pre-test, who were sent a message from ISED followed by a message from Nanos with a link to complete the survey. In addition, reminder messages were sent by both ISED and Nanos in an effort to increase the response rate. Due to the very short timelines, the decision was made to end the pre-test prior to the completion of 20 surveys. The pre-test contained three French completions, which is due to the composition of the pre-test list, which consisted of 16 English contacts and seven French contacts. Despite this, having the three French completions still enabled the project team to receive valuable input on the survey in French from these individuals and ensure comparability between languages. The number of francophone individuals in the pre-test list is also aligned with the proportion of francophones in the complete list (about 25% to 30%). The list for the survey contained every quantum company in Canada known by the NQS Secretariat, and they all received the link to complete the survey.

The purpose of the pre-test was to ensure that the content of the questionnaire was understandable, that the duration of the survey fit the target, to ensure comparability between the French and the English and to ensure that the logic of the survey flowed smoothly. The pre-test was completed between January 30th and February 5th, 2024. Upon conclusion of the pre-test, additional questions were added, and some were removed or changed slightly. As these were changes that impacted the comparability of the pre-test questionnaire with the updated questionnaire, the responses from the pre-test were not used. Individuals who participated in the pre-test were invited to participate in the full survey rollout so as to include their responses in the report.

Nanos Research monitors ten percent of all fieldwork for quality control and assurance in accordance with the standards of CRIC, ESOMAR and AAPOR.

- projects are staffed with employees best suited for the nature and subject matter of the project
- the Survey Field Manager
    - analyzes the general project summary, questionnaires, sample requirements, quota requirements and any special instructions
    - contacts the Client to clarify any grey areas
    - meticulously programs the questionnaire, incorporating all questionnaire logic and project requirements
    - extensively tests the programming to ensure that all possible scenarios are properly programmed
    - forwards the structure of the data file to the Client for approval prior to commencement of the fieldwork
    - if necessary, performs a duplication control check on the sample lists according to the Client's specifications

- reviews or prepares the survey invitation; gets final approval from client
- well documents all modifications made during the initial project stage and pre-test to support later inquiries on project specifications (questionnaire, sample and quotas)
- if required, arranges for translation of the questionnaire in the language(s) needed. For verification of translation accuracy, send the translated version(s) to the Client for their review and approval. Also, if requested, arrange a back-translation by separate translators to ensure accurate translation.

Pre-field procedures – Online

Prior to any online survey going live it undergoes multi-stage testing. The process for the survey was as follows:

1. Stage 1 (Programming) - Draft programming was tested by the assigned programmer for functionality, accuracy and logic flow.
2. Stage 2 (Internal testing) – Links to the draft programming were provided to Nanos' internal project lead team to validate that all questions and supporting information (e.g. links, background information, etc.) correctly display, that logic branches successfully trigger, and that data is captured in the survey database.
3. Stage 3 (Client validation) – Once Stage 1 and 2 testing has been successfully completed, testing links were provided to the client for their testing and approval in both English and French. Feedback received from the client was incorporated into the programming where required and the testing cycle recommences from Stage 1.

Fieldwork Procedures – Online

- Before invitation emails were sent, unique PIN numbers were tagged onto the survey links in order to identify and track survey attempts from individual respondents. With a unique PIN, each respondent can only complete the survey once.
- Project Managers oversee the validation and correction of erroneous email addresses. Log records are maintained for each email sent.
- After the first day of data collection is completed, the CAWI questionnaire is checked to ensure question wording, response codes and questionnaire logic are correctly programmed. Actual survey data is used to verify the programming.
- If there are errors or omissions due to questionnaire logic or CAWI programming, data collection is temporarily suspended while the programming is immediately corrected and re-tested.
- Data is also tested for respondent consistency, scanned for patterns (either general or within a specific case). If any record shows an illogical response or a peculiar pattern, it will be investigated, and if it is determined to be unsound, it will be removed from the completed interviews.
- Project Managers regularly check the project connection logs within the online survey system to review the connect time of all respondents who have completed a survey for each project. The connect time (duration) is monitored to find any record that may be questionable (e.g. a survey with a much lower than average duration). If such a record is found, the data for that case will be reviewed and tested, and if it is determined not to be a valid complete, it will be removed from the completed count and cumulative data.

