




## Natural Sciences and Engineering Research Council of Canada

# Evaluation of the Idea to Innovation (I2I) Grants

## Final report

### On this page

- [List of Acronyms](#)
- [Definitions](#)
- [Acknowledgements](#)
- [Executive Summary](#)
- [1.0 About Idea to Innovation \(I2I\) Grants](#)
- [2.0 About the Evaluation](#)
- [3.0 Evaluation Findings](#)
- [4.0 Conclusions and Recommendations](#)
- [Appendix A. I2I Logic Model](#)
- [Appendix B. I2I Evaluation Matrix](#)
- [Appendix C. Detailed Methodology](#)
- [Appendix D: Success Stories of I2I Funded Projects](#)
- [Appendix E: NSERC Lab2Market Pilot Review](#)

 Print this page

### List of Acronyms

Term	Definition
CIPO	Canadian Intellectual Property Office
I2I	Idea to Innovation
ILO	Industry Liaison Officer
IP	Intellectual Property
L2M	Lab2Market
MA	Market Assessment
NAMIS	NSERC's Award Management Information System
NSE	Natural Science Engineering

Term	Definition
NSERC	Natural Sciences and Engineering Research Council of Canada
PPA	Provisional Patent Application
R&D	Research and development
SME	Small Medium-Sized Enterprises
USPTO	U.S. Patent and Trademark Office
TRL	Technology Readiness Level
TTA	Technology Transfer Agreements
TTO	Technology Transfer Office

## Definitions

Term	Definition
<b>Business accelerator</b>	A business accelerator is a program that gives developing companies access to mentorship, investors and other support that help them become stable, self-sufficient businesses. <sup>1</sup>
<b>Commercialization</b>	In the context of the I2I Grants, commercialization has been defined as everything that transforms knowledge and technology into new goods, processes, or services to satisfy market demands. In this report the terminology of “the transfer of the technology to market” was also used to refer to the commercialization process.
<b>HQP (Highly qualified personnel)</b>	Defined as individuals with university degrees at the bachelors’ level and above. <sup>2</sup> Includes the postdoctoral fellows, doctoral students, master’s students and undergraduate students, as well as other groups supporting the grant such as technicians, research associates, etc.
<b>ILO</b>	Industry liaison offices (ILO) are responsible for interacting with university researchers to identify new technologies and to assess their commercial potential and suitability for patent or copyright protection. When a decision is made to invest in intellectual property protection, the ILO has the responsibility to seek out potential private sector receptors to commercially exploit the intellectual property (technology). They are also referred as Technology Transfer Offices (TTOs); however, this report uses the term “ILO”.
<b>Institutions</b>	For the purposes of this evaluation, “institutions” are inclusive of post-secondary institutions such as universities that host I2I funded researchers.
<b>Intellectual property (IP)</b>	Intellectual property is anything created by human minds: Inventions, designs, symbols, research innovations, and more. In Canada, intellectual property can be registered for protection through the Canadian Intellectual Property Office (CIPO). <sup>3</sup>
<b>Patents</b>	Intellectual protection granted by the government which gives the right to exclude others from making, using or selling a new invention (process, machine, product, composition of matter) or a new and useful improvement to an existing invention. <sup>4</sup>
<b>Partners</b>	For the purpose of this evaluation, partners during the grant refer to organizations that were Phase II contributors or provided Phase I Letters of Support. Often these organizations are the intended receptor organization that could commercialize the technology and not potential users of this technology. However other organizations besides these initial partners could also have been involved with projects by providing financial, in-kind contributions and/or business-related supports.
<b>Peer-to-peer leaders</b>	A model that brings together like-minded individuals to collaborate, share ideas, make connections, and develop entrepreneurial processes.

Term	Definition
<b>Principal investigator</b>	An individual with the primary responsibility for the overall intellectual direction of the research, research-related activity or partnership. They are also accountable, with the host institution, for coordinating the grant's overall financial and administrative aspects. <sup>5</sup> Throughout this report they are often referred as “researchers”.
<b>Provisional Patent Application</b>	A provisional patent application (PPA) is a document issued by the U.S. Patent and Trademark Office (USPTO) that helps protect a new invention from being copied during the 12-month period before a formal patent application is filed. It is intended to give an inventor time to pitch the idea, test its commercial feasibility, or refine a product before committing to the expensive and time-intensive process of a formal application.
<b>Spin-off</b>	For the purposes of this evaluation, a spin off company refers to a “university spin-off”, or a legal entity formed by researchers with the objective of commercializing a specific technology/IP developed at their institution. <sup>6</sup>
<b>Start-up</b>	Neither 'spin-offs' nor 'start-up' has an exact definition, and the two terms are sometimes used interchangeably. For the purposes of this evaluation, a start-up company references a legal entity that is formed outside a university setting formed with the objective of commercializing a specific technology/IP developed at the institution.
<b>Technology</b>	For the purposes of this evaluation, the term “technology” is used to encompass the entities developed from I2I grant innovations such as processes, products, goods, and services.
<b>Transfer of Technology</b>	The process by which new inventions and other innovations created in institutions’ labs are turned into products and commercialized. <sup>7</sup>
<b>University/Academic incubators</b>	Functionally distinct from classrooms, libraries, and student unions, academic incubators establish new forums for knowledge exchange on campus. Incubators provide space and resources for the full spectrum of startups, from early stage to growth stage. Depending on stated purpose and mission, incubators may offer co-working or maker spaces, conference rooms, labs, cafes, concierge services and mentoring staff. <sup>8</sup>
<b>Venture capitalists/Venture capital investors</b>	A private equity investor that provides capital to companies with high growth potential in exchange for an equity stake, typically in the form of stocks or securities. <sup>9</sup>

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## Executive Summary

This report presents findings from the evaluation of the Natural Sciences and Engineering Research Council of Canada (NSERC) Idea-to-Innovation (I2I) grants. The evaluation covered the period between fiscal years 2016-2017 through 2022-2023 and explored the effectiveness, relevance and efficiency of the I2I grants.

## About NSERC's I2I Grants

Introduced in 2003, NSERC's I2I grants provide funding to post-secondary researchers to support projects in the natural sciences and engineering (NSE) with recognized commercialization potential to accelerate their development and transfer to market. The I2I grants are distributed through four unique funding options that vary depending on the maturity of the technology and the level of involvement of an early-stage investment entity or industrial partner. The four funding options include Market Assessment (MA) grants, Phase Ia grants (Reduction to Practice), Phase IIa (Technology Enhancement for Early-Stage Investment) and Phase IIb (Technology Enhancement Partnership with a Canadian Company).

## Evaluation Findings

NSERC's I2I grants continue to be responsive to the need for research commercialization funding amongst post-secondary researchers and Canadian businesses operating within the dynamic landscape of the Canadian research innovation ecosystem. In particular the Market Assessment grants help provide researchers with information about a technology's market potential, while the Phase I grants address a funding gap for early-stage research commercialization across all NSE disciplines with minimal commitment required from industry partners. The Phase II grants also address a potential funding gap for later-stage research commercialization, but have low uptake compared to the other I2I grants.

The evaluation found that the I2I grants support the development of innovations and transfer of technologies to the market. This was demonstrated by most I2I funded projects filing for patents and obtaining patent protection, as well as creating successful partnerships during the grant, and remaining connected with partners or attaining new partners following the grant. Additionally, many funded projects were able to attract contributions during and following their I2I grant including financial support, in-kind resources, and business-related supports (BRS). These contributions derived from a variety of different sources including private companies, different levels of government and universities. Almost a third of the funded projects have already transferred their technology to the market with another third expecting to do so in the future. This is not unexpected given the time required to develop and commercialize a technology. Moreover, funded projects resulted in various examples of positive economic impacts, such as the creation of businesses and companies which contribute to sales revenue and employment opportunities. When transferring technologies to the market, more and more funded projects are using a spin-off pathway, which may be a result of the limited availability of Canadian companies to act as receptors for the commercialization of technologies.

Although not an objective of the I2I grants, student involvement in I2I funded projects contributed to positive outcomes for the projects and the students. For instance, the contributions of students often supported the advancement of the projects, and the training students received helped them to develop expertise that could be leveraged towards future educational and career goals. Consequently, there is an opportunity for the I2I program to further recognize the role of the students in funded projects. In addition to recognizing the role played by students, there is an opportunity for the I2I program to further support the training of students and researchers by leveraging complementary programs (e.g., Lab2Market offered by some Canadian universities, and the new NSERC Lab to Market Grants) and sources (e.g., university incubators, accelerators) that offer BRS that facilitate the development of business acumen and commercialization activities. Such supports may be particularly relevant for students and researchers at small post-secondary institutions with fewer commercialization-related resources.

Evaluation findings suggest that there is also an increased recognition amongst I2I stakeholders that equity, diversity and inclusion (EDI) is an important consideration in research and commercialization, and there is an openness from researchers and Industry Liaison Offices (ILOs) to learn more about how to best incorporate EDI into their R&D and commercialization activities. However, it was suggested that NSERC consider providing more EDI-related training and tools that can support this integration, as it would help improve the quality of applications, advance EDI considerations in funded projects and increase the I2I program's visibility.

Some of the design features the I2I grants have remained static since their inception twenty years ago, which may impact the extent to which they are able to achieve expected outcomes and remain competitive within Canada's research innovation ecosystem. Findings related to these features, as discussed in this report, led to the identification of three areas of recommendation to help ensure that the I2I grants continue to support post-secondary researchers with the development and transfer of their technologies to market.

## Recommendations

### Recommendation Area #1

**Modernize the suite of I2I grants to further align with needs of the Canadian research community and changing Canadian innovation ecosystem. This includes investigating opportunities to increase the funding amount for the Market Assessment and Phase I grants, reassessing the value-added by the Phase II grants and allowing in-kind supports by partners for Phase I grants.**

One of the most notable opportunities for improvement recognized throughout the evaluation is the need to increase the dollar value for Market Assessment and Phase I grants, to support the increasing costs associated with the commercialization of research within the Canadian research innovation ecosystem. The amount of the I2I grants have not changed since the program's inception. Therefore, the grants have not kept up with inflation and have approximately 50% less purchasing power than they did 20 years ago when first implemented. The evaluation found that the static amount of the grants often created challenges for funded projects

including difficulties hiring the necessary team members (e.g., consultants, students), and paying for materials, intellectual property (IP), and other project-associated costs. Such challenges could subsequently have a negative impact on the extent to which projects were able to achieve their expected results.

While the amount of the Phase II grants was not an issue, the low uptake of these grants over the years suggests that there are opportunities to re-assess the value-added by the Phase II grants as part of the suite of I2I funding and within the research and innovation ecosystem. For instance, between 2016-17 and 2021-22, Phase II grants represented 5% of applications received and 5% of the grants awarded, and very few Phase I funded projects sought a Phase II grant<sup>10</sup>. It is unclear why there is low uptake of the Phase II grants by the research community. However, the evaluation uncovered the following factors that may contribute to this situation including the lack of receptor companies willing to participate in a Phase II grant, the inability of companies to fulfill the matching required for this grant, and other funding opportunities available for researchers and Canadian companies to develop and transfer technologies to the market. Additionally, it appears that more researchers are using spin-offs as the pathway for commercialization which is sometimes perceived as a pathway that is ineligible for I2I funding or that will limit the success of a grant application.

A final opportunity for modernizing the I2I grants that was identified during the evaluation involves NSERC's consideration of allowing partners to provide in-kind supports during a Phase I grant, should they wish to do so. Despite not being required, evaluation findings indicate that almost a third (30%) of Phase I funded projects receive some form of financial or in-kind support from the partner and that such supports yield several benefits including fostering additional partner involvement throughout a project, encouraging long-term partnerships (i.e., post-grant), and supporting further technology development and commercialization activities. However, it was also noted by key informants that such investments, and in particular financial support, could increase the risk of committing IP too early in the process and raise challenges for smaller companies with limited resources. Consequently, it is recommended that NSERC create allowances for partners of Phase I funded projects to provide in-kind supports to facilitate project activities but does not make this a mandatory requirement of the grant.

## **Recommendation Area #2**

**Update the program logic model to improve the alignment between the expected outcomes of the I2I grants and NSERC's strategic vision (e.g., student training, Equity, diversity and Inclusion (EDI)), and revise the program reporting instruments to reflect these new outcomes and improve performance monitoring.**

There is an opportunity for NSERC to strengthen the extent to which the expected outcomes of the I2I grants align with key components of NSERC's strategic vision, which are outlined in NSERC2030: Discovery. Innovation. Inclusion. In particular, NSERC could examine opportunities to integrate considerations related to student training and EDI (e.g., considering EDI at each stage of the research and commercialization process) into the theory of change for the I2I grants and have these components reflected in the program's expected outcomes.

Although training was not an expected outcome of the I2I grants, evaluation findings indicate that students participated in most funded projects. As a result of their participation, students gained valuable experience regarding the commercialization process and could leverage this experience towards future career opportunities. Students also provided many benefits for funded projects with the majority of survey respondents whose funded projects involved students indicating that student support was an important facilitator for project completion. While student participation may sometimes be challenging for I2I funded projects (e.g., funding for salaries, time, and student availability), evaluation findings suggest that the benefits outweigh the challenges and there is an opportunity for NSERC to integrate student training as an expected outcome of the I2I grants. This will also enhance the recognition of the students' contributions for funded projects, support and further align the I2I grants with NSERC's strategic vision.

Regarding the EDI, findings from the evaluation indicate that while some researchers are integrating it within the research and commercialization activities, as well as in relation to the composition of their research team, there are opportunities for improvement and for NSERC to continue providing guidance and support. Additionally, NSERC should consider collecting self-identification data for its I2I grants to monitor progress on increasing equitable and inclusive access to these grants.

Revisions to the program theory and expected outcomes of the I2I program will require subsequent changes to the program's reporting requirements as student participation and EDI are currently not adequately captured. It is also an opportunity for the program to review the current performance monitoring instruments as the evaluation identified several inconsistencies across these instruments including their format, terminology, and metrics. Many have been modified over time, creating challenges to the examination of longitudinal data. Additionally, there are gaps in the information collected. Revising the performance monitoring instruments would allow the program to align the various reports across stakeholder groups and points in time, as well as with similar instruments for other programs within NSERC's Research and Technology Partnerships Directorate.

### Recommendation Area #3

**Communicate with a focus on clarifying and repackaging information about the I2I grants, as well as identify new and strengthen existing pathways for dissemination amongst key stakeholders. This includes improving the transparency, clarity, and comprehensiveness of the details regarding the requirements for the application and review processes, as well as developing and expanding relationships with complementary programs and other funders.**

The evaluation found that over the years there has been a fair amount of confusion among stakeholders of the I2I grants regarding what is expected from applicants, particularly around the eligibility requirements, selection criteria, and review process. This confusion is more likely to occur for the Phase I and Phase II grants. For the eligibility requirements and selection criteria, findings from the evaluation indicate that there is a disconnect between what is stated in the program literature, what ILOs perceive as a successful application and how selection committee members interpret the selection criteria. For instance, it is unclear whether spin-off companies are eligible to receive I2I funding. Also, in the case of IP, more clarity is needed as to whether it is a requirement for the IP protection to be obtained before applying for a Phase I grant.

Another opportunity for improvement identified during the evaluation is the perceived lack of transparency regarding the review process. This process was noted as a source of frustration because of inconsistencies across funding calls and in the feedback received for initial submissions and subsequent resubmissions. It is also unclear what is considered to be a “risky” project and the degree to which such projects are funded. As a result, it is recommended that NSERC revise the literature for the I2I grants, specifically in relation to the application and review processes. Additionally, there are opportunities for NSERC to consider offering increased guidance, tools, and training for applicants, ILOs, and selection committee members to help each group navigate the application and review process.

Finally, there is an opportunity to leverage complementary programs (e.g., Lab2Market offered by some Canadian universities and the new NSERC Lab to Market Grants) and other funders (e.g., university incubators, accelerators) to help build new and expand existing relationships between the I2I program, the post-secondary institutions and (potential) industry partners. Such efforts could help increase the visibility of the I2I grants within the Canadian research innovation ecosystem and provide opportunities to address potential situations of confusion amongst stakeholders of the I2I grants, particularly around the application and review processes. Moreover, it was suggested throughout the evaluation that developing and strengthening such relationships could facilitate opportunities to provide researchers with business-related and other supports to help them in their commercialization activities and strengthen the Canadian research innovation ecosystem. Such relationships were noted as likely to be particularly advantageous for small institutions as they often have access to fewer resources.

## 1.0 About Idea to Innovation (I2I) Grants

The first section of this evaluation report introduces the Natural Sciences and Engineering Research Council of Canada (NSERC)’s Idea-to-Innovation (I2I) grants including their purpose, objectives, phases, the application/selection process and the program budget.

### 1.1 Grant Objectives & Purpose

Initiated in 2003, the objectives of NSERC’s I2I grants are to accelerate the pre-competitive development of promising innovations originating from the post-secondary academic sector and to promote their transfer to new or established Canadian companies. To achieve these objectives, the I2I grants provide funding to post-secondary researchers to support research and development (R&D) projects in natural sciences and engineering (NSE) with recognized technology-transfer potential, particular in the early stages of technology validation and market connection.

The I2I grants are offered under the following four distinct funding options depending on the maturity of the technology<sup>11</sup> and the involvement of an early-stage investment entity or industrial partner<sup>12</sup>:

- **Market Assessment grants** were introduced in 2010 and are intended to help the Industry Liaison Offices (ILOs) and the researchers gain impartial market opportunity information and validate important business elements before embarking on the development process for a technology, as well as to test the viability of continuing to pursue an idea or commercialize a technology. This grant can be used to support applications for subsequent I2I grants by providing a better understanding of the market viability for a given technology.
- **Phase I grants** were introduced in 2003 and designed to advance promising technologies in order to attract early-stage investment and/or to build valuable intellectual property in anticipation of transferring the technology to a new or established

Canadian company. This grant offers the possibility of an extension with funds known as Phase Ib available for successfully completed Phase I projects with high promise to secure an investor or a licensing company by providing additional time and funding. For the purpose of this evaluation the Phase I and Phase Ib are grouped together and referred to as **Phase I grants**.

- **Phase II grants** were also introduced in 2003, are designed for projects that provide scientific or engineering evidence about whether a technology, process, or product is technically feasible and has a defined market. At this stage, a partner must share the cost of the project. Depending on the stage of the project, and the type of partner, there are two grants available, which are described below and for the purpose of this evaluation are grouped together as **Phase II grants**:
  - **Phase IIa** -The purpose of this grant is to continue to fund the technology to help researchers and partners (i.e., investors) determine whether there is justification to move forward with further developing the technology through a new or established company.
  - **Phase IIb** –The purpose of this grant is to support the technology enhancement and to provide evidence that establishes technical feasibility of the product. By the end of the project, the partner (which is expected to be Canadian Company)<sup>13</sup> must have or be able to acquire the technical capability to undertake any further development necessary to take the technology to market.

It should be noted that the objectives and design of the I2I grants have remained relatively unchanged since they were implemented.

Researchers or research teams (in collaboration with the Industry Liaison Offices (ILOs) at their respective post-secondary institution<sup>14</sup>) apply for the grant that is the best match for the stage of development of their technology(ies). The main characteristics of each grant are provided in Table 1.<sup>15</sup>

**Table 1. The I2I Funding Grants**

Type of I2I Grant	Key Players	Duration	NSERC Contributions
<b>Market Assessment</b>	ILOs Researchers External consultants	Maximum 12 months	3/4 of total cost, up to a maximum of \$15,000
<b>Phase I</b>	Researchers ILOs	Maximum 12 months	100% of total cost, up to a maximum of \$125,000
<b>Phase Ib</b>	Researchers ILOs Canadian companies	6 months	100% of total cost, up to a maximum of \$60,000
<b>Phase IIa</b>	ILOs Investors Researchers	6 to 18 months	2/3 of total cost, up to a maximum of \$125,000
<b>Phase IIb</b>	Researchers ILOs Canadian companies	24 months	1/2 of total cost, up to a maximum of \$350,000

### NSERC Lab2Market Pilot Program

Starting in 2022, NSERC partnered with a team at Toronto Metropolitan University (TMU) to offer the NSERC Lab2Market Pilot grant within the suite of I2I grants as an alternative option to the Market Assessments grants. This grant provides research teams (i.e., researchers and students) with training, workshops and mentoring that gives them the chance to assess the commercial potential of their technologies and gain a better understanding of the business side of commercialization. Because this is a pilot program with objectives that are complementary, but different than those of the other I2I grants, the evaluation findings related to the NSERC Lab2Market Pilot grant are not included in this report. A separate review of the NSERC Lab2Market Pilot grant can be found in [Appendix D](#).

## 1.2 Grant Selection Process

NSERC offers four I2I competitions per year in January, April, June and September. The selection process assesses the scientific and commercial potential of the proposed technology and the applications' fulfilment of the selection criteria.

Market Assessment applications are reviewed by members of the I2I team, while applications for Phase I and Phase II grants are reviewed by external reviewers and a selection committee (SC). External reviewers are recruited by the I2I team for their scientific/technical knowledge and/or practical experience in the research field and come from the Canadian academic community. For each application, the I2I team attempts to involve at least three external reviewers who provide their feedback for consideration by the SC. The SC is comprised of individuals from various sectors who have expertise in business, marketing, academic and industrial project management, and technology transfer. The SC members use the external reviewers' reports on the technical aspects, feasibility, and novelty of the proposed projects to evaluate the scientific merit of the applications. Funding decisions are based on the commercial opportunities presented, the projects' potential to achieve its ultimate objectives of transferring the technologies to the market through Canadian companies or creating new companies. On average, the I2I SC issues its funding recommendations within 11 weeks after the application deadline.

When an application is rejected, the reasons are stated in the decision letter sent to the applicant. If an applicant wishes to resubmit a rejected application, they must contact the I2I team to discuss the feedback and possibility of resubmission. The applicant must adequately address the items identified in the decision letter before resubmitting the application to NSERC. If the application was rejected because the proposed project was too early in the process of technology development, then resubmission is not possible unless the applicant can show that an appropriate level of progress has been achieved.

## 1.3 Monitoring and Reporting

There are a variety of reporting tools employed by NSERC to support the monitoring of I2I grants. For projects funded by a Market Assessment grant, an experienced professional (e.g., external consultant) is hired by the project team to conduct the study. The market assessment prepared by the consultant is submitted to NSERC by the ILO and/or the researcher as an end of grant report. All Phase I and II grant holders (i.e., researchers) are required to complete and submit a final report (developed by NSERC) at the end of their grant. Phase II grant holders must also submit a mid-term progress report, and the amount of the second funding instalment is negotiable and based on the need for funding as justified by the researcher in their progress report. The instalment also depends on whether the partner has met its project commitments and has confirmed its intention to continue supporting the project. As such, partners need to submit a letter confirming their continued support for the project. The partners also need to complete a final report at the end of the grant.

For all three types of grants, members of the I2I team will follow-up with researchers and partners by phone or in writing to learn more about whether the technology has been transferred to the market and ongoing commercialization activities. In addition, the ILOs are asked to complete a post-grant survey 18-months after the project ends for Phase I and Phase II grants. Table 2 provides an overview of the types of reports and follow-ups required for each grant.

**Table 2. Overview of reports and follow-up requirements for I2I grants**

Type of Grant	Type of report			
	Mid-term progress report	Final report	Post-grant survey 18 months after the project ends	Telephone Follow-up
Market Assessment	n/a	Available	n/a	Available
Phase I	n/a	Available	Available	Available
Phase II	Available	Available	Available	Available



## 2.0 About the Evaluation

### 2.1 Evaluation Objectives and Scope

The purpose of the evaluation is to provide NSERC with information to support learning and decision-making about the I2I grants. The evaluation also ensures that NSERC continues to meet its accountability requirements as per section 42.1(1) of the *Financial Administration Act* and the Treasury Board Secretariat's *Policy on Results (2016)*. Following the guidance of the *Directive on Results (2016)*, the evaluation considered issues of effectiveness, relevance and efficiency in relation to I2I grants. The evaluation also focuses on topics of interest to support future grant delivery such as the identification of lessons learned and best practices to grant implementation, and contribution of I2I grants within different phases of technology's maturity.

The evaluation focuses primarily on the last seven (7) years of operation of NSERC's I2I grants, from fiscal years 2016-2017 through 2022-2023 with strategic expansion for some lines of evidence to previous years (i.e., since fiscal years 2010-11) to explore how I2I grants have effectively met their long-term objectives. The evaluation does not include I2I participation from Canadian colleges, as few colleges applied for I2I grants and none received funding during the period of this evaluation.<sup>16</sup>

### 2.2 Evaluation Questions

This evaluation focuses on the four questions presented in Table 3, which align with the I2I Logic Model found in [Appendix A<sup>17</sup>](#). In particular, the evaluation focused on the contribution of the I2I grants within the Canadian research innovation ecosystem and the extent to which the design and delivery of the I2I grants support the achievement of their objectives and expected outcomes.