Post-field Procedures – Online

The Survey Field Manager prepares a final participation report and web connection summary that includes relevant survey statistics such as total completed interviews, total contacts made / total invitations sent, terminations due to various reasons, average duration of the questionnaire, incidence rate, response rate, etc.

Non-response bias

- To reduce non-response errors for a web survey, a few techniques were employed.
    - Reminder emails are sent, again containing the survey link.
    - Project Managers regularly checked on the completion status of web questionnaires. If a partially completed web questionnaire remained uncompleted for over 3 (or 5) days, a reminder email was sent.

Response Rate

The response rate for this survey was 26%.

2024-2519 - ISED Quantum - Response Rate		
A	Number of Contacts Provided by Client	433
B	Invalid Contacts	0
C	Potential Contacts (C=A-B)	433
D	Number of Completes	112
E	Refusals	0
F	**Response Rate (Completed Surveys) (F=C/D)**	**26%**

Appendix B: Survey questionnaire

INTRODUCTION

Si vous préférez répondre au sondage en français, veuillez choisir « Français » dans le menu déroulant situé en haut de cette page.

Welcome and thank you for taking part in the survey of the Canadian quantum ecosystem. This survey is conducted by Nanos Research on behalf of Innovation, Science, and Economic Development Canada (ISED). In January 2023, the Government of Canada released the National Quantum Strategy (NQS) to build on past successes and guide future efforts. Your feedback is key to gathering an accurate picture of the Canadian quantum sector.

The survey takes **about 15** minutes to complete, and your participation is voluntary and confidential. All your responses will remain anonymous and will be grouped with others to identify common themes and priorities, and to ensure no particular individual can be identified in any reporting for this research. Any information you provide will be administered in accordance with the *Privacy Act, the Access to Information Act*, and any other relevant legislation. For more information on how the data is collected, used and protected, please consult the Nanos Research Privacy Policy.

Please take the time to complete the survey by March 1st, 2024.

This research project is registered with the Canadian Research Insights Council (CRIC) Research Verification Service that allows you to verify its legitimacy and share your feedback. If you have feedback on this research, you can share it by going to https://canadianresearchinsightscouncil.ca/rvs and using the RVS code: 20240123-NA708.

Should you need an alternative means to access this survey please contact ISED's public opinion research team .

Initial Branch Question

1. In which sector do you primarily work in? [SELECT ONE]
   - Academia ..... 1 [SKIP TO ACADEMIC QS – Q31]
   - Industry/Not for Profit ..... 2 [SKIP TO INDUSTRY QS – Q3]
   - Both Academia and Industry ..... 3 [GO TO Q2]

2. [IF SELECTED BOTH] Which sector do you spend more working time on within Canada's quantum community? Please select only one role as the questions that follow will be specific to your response.
   - Academia ..... 1 [STREAM 2 – ACADEMIC – Skip to Q31]
   - Industry/Not for Profit ..... 2 [STREAM 1 – INDUSTRY – Go to Q3]

INDUSTRY STREAM

General Questions

Our first few questions will help group your responses.

3. In which province or territory is your organization headquartered? [SELECT ONE]
   - Alberta 1
   - British Columbia 2
   - Manitoba 3
   - New Brunswick 4
   - Newfoundland and Labrador 5
   - Northwest Territories 6
   - Nova Scotia 7
   - Nunavut 8
   - Ontario 9
   - Prince Edward Island 10
   - Quebec 11
   - Saskatchewan 12
   - Yukon 13
   - Outside Canada (please specify) TEXT BOX 20

4. Does your organization have offices in other provinces and territories that work on quantum technologies? (please specify) Select all options that apply.
   - Alberta 1
   - British Columbia 2
   - Manitoba 3
   - New Brunswick 4
   - Newfoundland and Labrador 5
   - Northwest Territories 6
   - Nova Scotia 7
   - Nunavut 8
   - Ontario 9
   - Prince Edward Island 10
   - Quebec 11
   - Saskatchewan 12
   - Yukon 13
   - Outside Canada (please specify) TEXT BOX 20
   - No other locations 14

5. Does your organization have remote employees in any of the following provinces and territories that work on quantum technologies? (please specify) Select all options that apply.
   - Alberta 1
   - British Columbia 2
   - Manitoba 3
   - New Brunswick 4
   - Newfoundland and Labrador 5
   - Northwest Territories 6
   - Nova Scotia 7
   - Nunavut 8
   - Ontario 9
   - Prince Edward Island 10
   - Quebec 11

Saskatchewan 12
Yukon 13
Outside Canada (please specify) TEXT BOX 20
No remote employees 14

6. Including yourself, approximately how many full-time staff does your organization employ in Canada that work on quantum technologies?
   1 to 9 1
   10 to 19 2
   20 to 29 3
   30 to 39 4
   40 to 49 5
   50 to 99 6
   100 or more 7
   Not sure 77

7. How many years has your organization been in business?
   Less than 5 years 1
   5 to 9 years 2
   10 to 14 years 3
   15 to 19 years 4
   20 years or more 5
   Not sure 77

Research

8. In which areas does your organization conduct research and development in quantum technologies? [SELECT ALL THAT APPLY]
   Quantum computing hardware 1
   Quantum software 2
   Quantum communications and cryptography 3
   Quantum sensors 4
   Quantum materials 5
   Other (Please specify): OPEN 20

9. Does your organization collaborate with the following entities? [RANDOMIZE] [SELECT ALL THAT APPLY]
   Companies located in Canada 1
   Companies located outside of Canada 2
   Universities/colleges in Canada 3
   Universities/colleges in other countries 4
   Canadian research institutes such as the Institute for Quantum Computing 5
   Government laboratories or international research institutes in other countries, such as the U.S. Department of Energy 6
   Canadian Federal government laboratories such as the National Research Council. 7
   None of the above 99

On a scale from 0 to 10, where 0 is not at all important and 10 is very important, how important is it for your organization to collaborate with the following entities to advance your research interests? [RANDOMIZE]

10. Companies located in Canada
11. Companies located outside of Canada
12. Universities/colleges in Canada
13. Universities/colleges in other countries
14. Canadian research institutes such as the Institute for Quantum Computing
15. Government laboratories or International research institutes in other countries, such as the U.S. Department of Energy
16. Canadian Federal government laboratories such as the National Research Council.

    0 (Not at all important).....0
    1.....1
    2.....2
    3.....3
    4.....4
    5.....5
    6.....6
    7.....7
    8.....8
    9.....9
    10 (Very important).....10
    Unsure 77

17. [IF COLLABORATES WITH ANY ORGS IN Q9] What is the main benefit for your organization, if any, of these collaborations? **[OPEN]**

18. [IF COLLABORATES WITH ANY ORG IN Q9] What has been the main output of these collaborations? [SELECT ALL THAT APPLY][RANDOMIZE]

    Expanded network.....1
    Ongoing collaboration 2
    Publication.....3
    Conference Presentation.....4
    Prototype.....5
    Market-ready product or service 6
    Patent 7
    Other [TEXT BOX] 20

19. [IF DOES NOT COLLABORATE WITH ANY ORGS IN Q9] What is the main barrier, if any, preventing your organization from collaborating? [OPEN]

Talent

20. How likely or unlikely is your organization to remain in Canada in the next five years?

    Likely.....1
    Somewhat likely 2
    Somewhat unlikely 4
    Unlikely.....5
    Unsure 77