**Table 3. Evaluation Questions**

Outcome Area	Questions
Implementation and Efficiency	1. To what extent do the design and delivery features of the I2I program effectively and efficiently support the development of promising technologies and their transition to successful commercialization?
Effectiveness	2. To what extent have I2I grants contributed to the achievement of the immediate results associated with each I2I funding option?
	3. To what extent have I2I grants contributed to the transfer and adoption of innovations by partners and their successful uptake to market (new or established Canadian companies)?
Relevance	4. What niche does the I2I program occupy in supporting technology transfer within the Canadian innovation ecosystem?

The evaluation matrix is presented in [Appendix B](#) and identifies the indicators and data sources for each of the evaluation questions addressed by this evaluation.

### 2.3 Methodology

The evaluation of the I2I grants was conducted as a mixed-methods study which included both primary data and secondary data collection. The methodology incorporates the following key sources of information:

- A quasi-experimental survey to compare the experiences and project outcomes of successful and unsuccessful applicants to the I2I grants. Four hundred ninety-seven (n=497) researchers whose projects were funded by one or more I2I grants (i.e., successful applicants) were invited to complete the survey with 121 completing the survey for a 24% response rate. Two hundred thirty-two (n=232) researchers whose projects were not funded (i.e., unsuccessful applicants) were invited to complete the survey, with 48 completing the survey for a 20% response rate. The characteristics of respondents from both groups were representative of the overall sample of applicants for the I2I grants. The survey results are presented using a combination of both

inferential statistics and descriptive data, depending on the number of answers to the specific survey questions. No inferential statistics were conducted for questions eliciting fewer than 10 responses<sup>18</sup>.

- A series of key informant interviews (KIIs) with both 11 internal (e.g., I2I program staff, NSERC senior management, and SC members) and 25 external (e.g., ILOs, partners) program stakeholders were conducted to further examine and understand certain components and context of the I2I grants. Findings from the KIIs are presented using qualifiers such as “a few”, “some”, “majority/most”, “all/almost all” to describe the data and a detailed description of the scale is provided in [Appendix C](#).
- A set of six case studies of funded projects deemed to be successful as the technology was or is on its way to being commercialized. The case studies examined the long-term impacts of the I2I grants using document reviews, website scans, and interviews with researchers, ILOs, trainees, and/or partners. A total of 15 interviews were conducted across the six case studies.
- A literature review and environmental scan which explored the I2I grants within the larger context of grants available to support the commercialization of research.
- A review of the I2I grants administrative data (funding application statistics, performance analysis data and financial information, progress and final reports from researchers, ILOs and partners) and available documents such as the logic model, previous evaluation report, or grant application instructions.

A total of eleven lines of evidence were used for this evaluation with detailed information about the data collection, analysis and synthesis approaches in [Appendix C](#).

## 2.4 Limitations & Mitigation Strategy

Table 4 below presents the key limitations to the evaluation of NSERC’s I2I grants, and the mitigation strategies employed.

**Table 4. Evaluation Limitations & Mitigation Strategies**

Limitation	Mitigation
<b>Secondary Data Availability and Reliability.</b> The administrative data reviewed for this evaluation had several limitations including missing data, inconsistent use of terminology across reports, changes to report metrics over time, multiple reporting formats, limited data.	Findings from the secondary data review were triangulated with other lines of evidence to ensure validity and consistency of results.
<b>Case studies potential respondent bias due to limited representation for some groups (i.e., partners and trainees).</b> Identifying and capturing the perspectives of all stakeholder groups involved in grant distribution was a challenge for the case studies, in particular for the partners and the trainees. This was partially due to the length of time between receipt of grant and this evaluation. As NSERC did not have the contact information for the partners and trainees, the case studies used a snowball approach to recruit these participants to be involved in interviews. That meant the researchers participating in the case studies provided the contact information for the partners and the trainees involved in their projects.	Findings from the case study were primarily used as illustrative examples aligned with data from other lines of evidence. A document review was conducted in tandem with interviews to attest to validity of information provided by key stakeholders.

Limitation	Mitigation
<p><b>Survey sample size and the statistical validity:</b> The survey sample size for some of the grants (i.e., market assessment and Phase II) was quite low for both funded and unfunded researchers. This limited the extent to which the survey findings could be disaggregated and presented across the different grants and impacted the survey statistical validity. Statistical validity is the degree to which conclusions about relationships in the data are reasonable and in agreement with statistical analyses. A potential threat to statistical validity is finding a relationship when there is not one (Type I Error or "seeing things that aren't there") and finding no relationship when there is one (Type II Error or "overlooking or missing something"). Small sample size of both surveys of funded and unfunded researchers limited the power of statistical significance tests. In addition, the skip logic of the survey limited further the number of the responses to specific questions. As such some of the questions in the survey had low response rates and the results could not be presented separately.</p>	<p>No inferential statistics were conducted for questions eliciting fewer than 10 responses.<sup>19</sup> Where possible, the n-values are incorporated throughout the report to encourage transparency of findings even with low sample sizes for some survey questions.</p> <p>Various data sources and multiple lines of evidence (secondary data review, interviews and case studies, in addition to survey data) have been utilized to triangulate the findings and ensure their validity.</p>

3.0 Evaluation Findings

3.1 I2I Within the Canadian Research Innovation Ecosystem

Key Findings

NSERC’s I2I grants operate within the Canadian research innovation ecosystem, a dynamic landscape in which diverse stakeholders work collaboratively to produce the expertise, funding, and information needed to translate innovative ideas into technologies that can be transferred to the market. The evaluation revealed a few perceived trends in the ecosystem such as a shift away, starting the early 2000s, from basic research towards funding of applied research within NSE sectors. More recently, the Bouchard Report (2023) noted there is also an increasing fragmentation of funding for research commercialization in Canada with an ongoing funding gap in the absence of additional federal support. In addition, there is a perception that Canadian companies are unwilling to act as receptors for the commercialization of research technology, and that spin-off companies are an easier pathway to bring a technology to market.

Within this changing landscape, I2I grants continue to be relevant and responsive to federal priorities and the needs of the Canadian research innovation ecosystem. For instance, the grants, and in particular the Phase I grant, specifically address the funding gap referred to as the “Valley of Death”, where support is needed to move academic research towards proof of concept and early-stage technology development. The Phase I grant is one of few options for early-stage research commercialization funding within the Canadian research innovation ecosystem that addresses early-stage technology commercialization stemming from academic research and more early-stage research generally, that does not require matching funds from a partner and is nationally available for all NSE disciplines.

The steady or increasing number of applications received annually by NSERC between 2016 and 2022 suggests that the I2I grants continue to have a place in the research funding environment. Given that they address a gap in funding, Phase I grants were the most sought-after, representing almost seventy percent (68 %) of all applications received for I2I grants. The Market Assessment grants also appear to be valued by the academic research community, representing 27% of the I2I applications received.

During the period under evaluation, there was very low uptake of the Phase II grants, which represented only 5% of the total applications for I2I grants. It has to be acknowledged that the Phase II grants are unique in the sense that they are providing funding for researchers who need a partner to support their technologies, whereas there are other funding opportunities available for Canadian companies at this stage of the commercialization process. A lack of Canadian companies to act as receptors to help researchers with the partnership requirement for this grant and the perception that using a spin-off would not be eligible for a I2I Phase II grant could contribute to the low uptake.

Given the unique objectives and placement of each grant type along the pathway to commercialization, their relevance should be examined both as individual entities and within the suite of I2I grants. The ability for the I2I grants to remain relevant within the Canadian innovation ecosystem is dependent on a continued need for funding within this space, the successful use/operationalization of the grant by its target audiences (i.e., researchers, ILOs, partners), and the extent to which the grants can support the development and commercialization of Canadian research.

### 3.1.1 I2I in a Changing Canadian Innovation Ecosystem

NSERC's I2I grants operate within the Canadian research innovation ecosystem, a dynamic landscape in which a diversity of stakeholders work collaboratively to produce the expertise, funding, and information needed to translate innovative ideas into technologies on the market. This ecosystem is dynamic and changes to key players, targeted sectors, policy shifts, and focus areas can influence funding initiatives that influence the commercialization pathway. The evaluation explored the evolving the Canadian research innovation ecosystem through interviews, surveys with funded and unfunded researchers, an environmental scan and a literature review to determine current needs of I2I stakeholders and relevance of the I2I grants.

#### **Funding: fragmentation and a shift from basic to applied research**

Some of the literature points to a perception of a shift within the Canadian research innovation ecosystem with increasing emphasis on funding applied research and away from basic research within NSE sectors.<sup>20, 21</sup> Another study shows that business willingness to support fundamental, basic research appears to have diminished as they prioritize applied research with clear commercial viability.<sup>22</sup> This shift started in the early 2000s and is driven by a stronger emphasis on research partnerships between post-secondary institutions and the private sector<sup>23</sup> and may be the result of expectations that such partnerships facilitate the commercialization of research with a focus on growing Canada's competitiveness in national and international markets. Like other industrialized countries, the Government of Canada has given priority to better translating the knowledge production capacity of post-secondary institutions for greater economic and social benefits. In the last two decades, this has led to changes in law, funding structures and academic research institutions. For example, patent applications, partnerships with industry and commercialization have since become common practice in universities<sup>24</sup>.

More recently, the Bouchard Report (2023) on the Federal Research Support System highlights a fragmentation across the Canadian research funding system which limits opportunities to foster commercialization activities and inhibits the capacity to set forward-looking strategic direction for science, research and innovation<sup>25</sup>. The report describes the fragmentation across the system, with granting councils and several other organizations often assigned with similar but uncoordinated mandates many of which are sub-scale and minimally resourced. This has contributed to significant gaps in research support which made it more difficult to fund certain types of initiatives that fall between or outside programs or organizational mandates, including (but not limited to) interdisciplinary research, mission-driven research, ambitious international programming, and pre-commercialization activities.

#### ***Limited Commitment by Canadian Companies***

Various reports examining the state of R&D in Canada show that despite Canada's strength in research and increased efforts to further support the commercialization of research, Canada is not as successful as its international counterparts when it comes to turning research into technologies with concrete economic and social impacts<sup>26, 27</sup>. Canada's R&D landscape stands out among OECD countries due to a large share of research carried out in the higher education sector, but low levels of investment by business for R&D. The latter is below the OECD average<sup>28</sup>. As a result, Canada's overall research competitiveness has declined in recent decades<sup>29</sup>. Several explanations provided by key informants and the literature as to why Canadian businesses underinvest in the commercialization of research technology include; a lack of competitive pressures, protective regulatory regimes, and a risk-averse business culture.<sup>30</sup>

Not only are Canadian businesses not investing in the R&D, but some key informants and case study participants also indicated that there is a lack of Canadian businesses willing to act as receptors for research technology to be commercialized; thereby limiting opportunities to bring such technologies to market. This unwillingness is attributed to a perception that Canadian businesses are reluctant to assume the risks that are often associated with research commercialization, which has led to challenges in finding partners for I2I funded projects. Some key informants further observed that these challenges have been exacerbated since the COVID-19 pandemic as potential partners appear to be increasingly more constrained in their spending and selective about investments in technology commercialization.

*“Even when we can identify potential Canadian licensees, honestly speaking they're not either a true leader in their industry in many cases, and so they may not be the best prone for technology in terms of the ability for it to have a strong impact and bring it to market. And also, a lot of these companies we just find really hard to convince them to license it. And even when they say they want to license it, you know, try to negotiate a fair license deal is just my own experience with Canadian companies is much more difficult than many other companies. They just don't seem to have that risk appetite that you find in the U.S.”*

— Key Informant

**Increased Creation of Spin-offs<sup>31</sup>**

Many key informants shared their perception of a notable increase in the use of spin-off companies within Canada’s research innovation ecosystem. Survey results support this assessment with almost half of funded and unfunded researchers who were past the market assessment stage (44%, n=95) indicating that they applied to I2I with the intent to start a company. In particular, key informants highlighted spin-offs as a commercialization pathway used by an increasing number of researchers in post-secondary institutions in response to the limited number of Canadian companies willing to invest in R&D or act as receptors to support technology advancement. As explained previously, there is a perception that Canadian companies are not willing to assume the risks associated with commercializing a technology and evaluation findings suggest that researchers and the institutions where they work with are more willing to take on those risks to support the commercialization of research.

*“I think there's a perception that it's difficult in Canada to find partners who are willing to take risks, at least that's perception. I don't know that may be changing. It's why we tend to work with a lot of startups because they're willing to take more of the risks”.*

— Key Informant

**3.1.2 Alignment with Federal Priorities**

In 2002, the Government of Canada published its Innovation Strategy, which emphasized the commercialization potential of federally funded university research.<sup>32</sup> Following the strategy, the Government has continued to support this commercialization potential through ongoing investments for R&D and transferring research products to the market, as reflected in various federal government budgets (e.g., Budget 2022, Budget 2024). Moreover, a number of federal initiatives have been created over the years with the intent to strengthen the collaboration between Canadian post-secondary institutions and private sector companies to work together more strategically to tackle innovation challenges and create a shared competitive advantage. etc.<sup>33</sup> Examples of such initiatives include the Centers for Excellence for Commercialization in Research (CECR) launched in 2007, Global Innovation Clusters (GIC) in 2022, NSERC Alliance Grants in 2019.

NSERC’s mission is to “nurture the discoveries and innovations that advance knowledge, improve the lives of Canadians and transform the world for the better.”<sup>34</sup> A key mechanism to achieving this mission is illustrated in one of the pillars of NSERC’s 2030 Strategic Plan, which is to "Translate Discovery into Impact". Through this pillar, NSERC fosters collaboration between researchers and key partners in the private, public and not-for-profit sectors that stretch beyond the lab to effectively establish new knowledge and technologies, and drive commercialization within Canada and the global community for results that span social, environmental, and economic benefits. I2I grants were found to support these NSERC priorities and align with the agency’s purview to foster opportunities for innovative R&D and to enhance collaboration between academia and industry, leveraging capacity in academic research excellence. In particular, the Phase I grants help with supporting NSERC priorities within the federal funding landscape by focusing on early-stage research technology development.

**3.1.3 Demand for I2I Grants**

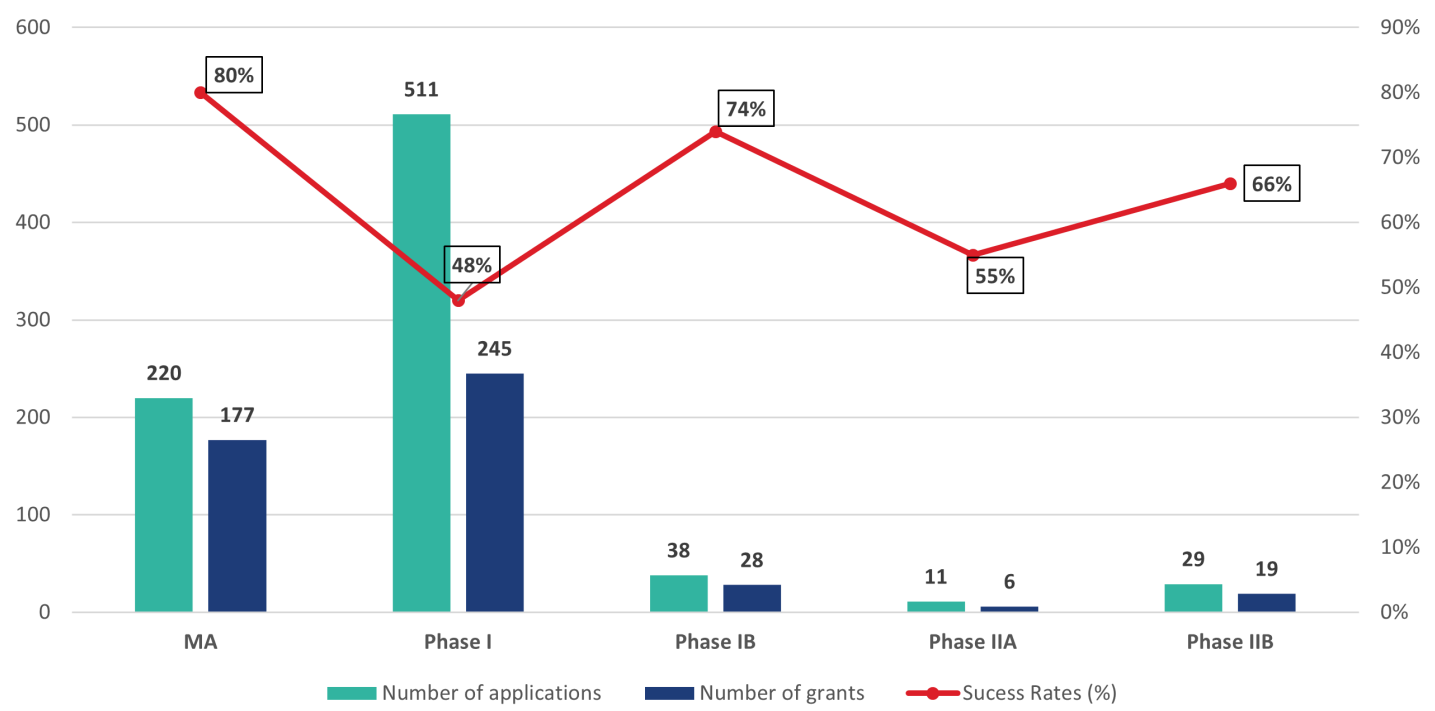
For the period of 2016-17 to 2021-2022,<sup>35</sup> NSERC’s I2I program received 809 applications. On average NSERC received 135 applications each year, ranging between 110 and 168 (Table 5).

**Table 5. Distribution of I2I Applications by Fiscal Year and Phases (2016-17 to 2021-22)**

Program Phases	Phase I	Phase IB	Phase IIA	Phase IIB	Market Assessment	Total
Fiscal Years	Number of Applications					
2016-2017	92	11	1	5	28	137
2017-2018	80	6	2	3	33	124
2018-2019	82	10	1	6	40	139
2019-2020	64	2	1	2	41	110
2020-2021	84	5	2	4	38	133
2021-2022	109	4	4	10	41	168
Total	511	38	11	29	220	809

Of the 809 applications received, 475 grants have been awarded for an overall success rate of 59%. This demonstrates that interest in I2I grants remains higher than the number of applications that receive funding. Most of the applications were received for Phase I grants (68%), followed by Market Assessment (27%) and Phase II grants (5%). The highest success rate<sup>36</sup> is represented by the Market Assessment grant (80%) and lowest by Phase I (48%). Most of the grants were awarded for Phase I (58%), followed by Market Assessment (37%) and Phase II (5%).Figure 1 depicts the number of applications and grants awarded as well as the success rates by type of grant.

Figure 1. I2I Applications, Grants and Success Rates by Type of Grants (2016/17 to 2021/22)



Source: I2I administrative data

▼ Text description of figure 1

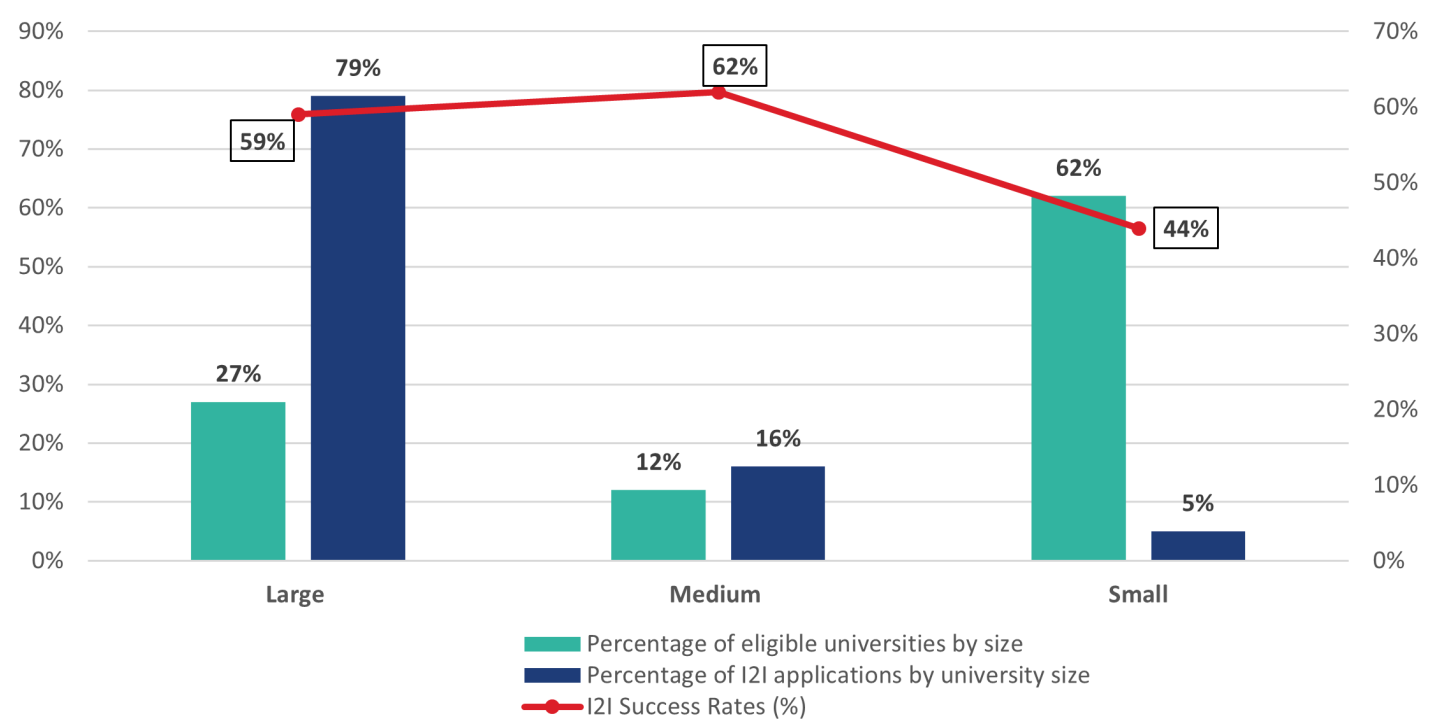
Type of grant	MA	Phase I	Phase IB	Phase IIA	Phase IIB
Number of applications	220	511	38	11	29
Number of grants	177	245	28	6	19

Type of grant	MA	Phase I	Phase IB	Phase IIA	Phase IIB
Sucess Rates (%)	80%	48%	74%	55%	66%

Notable trends in I2I funding based on the administrative data for the grants include:

- Most grant applications were received from researchers at large universities (79%) compared to medium (16 %) and small (5%) universities.<sup>37</sup> For the period of this evaluation, no applications were received from researchers working at a college. As illustrated in Figure 2, when comparing these proportions with the distribution of NSERC’s eligible universities<sup>38</sup> it appears that researchers at large universities are overrepresented as applicants for the I2I grants (79% of I2I applicants vs 27% of eligible institutions) and researchers working at small universities are underrepresented (5% of I2I applicants vs 62% of eligible institutions). The results are significantly different by university size.<sup>39</sup> There were no significant differences for success rates by university size.

Figure 2. I2I Grants Applications’ Distribution and Success Rates by University size (2016/17-2021/22)



Source: I2I Grants administrative data

▼ Text description of figure 2

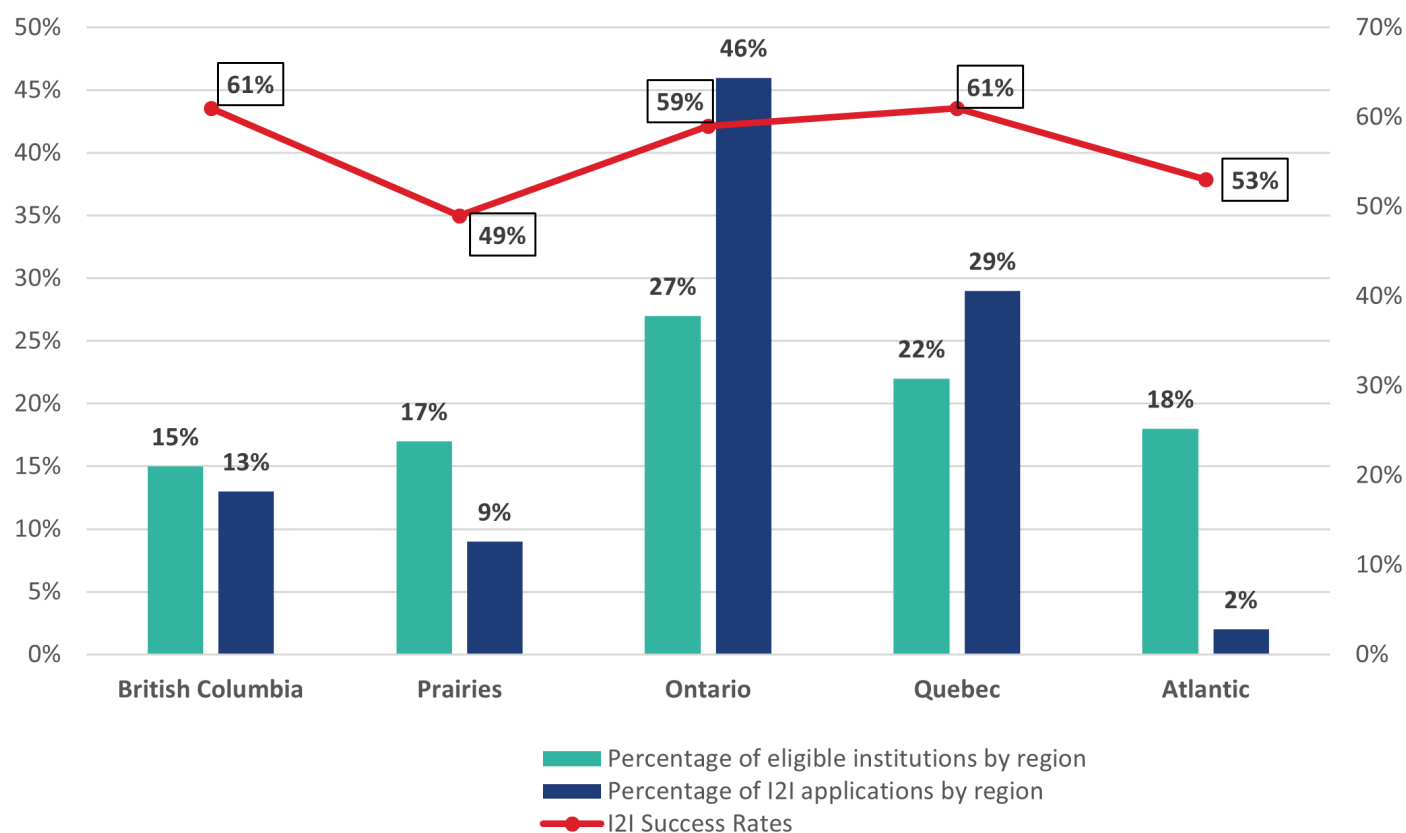
Size of the University	Large	Medium	Small
Percentage of eligible universities by size	27%	12%	62%
Percentage of I2I applications by university size	79%	16%	5%
I2I Success Rates (%)	59%	62%	44%