21. In the **past** six months, has your organization tried to fill positions for which a quantum science and technology background is important?
    Yes .....1 [Go to Q22]
    No .....2 [Go to Q27]
    Unsure .....77 [Go to Q27]

22. Where was your organization's search mainly conducted? [SELECT ALL THAT APPLY]
    Domestic (in Canada) 1
    The United States 2
    Europe 3
    Asia 4
    Other International (Specify).....20
    Unsure 77

23. Were there any qualified *Canadian* candidates that met your organization's needs?
    Yes 1
    No 2
    Not applicable/did not search in Canada 3
    Unsure 77

24. What recruiting tools were the most helpful for your organization to find qualified candidates? [SELECT ALL THAT APPLY]
    Recruiting agency 1
    Job posting websites [monster.ca, Indeed, etc.] 2
    Social media [LinkedIn]..... 3
    Other [please specify]..... 20
    Unsure 77

25. What was the result of the hiring process? [select one]
    My organization filled all of the positions we were hiring 1
    My organization filled some of the positions we were hiring 2
    My organization did not fill any of the positions we were hiring 3
    The process is still ongoing..... 4
    Other (Specify)..... 20
    Unsure 77

26. What was the main barrier, if any, to hiring someone to work at your organization? [RANDOMIZE][select one]
    Candidate expectations (e.g. salary, benefits) 1
    Lack of qualified candidates 2
    Candidates unwilling to relocate..... 3
    Immigration barriers..... 4
    Other [please specify]..... 20
    Unsure 77

27. In the **next** six months, how likely or unlikely is your organization to hire people for positions where a quantum science and technology background is important?
    Likely.....1
    Somewhat likely 2
    Somewhat unlikely 3
    Unlikely.....4
    Unsure 77

28. From the list below, please identify areas of quantum technologies for which there is a shortage of skilled people in Canada? [select all that apply][RANDOMIZE]
    - Quantum computing hardware....1
    - Quantum software....2
    - Quantum communications and cryptography....3
    - Quantum sensors....4
    - Quantum materials....5
    - Other [please specify]....20
    - None of the above....6
    - Unsure....77

29. Which of the following groups, if any, are represented in your organization's workforce? [RANDOMIZE]
    - Women.... 1
    - Indigenous people.... 2
    - Persons with disabilities.... 3
    - Racialized persons [persons, other than Aboriginal peoples, who are non-Caucasian in race or non-white in colour],.... 4
    - 2SLGBTQIA+ community).... 5
    - None of the above.... 5
    - Unsure.... 77

30. What is the biggest challenge, if any, for your organization when hiring a more diverse workforce? [OPEN]

[INDUSTRY – NOW SKIP TO Q63]

ACADEMIA STREAM

General

Our first few questions will help group your responses.

31. What is your role within academia?
    - Professor (include Associate, Assistant, Professor).... 1
    - Lecturer/Sessional.... 2
    - Postdoctoral.... 3
    - Graduate student.... 4
    - Researcher.... 5
    - Undergraduate student.... 6
    - Other (please specify).... 20

32. Where do you primarily conduct your work/studies? [SELECT ONE]
    - Alberta....1
    - British Columbia....2
    - Manitoba....3
    - New Brunswick....4
    - Newfoundland and Labrador....5
    - Northwest Territories....6
    - Nova Scotia....7
    - Nunavut....8
    - Ontario....9
    - Prince Edward Island....10
    - Quebec....11

Saskatchewan 12
Yukon 13
Outside Canada (please specify) TEXT BOX 20

33. How many years have you been working/studying in this field?
    Less than 5 years 1
    5 to 9 years 2
    10 to 14 years 3
    15 to 19 years 4
    20 years or more 5

34. Which of the following groups, if any, are represented in your department's workforce? [RANDOMIZE]
    Women 1
    Indigenous people 2
    Persons with disabilities 3
    Racialized persons [persons, other than Aboriginal peoples, who are non-Caucasian in race or non-white in colour], ... 4
    2SLGBTQIA+ community) 5
    None of the above 5
    Unsure 77