- When comparing the distribution of I2I applications and eligible institutions by region (Figure 3), most applications were received from central Canada, specifically Ontario (46% of I2I applications vs. 27% of eligible institutions) and Québec (29% of I2I applications vs. 22% of eligible institutions). It also appears that I2I applicants are under-represented within Atlantic Canada (2% of I2I applications vs. 18% of eligible institutions) and the Prairies (9% of I2I applications vs. 17% of eligible institutions). The

proportions for each group for the region of British Columbia are relatively similar at 13% for I2I applications vs. 15% of eligible institutions. The results are significantly different by regions except for British Columbia where the results are similar.<sup>40</sup> No I2I applications were received from eligible institutions in the Northern Territories. There were no significant differences for success rates by region.

- Eleven percent (11%) of applications for I2I grants were submitted in French which is consistent with the fact that 11% of the applicants' indicated that their preferred language of communication was French.
- At the time of this evaluation no equity, diversity and inclusion (EDI) data related to the I2I grants was available as this data was not yet collected.

**Figure 3. I2I Grants Applications' Distribution and Success Rates by Region (2016/17- 2021/22)**



Source: I2I Grants administrative data

#### ▼ Text description of figure 3

Region	British Columbia	Prairies	Ontario	Quebec	Atlantic
Percentage of eligible institutions by region	15%	17%	27%	22%	18%
Percentage of I2I applications by region	13%	9%	46%	29%	2%
I2I Success Rates	61%	49%	59%	61%	53%

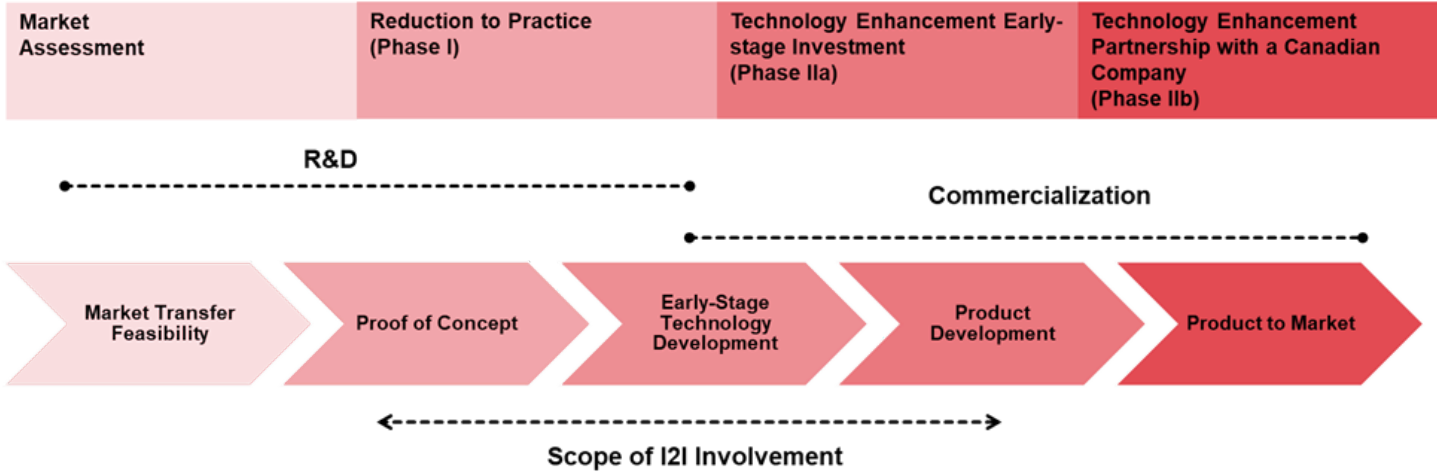
### 3.1.4 Supporting Research Through Different Phases of Commercialization

The I2I grants are dedicated to early-stage investments that support the maturity of a technology through R&D activities from proof of concept toward product development and commercialization (Figure 4). There are several paths that an emerging innovation may take as part of the commercialization process, however, an initial assessment of the market is usually undertaken. The market feasibility can be conducted using an I2I Market Assessment grant. If the assessment confirms a potential market, activities then



shift to the “reduction-to-practice” which is supported by Phase I grants, when researchers and partners typically start collaborating to work on the innovation together. During this stage, as the R&D activities progress and reach a certain threshold of maturity (i.e., proof of concept), researchers start working on the disclosure process and explore appropriate intellectual property (IP) protection. Following this phase, if early-stage technology development advances well, the commercialization process continues with partners leading along the researchers, the technology enhancement through Phase II grants to create a product, service, or process that can successfully be marketed. A full market deployment concludes the commercialization process, and any profits are distributed according to the agreement signed between the project stakeholders. The I2I grants address the gap sometimes referred to as the “Valley of Death”, which is typically categorized as a financial limitation, where support is needed to move academic research towards proof of concept and early-stage technology development.<sup>41, 42</sup>

Figure 4. I2I Grant Support for Technology Development & Commercialization



▼ Text description of figure 4

The figure describes how the I2I funding opportunities align with the commercialization process:

- First line describes the I2I funding opportunities: Market Assessment, Reduction to Practice (Phase I), Technology Enhancement Early-Stage Investment (Phase II-a) and Technology Enhancement Partnerships with a Canadian Company (Phase IIb)
- Second line describes the phases of the commercialization process: Market Transfer Feasibility, Proof of Concept, Early-Stage Technology Development, Product Development and Product to Market.

**Market Assessment (MA)**

Research stresses the importance of market knowledge and suggests a positively correlated relationship between market assessments and commercialization success.<sup>43, 44</sup> The I2I Market Assessment grants appeared to be a unique and useful tool within the Canadian research innovation ecosystem and survey findings indicate they are most often used to provide information about opportunities for spin-off creation or to learn more about market potential. For instance, market assessments can help researchers determine whether there is a market for their technology and if it is worthwhile to pursue commercialization. Survey findings indicate that the results of a market assessment typically suggest a technology either needs more development or that commercial success is unlikely. The majority of survey respondents (83%) noted feeling that the Market Assessment grants were useful to their commercialization endeavors. Findings from key informant interviews suggest that smaller universities benefit the most from this grant, especially as the funding supplements the internal resources and expertise of the ILOs by bringing on a third-party consultant to conduct the market assessment and write the assessment report.

Some key informants identified the Market Assessment grant as a required pathway within their ILO when a researcher applies for a I2I Phase I or Phase II grant. However, administrative data for the I2I grants indicates there is no statistically significant correlation between receiving an I2I Market Assessment grant and attaining a subsequent I2I grant for the same technology. Consequently, completing a market assessment funded by an I2I grant does not increase the chances of receiving future funding. As such the market assessment study requirement could be achieved through other mechanism besides the I2I Market Assessment grants.

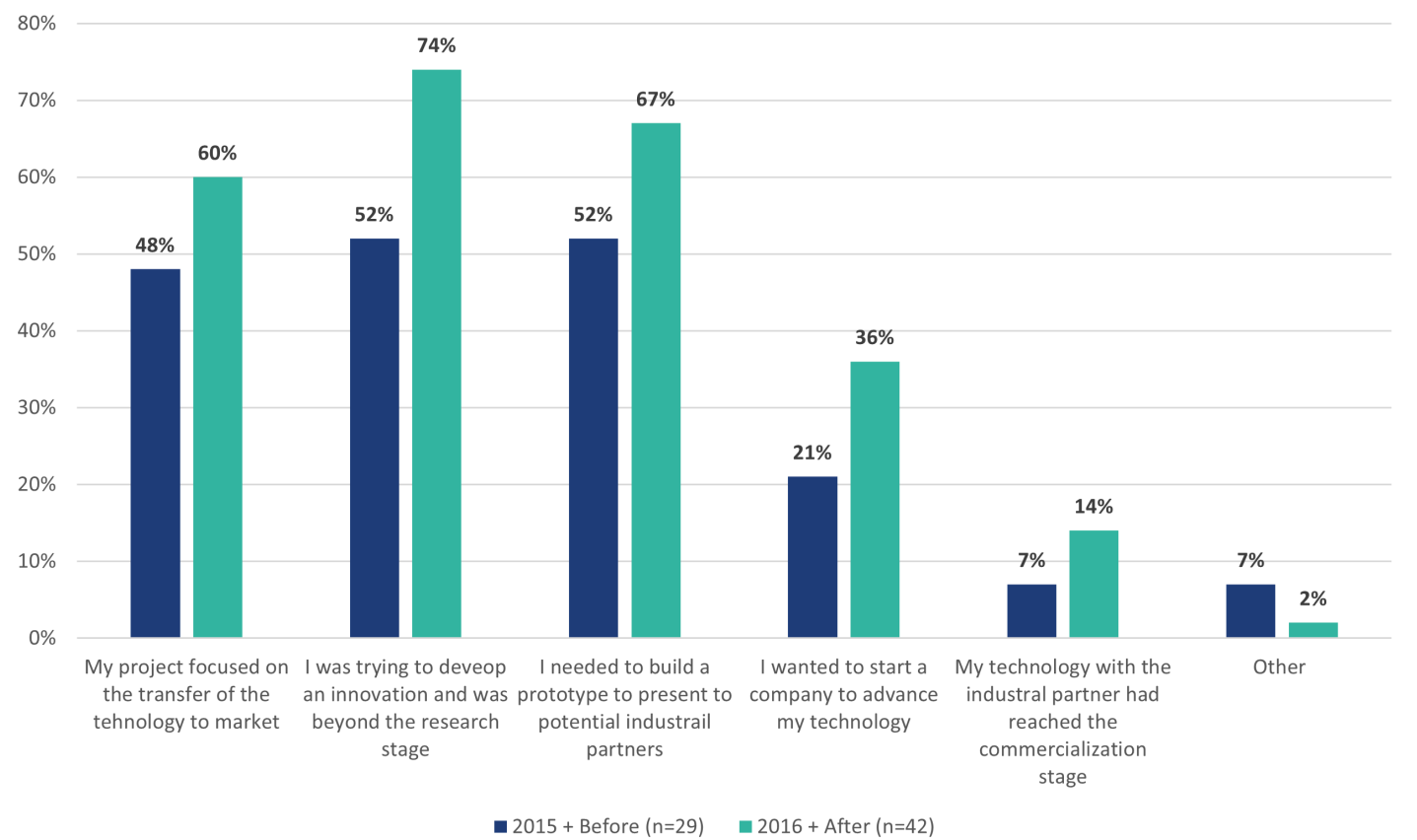
NSERC support for innovation through its I2I Market Assessment grants is in line with its mandate to promote and assist researchers in the NSE and ensure high quality projects to be able to support their innovations. <sup>45</sup>

*Phase I (Reduction-to-Practice<sup>46</sup>)*

The I2I Phase I grant is one of a few options for early-stage research commercialization funding within the Canadian academic research innovation ecosystem that addresses early-stage technology commercialization, that does not require matching funds from a partner and is nationally available for all NSE disciplines. Given its uniqueness, Phase I grants have been the most sought-after within the I2I grants portfolio, representing almost seventy percent (68 %) of all applications and over half of the awarded grants (58%).

Funded survey respondents indicated that they primarily applied for a Phase I grant with the intention to develop a technology or a prototype. When examining the differences between researchers who were funded during (e.g., since 2016) (n=42) and prior (i.e., 2015 and earlier) (n=29) to the period of the evaluation, a higher proportion of survey respondents from the former group indicated applying for Phase I grants to support multiple diverse reduction-to-practice components (74% vs 52%) and to start a company to advance their technology (36% vs 21%) (see Figure 5).

**Figure 5. Reasons to Apply to Phase I Grants, Comparison Before/After 2015-2016**



Source: Survey of Researchers. Note: This was a multiple-choice question.

▼ Text description of figure 5

Resons to apply to Phase I grants	My project focused on the transfer of the tehnology to market	I was trying to deveop an innovation and was beyond the research stage	I needed to build a prototype to present to potential industrail partners	I wanted to start a company to advance my technology	My technology with the industrial partner had reached the commercialization stage	Other
2015 + Before (n=29)	48%	52%	52%	21%	7%	7%
2016 + After (n=42)	60%	74%	67%	36%	14%	2%

This points to an increased need for funding that can support multiple aspects of technology readiness and suggests Phase I grants are being used as a steppingstone to commercialization with the intention for technology development and movement beyond the research stage.

### ***Phase II (Technology Enhancement)***

Very few funding opportunities in the Canadian research innovation ecosystem were available for researchers in later stages of technology development, with I2I Phase II being the only one nation-wide that is open to all NSE domains. Despite addressing a specific niche for researchers seeking funding further along the commercialization pathway, the Phase II grants have received very few applications compared to other I2I grants, with only 40 applications (5% of the applications) between 2016-17 to 2021-22. Additionally, few Phase I funded projects (9%) apply for a Phase II grant, although it is important to keep in mind that this is not an expectation for funded projects. The low application rates for Phase II grants may be due to the challenges surrounding commercialization in Canada such as lack of interest and investment by potential partners (i.e., receptor companies), which makes it difficult for researchers to access matching funds as required. It may also be linked to the grants available for small and medium enterprises (SMEs) (e.g., National Research Council – Industrial Research Assistance Program) and spin-offs (e.g., Business Benefits Finder powered by Innovation Canada) to support later stages of research commercialization as they may be a more popular option for similar projects. In particular, this may be the case for projects that involve a spin-off given the increasing trend to use this pathway for technology transfer and the perception among some key informants and case study participants that efforts to transfer technology to the market using a spin-off would not be eligible for a I2I Phase II grant (see section 3.3.2).

Speaking to the particular niche that Phase II grants address, some key informants felt the Phase II I2I grants were relevant to respond to the need for de-risking research technology with a connection to industry that can facilitate understanding market demand when developing a product. The quote below illustrates this perceived benefit of the Phase II grants:

*“[...] with I2I this project is directly involved in the development of a product. This is a pretty good model compared to all the other opportunities out there. [...] There's a lot of exciting things happening in business and science, but professors, of course, have their own thing that they want to do. And so, unless they're forced, they're not going to [align with what the industry needs].”*

— Key Informant

Overall, the low uptake for Phase II and the increased interest from researchers to use the spin-offs as a pathway for commercialization points to possible opportunities to explore the relevance of this grant in the context of the current commercialization landscape.

## **3.2 Support for Promising Innovations**

### **Key Findings**

The commercialization process is not linear; however, there are typically key activities that help move research technology towards the market such as creation of intellectual property (IP) or the attraction of partners. I2I grants have been successful in helping researchers protecting their IP, with most I2I funded researchers filing for patents and attaining patent protection by the end of their grant. Also, the protection of IP was higher for funded I2I projects (68%) compared to unfunded projects (29%).

I2I funded projects have been also successful with their partnerships and able to attract different types of contributions from their partners and other organizations such as financial contributions, in-kind resources, and business-related supports (BRS). Following the end of the grant, most partners (70%) remained connected with the technology and many projects (57%) managed to attract contributions from new partners. While not required, almost a third of Phase I funded projects (30%) received in-kind and/or financial contributions from the partner organization that supported their grant application. It was found that such contributions fostered partnership engagement. However, it was suggested that such contributions during Phase I grants should not be mandatory as it could increase the risk of committing the IP too early or present challenges for smaller companies that may not have such resources to commit to a project.

Researchers that received I2I funding primarily accessed BRS for business acumen or contact with industry networks. Sources that provided BRS for I2I funded projects were most often university incubators, private companies, and academic institutions. Evidence suggests that more BRS are available at larger institutions compared to smaller institutions with potentially smaller networks or less access to resources (e.g., incubators).

Student involvement in I2I funded projects and the training they received were identified as positive outcomes of the grants. Moreover, students provided valuable contributions to I2I funded projects with the majority of survey respondents whose project was funded by I2I (62%) indicating that the availability of students to support the project was an important factor for its completion. While most of the I2I projects involved students (all Phase I projects and 70% of Phase II projects), it was also noted that student participation may sometimes be challenging for I2I funded projects given the time required to train students, particularly in commercialization-related activities, as well as student availability and the availability of funds to pay students for their time. In the latter case, it was noted that due to the rising costs of research and commercialization, I2I grant funds may not stretch as far as they used to and there may not always be enough funds to cover the cost of hiring one or more students.

Commercialization is a long and complex process that requires considerable investment (financial and other contributions) to support a successful outcome. Findings from the literature review show that the more investments made to support the commercialization process the greater the likelihood the technology will be successfully transferred to the market.<sup>47</sup> In addition to investments, other key activities also help move the research technology to the market including the protection of intellectual property (IP) and the attraction of partners, who often provide the necessary investments.

While NSERC, and specifically the I2I grants play an important role in providing financial investments that support researchers as they embark or continue their commercialization journey, a variety of factors outside of the agency's control can impact commercialization outcomes. Within this purview, evaluation data does suggest that I2I grants support promising innovations in their trajectory towards the market. This section of the evaluation report explores outcomes pertaining to IP and partnership achievements, particularly related to the Phase I and II grants which focus on driving the commercialization of technology.

### 3.2.1 Obtaining Intellectual Property (IP) Protection

IP protection is often considered an important step towards commercialization and a Canadian survey in 2019 found businesses that owned IP credited it with improving their success in some capacity, usually associated with increased competitiveness.<sup>48</sup> Canadian universities employ a variety of different IP policies in relation to technologies developed by researchers, ranging from creator-owned to institution-based ownership, with most adopting a hybrid of the two.<sup>49</sup> The variability of the IP policies across universities and the fact that there are no standardized rules that govern such policies has been mentioned by the literature as a challenge for the commercialization of research in Canada.<sup>50</sup>

Despite the variation in IP policies, NSERC requires that projects funded with an I2I grant have their IP owned by an institution's ILO or equivalent, and an IP strategy is required for applications for the Phase I and Phase II grants. According to a few key informants and case study participants, the requirement that the IP should be assigned to the institution/ILO in order to receive an I2I grant may create apprehension for some researchers and stop them from applying for an I2I grant as they do not want to lose the ownership of their technology. Such instances were noted as being particularly likely when researchers intended to use a spin-off pathway for transferring their technology to market as the ownership resides with the researcher. As shown in section 3.1.1., spin-offs are becoming a preferred option for research commercialization because of the lack of available partners (i.e., receptor

companies). However, the I2I requirements for IP ownership are also perceived as hindering this commercialization pathway. Additional complexities with the IP requirements of the I2I grants identified by a few key informants and case study participants were related to navigating IP ownership when students are directly involved in creating a new technology.

Despite the challenges related to the IP requirements of the I2I grants, the evaluation found that the I2I grants helped funded projects obtain IP protection for their technologies. For instance, some key informants believed that the I2I grants increased the likelihood of a technology obtaining protection because some of the funds could be transferred to the institution's ILO and be used to cover the costs of IP; thereby, increasing the likelihood that the institutions will submit an application for the protection of IP.

The administrative data from the I2I researchers' final reports show that the majority of funded projects (71%) had filed for one or more patents by the end of their grant, and both administrative and survey data suggest this percentage may increase slightly following the grant (up to 88%). Additionally, most funded projects obtained IP protection (68%, n=90), compared to 29% (n=21) of the unfunded projects with this difference being statistically significant.<sup>51</sup> A few of these funded projects also had filed a Patent Application and/or Provisional Patent Application (PPA) (19%). Projects that filed for patents by the end of the grant were more likely to file in the US (average 1.4 patents/project) compared to Canada (average 0.93 patents/project). Survey data show a similar trend with respondents whose projects received I2I funding indicating that they were more likely to file for patents outside of Canada (average 1.4 patents/project) than within Canada (average 1 patent /project).

When comparing funded and unfunded projects, the survey findings indicate that projects funded with an I2I grant were more likely to obtain IP protection for their technologies compared to unfunded projects, with this difference being statistically significant.<sup>52</sup> As an example, the majority (69%) of projects funded with a Phase I grant (n=68) obtained IP protection for their technology compared to only 24% of projects that applied for but did not receive a Phase I grant (n=17). Survey respondents of funded projects also reported having more patents outside Canada, as well as Canadian trademarks and non-disclosure confidentiality agreements, compared to unfunded survey respondents; however, the differences were not statistically significant. There was a notable difference between the average number of patents obtained by survey respondents of funded projects, at an average of 4.8 patents per project compared to an average of 1.9 patents per unfunded project. It is important to note that some key informants indicated IP can be in place before I2I funding is obtained, which may contribute to this difference between funded and unfunded projects. Some key informants had the perception that the selection committee members favored applications for which IP protection was already obtained before funding a project. At the time of the evaluation, data regarding the proportion of I2I applications with IP already obtained for the technology was unavailable. Consequently, it is not possible to determine if applications for I2I grants were more likely to be funded if IP was already obtained or whether funded projects were more likely to protect their IP as a result of the I2I grant.

According to most key informants, commercialization activities (e.g., market research, patent consultations, and patent applications) for I2I projects are often conducted by technology transfer professionals within the institutions such as the ILO. The I2I administrative data validates the important role the ILOs play when it comes to IP by demonstrating a strong positive correlation between the number of patents filed for a technology from an I2I funded project and the institution's financial contribution ( $r=.679$ , p-value less than 0.001). This correlation suggests that IP and in particular patent filing may be hindered by the lack of institutional financial resources to support technology transfer. The role and support of the ILOs for commercialization activities was echoed by some key informants who indicated that it has become increasingly expensive to attain IP and that the ILOs are in a better position to apply for IP protection because they could use the I2I funds to support this process. It should be reiterated that I2I grants require that the IP is managed by the institutions' ILOs which have a commercialization mandate and are an important support for researchers wanting to transfer their technologies to market. A portion of the award may be used to co-support some of the activities undertaken by the ILO or its equivalent.

*"The I2I program gives us an increased chance to secure protection but also to secure quality protection by providing a little bit more funding for our External Council to spend drafting meaningful claims, looking at the prior submissions and so on. So, I think it increases securing intellectual property protection."*

— Key Informant

### 3.2.2 Partner Engagement<sup>53</sup> and Attracting Additional Contributions

#### *Partner Engagement*

Engaging and attracting partners (e.g., Canadian receptor companies) is important for the commercialization of research as such partners can help bring the technology to the market. Additionally, partners may be able to further facilitate the commercialization process by investing in the technology through financial contributions, in-kind contributions or BRS. Therefore, it is beneficial for

academic researchers to engage with these partners who can facilitate an understanding of the market and support various aspects of the pathway towards commercialization.<sup>54</sup> While, obtaining contributions from partners is a common step towards commercialization and can be indicative of progress, potential partners may be hesitant to provide contributions to early-stage technologies due to the large degree of associated risk and uncertainty.

Evaluation findings suggest that the I2I Phase I and Phase II grants support the engagement of partners for the commercialization of technologies developed by university researchers. For instance, during interviews with key informants and case study participants, the I2I grants were described as helping to foster relationships with partners at two key stages:

1. The application stage where potential partners are asked to provide Letters of Support (Phase I) and/or the creation of a dedicated commercialization strategy (Phase II) to help projects build a more concrete plan for market transfer.
2. The implementation stage during which a technology can be situated within the context of a potential market to be developed/de-risked (Phase I) or enhanced/scaled-up (Phase II) to produce a more realistic and marketable product.