Research:

35. In which areas do you conduct research and development in quantum technologies?
    Quantum computing hardware 1
    Quantum software 2
    Quantum communications and cryptography 3
    Quantum sensors 4
    Quantum materials 5
    Other [SPECIFY] 20

36. What department in the university/college are you with?
    Physics 1
    Mathematics 2
    Engineering 3
    Computer Science 4
    Other [please specify] 20

37. In quantum research, do you collaborate with the following entities? [RANDOMIZE][SELECT ALL THAT APPLY]
    Companies located in Canada 1
    Companies located outside of Canada 2
    Universities/colleges in Canada 3
    Universities/colleges in other countries 4
    Canadian research institutes such as the Institute for Quantum Computing 5
    Canadian Federal government laboratories such as the National Research Council. 7
    Government laboratories and international research institutes in other countries, such as the U.S. Department of Energy 8
    None of the above 9

On a scale from 0 to 10, where 0 is not at all important and 10 is very important, how important is it for you to collaborate with the following entities to advance your research interests? [RANDOMIZE]

38. Companies located in Canada
39. Companies located outside of Canada
40. Universities/colleges in Canada
41. Universities/colleges in other countries
42. Canadian research institutes such as the Institute for Quantum Computing
43. Government laboratories and international research institutes in other countries, such as the U.S Department of Energy
44. Canadian Federal government laboratories such as the National Research Council.

    0 (Not at all important).....0
    1.....1
    2.....2
    3.....3
    4.....4
    5.....5
    6.....6
    7.....7
    8.....8
    9.....9
    10 (Very important).....10
    Unsure 77

45. [IF COLLABORATES WITH ANY ORG IN Q37] What is the main benefit for you, if any, of these collaborations? **[OPEN]**

46. [IF COLLABORATES WITH ANY ORG IN Q37] What has been the main output of these collaborations? [SELECT ALL THAT APPLY][RANDOMIZE]

    Expanded network.....1
    Ongoing research collaboration 2
    Publication.....3
    Conference Presentation.....4
    Prototype.....5
    Market-ready product or service 6
    Patent 7
    Other [TEXT BOX] 20

47. [IF DOES NOT COLLABORATE WITH ANY ORG IN Q37] What is the main barrier, if any, preventing you from collaborating? [OPEN]

Talent

48. How likely or unlikely are you to remain in Canada in the next five years to pursue your research?

    Likely.....1
    Somewhat likely 2
    Somewhat unlikely 3
    Unlikely.....4
    Unsure 77

On a scale from 0 to 10, where 0 is not at all important and 10 is very important, how important or not important are the following factors to you when choosing where to conduct your research? [RANDOMIZE]

49. Salary
50. Quality of life
51. Funding opportunities
52. Professional connections

53. Reputation of institution
54. National Moonshot programs
55. Strength of the local quantum community
56. Other (Specify)
    0 (Not at all important).....0
    1.....1
    2.....2
    3.....3
    4.....4
    5.....5
    6.....6
    7.....7
    8.....8
    9.....9
    10 (Very important).....10
    Unsure 77

57. Has your department attempted to hire a new faculty member in quantum in the past six months?
    Yes .....1 [GO TO Q58]
    No .....2 [SKIP TO Q60]
    Unsure .....77 [SKIP TO Q60]

58. What was the result of the hiring process? [select one]
    My department filled all of the positions we were hiring..... 1
    My department filled some of the positions we were hiring..... 2
    My department did not fill any of the positions we were hiring 3
    The process is still ongoing..... 4
    Other (Specify)..... 20
    Unsure 77

59. What was the main barrier, if any, to hiring a new faculty member to work in your department? [RANDOMIZE][select one]
    Candidate expectations (e.g. salary, benefits) 1
    Lack of qualified candidates 2
    Candidates unwilling to relocate..... 3
    Immigration barriers..... 4
    Other [please specify]..... 20
    Unsure 77