I2I administrative data from the researcher's final reports illustrate that all Phase II partners who contributed matching funds to a project (n=30) exhibited some form of engagement during the grant with 73% of partners being engaged to a great extent, and 27% of partners being engaged to some extent. Examples of engagement include project management (e.g., consultations, discussion of project) and in-kind contributions (e.g., time, facilities). Interestingly, the administrative data from the researchers' final reports also showed that many of the partners who wrote a letter of support for a Phase I funded project (70%, n=134) were also engaged in various ways throughout the projects by offering consultations, training, facilities, and even providing financial and in-kind contributions. For instance, almost a third (30%, n=134) of Phase I projects received either financial or in-kind contributions from their partners, even though such contributions are not required for this grant and discouraged by NSERC<sup>55</sup>. More specifically, financial support was received by 14% (n=134) of Phase I projects with an average of \$35,278. When asked about the potential for partner engagement during Phase I projects, several key informants and case study participants agreed that in-kind contributions could be seen as a method to support the development of the technology, bridge the gap between academia and industry and foster longer term investments from these partners. Many (66%) of the survey respondents with a project funded by a Phase I grant and having a partner writing the letter of support (n=68) also felt that engagement of partners during this grant would encourage lasting partnerships and most agreed it would support further development of their technology (72%) and its subsequent commercialization (63%). However, it was underlined by some key informants that any investments from partners during a Phase I grant should not be mandatory or involve financial support as this was perceived to increase the risk of committing IP too early in the research development process and may present challenges for smaller companies who have limited resources. The demonstrated level of engagement from partners during Phase I grants may point to an interest from and opportunity for partners to be further involved during technology development.

Partner engagement demonstrated throughout the Phase I and Phase II grants was also often found to be sustained over time as shown by the survey data. For example, it was reported by survey respondents in a majority of funded projects, that at least one partner continued to be engaged following the end of the Phase I (68%, n=68) or Phase II (66%, n=9) grant. Partners of Phase I funded projects would often continue to provide BRS and in-kind contributions, such as staff time or access to equipment, whereas partners of Phase II funded projects tended to provide additional financial as well as in-kind contributions (Table 6).

**Table 6: Partners Remaining Involved with the Project**

Program Phase	Phase I		Phase II	
	N	%	N	%
Numbers and percentages				
Provided financial contributions	20	43%	5	83%
Provided in-kind contributions (e.g., staff time, access to equipment)	34	74%	5	83%
Provided business-related supports	33	72%	3	50%
Other <sup>56</sup>	3	7%	3	50%
<b>Total</b>	<b>46</b>	<b>100%</b>	<b>6</b>	<b>100%</b>

Source: Survey of Researchers

Some key informants and case study participants suggested that partners were more likely to remain connected to a project when technology transfer continues to the market with minimal delays while remaining aligned with the partner's interests. It was also suggested that increasing the engagement of partners during the grant by developing a strong connection to the researcher or meaningfully contributing to the project through financial and/or in-kind support would help build sustained relationships with partners following the grant, depending on the stage at which the project is along the commercialization process.

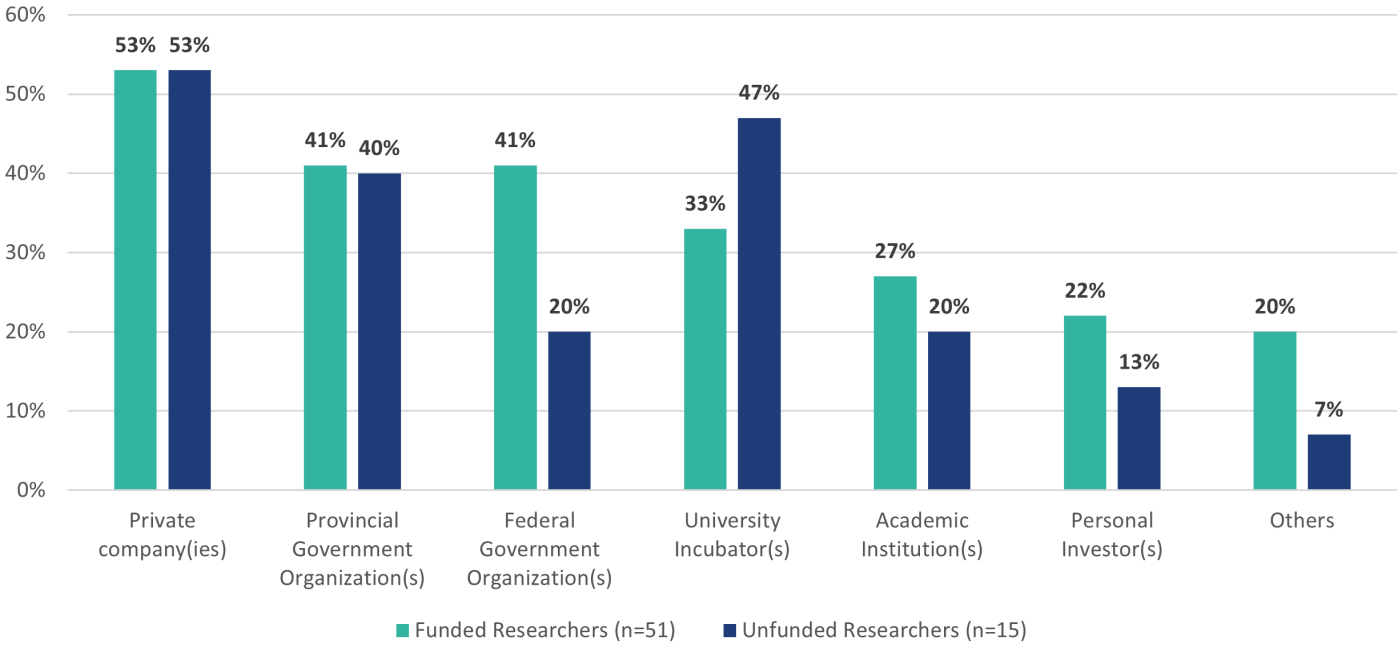
### ***Attracting Additional Contributions<sup>57</sup>***

Often, technology transfer is more likely to be successful if other investments are made over and above the funding received from the I2I grant(s) and from the partners that are initially involved with funded projects. This section refers to the additional financial contribution, in-kind support and BRS that the researchers received, following the end of the grant, from sources other than the initial project partners. When survey respondents of funded I2I projects were asked to estimate what proportion out of the total money obtained to bring the technology to market, did the I2I grant(s) represented, the majority of researchers who could estimate a proportion<sup>58</sup> (69%, n=86) indicated that the grant(s) represented less than half of the total funding required to bring their technology to market. Specifically, 23% (n=86) mentioned that the I2I grant represented 26% to 50% of the total money obtained to bring the technology to market and 46% (n=86) indicated that it represented 25% or less of the total amount invested. This finding is indicative of the scale of investment needed to commercialize research and is consistent with findings from the previous evaluation of I2I, in which a majority of researchers (52%) mentioned that I2I funding represented 25% or less of the total money invested. Consequently, researchers will seek contributions from sources other than the I2I grants (e.g., incubators, government organizations, personal investors) to support the transfer of their technology to market.

I2I administrative data from researchers' final reports for Phase I and II grants indicated that by the end of the grants, only 9% (n=164) of the funded projects received additional financial or in-kind contributions from other sources to support their next steps towards commercialization, with most of these contributions offered for Phase I projects (7%, n=164). However, survey data suggests that receiving additional contributions takes time with more than half of the respondents who pursued commercialization for their funded project (57%, n=90) indicating that they had received additional financial and/or in-kind contributions, following the end of the grant, from other sources that were not initially involved with the I2I funded project<sup>59</sup>. While it could be expected that Phase II grants would attract additional contributions following the grant (56%, n=9) as the technology is more developed, survey findings demonstrate that 77% (n=13) of the Market Assessment projects and 53% (n=68) of the Phase I projects also attracted additional contributions following the end of the grant. These findings demonstrate that as projects funded by I2I continue to pursue commercialization they require and attract additional contributions.

Of the 51 funded projects (across all the three grants) that attracted additional contributions from sources other than the initial project partners, most of these projects received additional financial contributions (77%), followed by in-kind contributions (64%), and BRS (43%). Survey findings indicate that the most common sources included private companies and personal investors, provincial and federal governments, and university-related stakeholders like incubators or institutions themselves. The survey also demonstrated that overall, funded projects are more likely to receive additional contributions than unfunded projects, with the exception of funding offered by university incubators and from private companies (as shown in Figure 6). Survey data also shows that the types of contributes tended to vary by source. For example, private companies generally provided financial and in-kind contributions, government and personal investors tended to provide financial, and university-related stakeholders mostly provided in-kind and business supports.

### **Figure 6. Key sources of additional contributions identified by researchers of funded and unfunded projects.<sup>60</sup>**



Source: Survey of Researchers. Note: This was a multiple-choice question.

▼ Text description of figure 6

Additional contributions	Private company(ies)	Provincial Government Organization(s)	Federal Government Organization(s)	University Incubator(s)	Academic Institution(s)	Personal Investor(s)	Others
Funded Researchers (n=51)	53%	41%	41%	33%	27%	22%	20%
Unfunded Researchers (n=15)	53%	40%	20%	47%	20%	13%	7%

Financial Contributions

According to survey respondents that received some form of financial support post I2I grant (n=51), the most common sources of financial support among funded projects came from the federal government (37%), provincial government (37%), and private companies (35%) with amounts ranging from \$2,500 to \$4,000,000. Federal government contributors were most likely to be NSERC (68%, n=19), followed by MITACS (53%, n=19) and the Canadian Foundation for Innovation (CFI) (26%, n=19). Results from the survey demonstrate that Phase II funded projects were more likely to receive financial contributions and contributions of a higher dollar value. This is not unexpected given that projects are more advanced in the commercialization process and would likely be less risky to fund require more funding. A few key informants described examples of funded Phase II projects that attracted financial contributions, after the grant completion, from a variety of international and Canadian sources such as seed funds, venture capitalists and angel investors. It was further noted that venture capitalists offered the highest financial contributions on average.

In-Kind Contributions

Although each project would receive in-kind contributions that were unique and relevant for their situation, most funded and unfunded projects that pursued commercialization were able to receive such contributions after the grant completion, from private companies, academic institutions, university incubators and peer-to-peer leaders. Funded projects that received in-kind contributions (n=34) generally had access to technical skills and advice (82%), resources and materials (74%) and consultations about the technology (68%). Alternatively, unfunded projects that received in-kind contributions (n=7) were more likely to receive access to facilities (86%) and resources and materials (57%).



## ***Business-Related Supports***

Knowledge of the market and customer needs can be vital for the successful transfer of research technology to the market.<sup>61</sup> Findings from the evaluation suggest that a researcher who is keen to commercialize and understands business acumen will facilitate technology transfer. Business acumen includes knowledge of the research commercialization ecosystem, how to communicate with/understand the needs of industry, or how to start a company. While the researchers trying to transfer their technology to market are experts in the scientific fields related to their technology, a few key informants mentioned that some of the researchers need more support and knowledge regarding the commercialization process for their technology. Survey findings also indicate that 31% (n=113) of the survey respondents with funded projects identified the team's business skills as a challenge for the transfer of their technology to market. Some key informants and case study participants indicated that a mentor or partner can often help provide I2I funded projects with this knowledge and build connections between industry and researchers, helping the latter to expand their networks and become part of a larger entrepreneurial ecosystem. However, a few key informants further noted that it can be a challenge to find such mentors and partners in the Canadian entrepreneurial landscape.

According to the survey, about a quarter (26%) of the survey respondents with funded projects who continued to pursue commercialization after the I2I grant (n=90), indicated receiving BRS from a partner that was not part of their I2I grant. Of these respondents (n=23), the majority reported gaining business acumen (65%) and receiving access to industry and business networks (61%). The quality of the match between the source of BRS and the project was identified as exceptionally important to commercialization success and the most effective BRS were described to come from sources with a high level of interest in the project and that are aligned with a project's needs in terms of priorities, sector, and timelines. The most common sources of BRS were university incubators, private companies, and academic institutions, although respondents with a Phase II funded project also accessed BRS from personal investors.

Interviews with some key informants revealed that there may be some differences between large universities, and small or medium universities when it comes to BRS. In particular, it was suggested that smaller universities may be at a disadvantage in terms of being able to provide BRS as they have smaller networks and limited access to resources. However, a few key informants further indicated that while the amount or availability of resources offered by the institution are important factors that impact access to BRS, the researchers need the time, interest, and financial support to participate in BRS training or activities.

Some key informants saw an opportunity for I2I to build connections between funded projects and incubators or accelerators to help support opportunities to find the good match and facilitate access to BRS for researchers seeking to transfer their technologies to the market. This opportunity will also help to increase the visibility of the I2I grants and facilitate the best use of BRS available for researchers. It was also suggested by some key informants that partnerships with existing programs that support BRS such as NSERC's Lab2Market Pilot, and the NSERC Lab to Market Grants could be a positive avenue for the I2I program to explore.