60. In your opinion, what is the biggest challenge for your department when cultivating a diverse workforce? [OPEN]

Academia Commercialization:

61. Are you primarily engaged in fundamental or applied research?
    - Fundamental research..... 1
    - Applied research..... 2
    - Both fundamental and applied research..... 3

62. In addition to your primary work in academia, do you also currently play any role for a quantum company?
    - Yes, I work at a quantum company as an Executive or Board Member..... 1
    - Yes, I work at a quantum company as an employee..... 2
    - Yes, I work at a quantum company as a consultant..... 3
    - No, I do not work at a quantum company..... 4

[ASK ALL] Commercialization of technologies:

63. Have you/your organization ever filed a patent related to quantum technologies?
    - Yes 1
    - No 2

64. Have you/your organization engaged with potential end users of your product or service within the past year?
    - Yes .....1[Go to Q65]
    - No .....2 [Skip to Q68]

65. How interested or not interested are potential end users in adopting quantum technologies?
    - Interested 1
    - Somewhat interested 2
    - Somewhat not interested.....3
    - Not interested 4
    - I don't know.....77

66. How comfortable or not comfortable are potential end users with adopting quantum products or services?
    - Comfortable.....1
    - Somewhat comfortable.....2
    - Somewhat not comfortable 3
    - Not comfortable 4
    - I don't know.....77

67. [ASK INDUSTRY ONLY] What is the main barrier, if any, preventing end users from adopting quantum solutions? [OPEN]

68. [ASK ACADEMICS ONLY] What is the main barrier, if any, preventing the commercialization of your research? [OPEN]

69. Do you/does your organization have a market-ready quantum product or service?
    - Yes 1
    - No 2
    - I don't know.....3

[ASK ALL] Awareness and Use of Federal Programming

70. On a scale from 0 to 10, where 0 is not knowledgeable at all and 10 is very knowledgeable, to what extent are you knowledgeable of how federal programming can support quantum research and development?
    0 (Not at all knowledgeable) 0
    1.....1
    2.....2
    3.....3
    4.....4
    5.....5
    6.....6
    7.....7
    8.....8
    9.....9
    10 (Very knowledgeable).....10
    Unsure 77

Have you heard or not heard of the following federal programs that support commercialization? [RANDOMIZE]

71. Business Development Bank of Canada Deep Tech Fund
72. Global Innovation Clusters
73. Innovation for Defence Excellence and Security (IDEaS)
74. Innovative Solutions Canada (ISC)
75. NRC Challenge Programs
76. NRC Industrial Research Assistance Program (IRAP)
77. Regional Development Agency (Canada Economic Develop for Quebec Regions, Federal Economics Development Agency for Southern Ontario, Prairies Economic Development Canada, Pacific Economic Development Canada)
78. Strategic Innovation Fund (SIF)
79. Other [TEXT BOX]
    Heard of.....1
    Not heard of 2

Have you/your company ever applied for or received assistance (including grants, contributions or contracts) from any of the following programs that support commercialization? [SHOW ONES HEARD OF IN Q71-79]

80. Business Development Bank of Canada Deep Tech Fund
81. Global Innovation Clusters
82. Innovation for Defence Excellence and Security (IDEaS]
83. Innovative Solutions Canada (ISC
84. NRC Challenge Programs
85. NRC Industrial Research Assistance Program (IRAP)
86. Regional Development Agency (Canada Economic Develop for Quebec Regions, Federal Economics Development Agency for Southern Ontario, Prairies Economic Development Canada, Pacific Economic Development Canada)
87. Strategic Innovation Fund (SIF)
88. Other [TEXT BOX]
    Yes, applied for but did not receive assistance/funding 1
    Yes, applied for and received assistance/funding 2
    Yes applied for, but decision is pending 3
    No, did not apply for or receive assistance/funding 4
    Unsure 77

89. Do you have any specific comments on your engagements with any of these federal programs that support commercialization? [OPEN]

Have you heard or not heard of the following federal programs that support research?

90. Bank of Canada PIVOT program
91. Canadian Institute for Advanced Research
92. NSERC Alliance Quantum
93. Other [TEXT BOX]

Heard of.....1
Not heard of 2

Have you/your company ever applied for or received assistance (including grants, contributions or contracts) from any of the following federal programs that support research? [SHOW ONES HEARD OF IN Q90-93]

94. Bank of Canada PIVOT program
95. Canadian Institute for Advanced Research
96. NSERC Alliance Quantum
97. Other [TEXT BOX]

Yes, applied for but did not receive assistance/funding 1
Yes, applied for and received assistance/funding 2
Yes applied for, but decision is pending 3
No, did not apply for or receive assistance/funding 4
Unsure 77

98. Do you have any specific comments on your engagements with any of these federal programs that support research [TEXT BOX]

Have you heard or not heard of the following federal programs that support talent ? [RANDOMIZE]

99. Mitacs
100. NSERC CREATE
101. Other [TEXT BOX]

Heard of.....1
Not heard of 2

Have you/your company ever applied for or received assistance (including grants, contributions or contracts) from any of the following federal programs that support talent? [SHOW ONES HEARD OF IN Q99-101]

102. Mitacs
103. NSERC CREATE
104. Other [TEXT BOX]

Yes, applied for but did not receive assistance/funding 1
Yes, applied for and received assistance/funding 2
Yes applied for, but decision is pending 3
No, did not apply for or receive assistance/funding 4
Unsure 77

105. Do you have any specific comments on your engagements with any of these federal programs that support talent? [TEXT BOX]

[ASK ALL] NQS public opinion

106. Prior to today, were you aware or not aware that Canada released a national quantum strategy (NQS) in January 2023?

Aware .....1 [GO TO Q107]
Not aware.....2 [SKIP TO Q112]

[IF AWARE IN Q106] On a scale from 0 to 10, where 0 not at all satisfied and 10 is very satisfied, how satisfied are you with the following aspects of the NQS's missions? [RANDOMIZE]

107. Make Canada a world leader in the continued development, deployment and use of quantum computing hardware and software—to the benefit of Canadian industry, governments and citizens.
108. Ensure the privacy and cyber-security of Canadians in a quantum-enabled world through a national secure quantum communications network and a post-quantum cryptography initiative.
109. Enable the Government of Canada and key industries to be developers and early adopters of new quantum sensing technologies.

    0 (Not at all satisfied) 0
    1.....1
    2.....2
    3.....3
    4.....4
    5.....5
    6.....6
    7.....7
    8.....8
    9.....9
    10 (Very satisfied).....10
    Unsure 77

110. Do you agree, somewhat agree, somewhat disagree or disagree that the NQS missions create clear priorities for quantum in Canada?

    Agree 1
    Somewhat agree.....2
    Somewhat disagree 3
    Disagree.....4
    Unsure 77

111. Why do you have that opinion [OPEN]

112. Have you ever received information from the federal government (e.g. NQS Secretariat) concerning events related to the national quantum strategy, such as workshops, roundtables, missions, etc.?

    Yes 1
    No 2
    Unsure 77

Our last question will help us group your responses.

113. What is your gender?

    Female 1
    Male..... 2
    Other (please specify)..... 3
    Prefer not to answer 4

114. Do you identify with any of the following groups? [RANDOMIZE] (Multiple selection)? [RANDOMIZE]

Indigenous people 1
Persons with disabilities 2
Racialized persons [persons, other than Aboriginal peoples, who are non-Caucasian in race or non-white in colour], ... 3
2SLGBTQIA+ community) 4
None of the above 5
Unsure 77

Thank you very much for taking the time to complete the survey. This survey was conducted on behalf of Innovation, Science and Economic Development.

In the coming months the report will be available from Library and Archives Canada.