### **Spotlight: ILO Involvement**

**ILOs were identified as an important resource for I2I funded projects, as their involvement and provision of business-related supports can be instrumental to help researchers with their technology transfer activities.**

ILOs were found to play an important role to help funded researchers identify and establish contacts with potential receptor companies for technology transfer. I2I administrative data from the ILO 18-month post-grant reports (n=69) show that about 80% of ILOs support researchers with finding partners for their projects in order to commercialize their research. Some key informants also reinforced this finding mentioning that ILOs are helping researchers to find partners that may write letters to support to strengthen their funding application. It appears that although the ILOs are involved with I2I grants at the application stage they seem to be much less involved once funding is received (i.e., during the project). Almost half of the survey respondents with funded projects answering the questions about I2I design and delivery (n=80) were satisfied with the role of ILOs to complete the application (51%), while only a little more than a quarter (28%) reported being satisfied with the level of involvement of ILOs during the funded projects. The capacity of ILOs to help researchers with the transfer of their technology was noted as a challenge by a quarter (27%, n=113) of survey respondents with funded projects. For example, some respondents stated that ILOs did not always have the commercialization expertise, while some experienced communication difficulties (e.g., response from ILO was slow, lack of follow-up) and others mentioned that ILOs were understaffed or have a high staff turnover.

*“During [the] initial application, I was working with a very knowledgeable ILO who helped both with the application and also helped to file a patent. But he left the university halfway through the project. New people came in and the identity of the responsible ILO changed a number of times. The new staff did not have the expertise and time to identify with the project and to maintain momentum”.*

— Survey respondent

It was noted by some key informants that such challenges were even more pronounced in small and medium universities due to smaller technology transfer budgets, smaller networks to recruit partners/mentors, and less personnel.

### 3.2.3 Student Involvement

Data collected by NSERC through the researchers’ final reports demonstrate that students were involved with all the Phase I funded projects (100%) and most Phase II funded projects (70%). Although not an objective of the I2I grants, student<sup>62</sup> involvement in I2I funded projects and the technical skills and knowledge they developed as a result of this involvement were identified throughout the evaluation as positive outcomes of the I2I grants. It is important to recognize these outcomes, as one of NSERC’s core objectives is to support future researchers and innovators with realizing their full potential<sup>63</sup>. This includes student training and retention in the NSE, as reflected in NSERC’s 2030 Strategic Plan Pillar 02: “Expand, Diversify, and Nurture Canada’s Talent Pool.”<sup>64</sup>

Evaluation findings indicate that students generally participated in I2I funded projects under the direction of the principal investigator(s) who would involve them in various research related activities. Some key informants indicated that student contributions were often seen as important to the advancement of the projects, as researchers may not have enough time to do this work themselves. These sentiments were echoed by the majority of survey respondents with I2I funded projects (62%, n=113) as they indicated that the availability of students to support their project was an important factor for project completion. Survey respondents with I2I funded projects who answered the question about students’ involvement (n=80) indicated that participating in these projects allowed students to contribute to the development of technologies and to be involved in research related activities such as analyzing/interpreting research findings (91%), conducting data collection (86%), and/or developing data collection tools or equipment (74%). Some examples shared by key informants of the longer-term impacts the I2I grants had on students include the fact the students’ involvement with projects sometimes led to their involvement in subsequent commercialization activities (as illustrated below). In one case a student was hired by the company interested in the technology to continue with the commercialization process after the I2I grant.

*“Because the students are really the one working on the project, it helps students to be part of the development of technologies that are intended for the market. So, it provides them with really good experience, and in the one case of our technology that went out, it was the student that led the project on campus and who formed the [spin-off] and eventually licensed out the technology. It had a positive impact on the student.”*

— Key informant

All the case studies (n=6) had also students involved with their I2I grants and in three instances, the students who were involved in the I2I projects developed a specialization with the technology being developed and were able to find jobs in the relevant fields. In another case study, two I2I students had hands-on involvement in the development of the technology from the beginning and became partners in the subsequent spin-off.

While some evaluation participants perceived value in having students involved with I2I funded projects, others cautioned against making their involvement mandatory for the I2I grants. The latter group felt that student involvement might not be a good fit for the grants due to the rapid nature of commercialization projects and the need for team members who could do the work quickly and autonomously. It was also noted that it is sometimes a challenge to recruit students with the relevant expertise within the tight timelines of the I2I grants, specifically from when the project is approved, and the funding is released to the researcher. In response to a question about students’ involvement (n=80), survey respondents also acknowledged that supporting ongoing student engagement in I2I projects would require more funding (81%), additional time for project completion (60%), and access to students with the required expertise (44%). NSERC’s Lab2Market Pilot was identified by key informants as a potentially useful resource for commercialization training to help prepare students to become involved with I2I projects.

3.3 Transfer of Technology to Market

Key Findings

Anticipated longer-term impacts of the I2I grants, such as transferring technology to the market and the subsequent benefits of increased revenue and jobs creation often take years to realize. Survey data indicate that the majority (79%) of researchers whose projects were funded since 2010 continued to pursue the commercialization of their technology. Of these funded projects (n=90), almost-two thirds (61%) have already transferred their technology to the market (28%) or expect to do so in the future (33%). These data help to illustrate that it takes time for technologies to find their way into the market. When looking specifically at the period since 2016, survey respondents with I2I funded projects were more likely (78%, n=78) to continue to pursue the commercialization of their technologies than those whose projects did not receive I2I funding (45%, n=47). Evaluation findings point to the lack of financial support as a critical barrier to pursuing commercialization. Additionally, a quarter of projects funded since 2016 (26%) have their technology already on the market compared to 14% of unfunded projects.

It is suggested that spin-off pathways are an increasingly popular option to bring technologies to the market, especially when there is lack of investment and interest from potential receptor companies. Sixty-five percent (65%) of funded projects since 2010 leveraged or plan to use the spin-off pathway to transfer their technology to market, which is higher than the 49% of funded projects that plan or have used an established company (either in Canada or foreign) as the pathway for commercialization. Despite survey findings indicating a preference for the spin-off pathway, some key informants did not always perceive the I2I grants as well-suited for this pathway due to lack of clarity regarding the eligibility criteria and the selection process, particularly around the Phase II grants.

Evaluation findings show that I2I grants have been successful in supporting researchers with the transfer of their technologies to market and contributed to the achievement of impacts such as the establishment of new companies, increased sales revenues and jobs. Of the survey respondents whose funded projects have already transferred their technology to the market since 2010 (n=25), the majority of projects resulted in the creation of jobs (64%) and/or a company (60%), while 16% contributed to the expansion of an existing company. It was reported that 236 jobs were created from these projects.

I2I grants support a variety of commercialization-related outcomes. However, the anticipated longer-term impacts of the grants such as transferring the technology to the market and subsequent benefits (i.e., job creation) often can take years to realize. Given the time required for the achievement of these impacts, this section primarily focuses on projects funded between 2010 and 2022-23 to allow for a longer period of time for the achievement of outcomes.

3.3.1 Transfer of Technology and Results

Findings from the survey help to illustrate the time required to transfer a technology to the market. For instance, the majority (79%) of the survey respondents whose projects were funded since 2010 (n=114) continued to pursue the commercialization of their technology. Of the funded projects that pursued commercialization (n=90), the majority (61%) have transferred or plan to transfer the technology to market. In particular, just over a quarter of projects (28%) have transferred the technology, and a third (33%) plan to do so in the future. Approximately another quarter of survey respondents with funded projects (27%) indicated that it is too early for the technology to be taken to the market (Table 7).

Table 7. Progress Towards the Market of Funded Projects Pursuing Commercialization since 2010

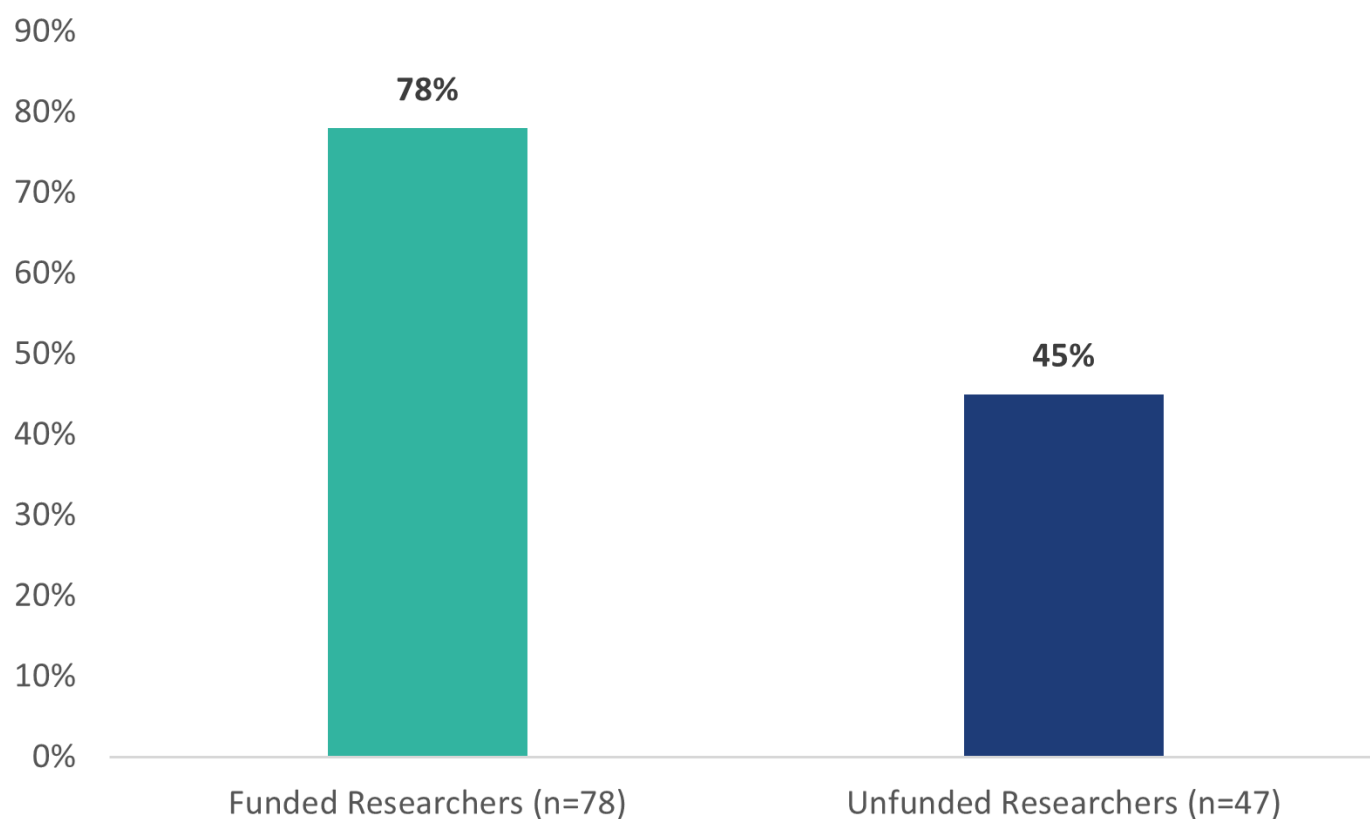
Progress Towards the Market	Total	
Numbers and percentages	(N)	(%)
Technology is on the market already	25	28
Technology will be on the market in the future	30	33
It is too early for technology to be taken to market	24	27

Progress Towards the Market	Total	
Numbers and percentages	(N)	(%)
The technology has not, and will not be taken to market	5	6
Don't know/no response	6	6
<b>Total</b>	<b>90</b>	<b>100</b>

For the funded projects with technology already on the market since 2010 (n=25), the time required to commercialize the technology varied with a little more than half the funded projects (56%) being able achieve this result within one to three years following their grant application. About 40% were able to achieve the outcome within four to seven years, while the remaining 4% were able to achieve it within 8-10 years. In comparison, a slightly higher proportion of projects that expect to transfer their technology to the market seem to require more time to accomplish this goal, with 17% of projects requiring 8-10 years.

When looking specifically at the period since 2016 and comparing funded projects (n=78) with unfunded projects (n=47)<sup>65</sup>, it appears that projects that received one or more I2I grants are more likely to pursue the commercialization of a technology and to have transferred a technology on the market. For instance, the majority of survey respondents whose projects were funded with an I2I grant continued to pursue the commercialization of their technology (78%) compared to less than half of the survey respondents whose projects did not receive I2I funding (45%), illustrated in Figure 7. Similarly, projects funded since 2016 that pursued commercialization (n=61) are more likely to already have a technology on the market (26%) compared to unfunded projects that pursued commercialization (14%, n=21) (Figure 8).

**Figure 7. Proportion of Funded and Unfunded Projects Pursuing Commercialization (since 2016)**

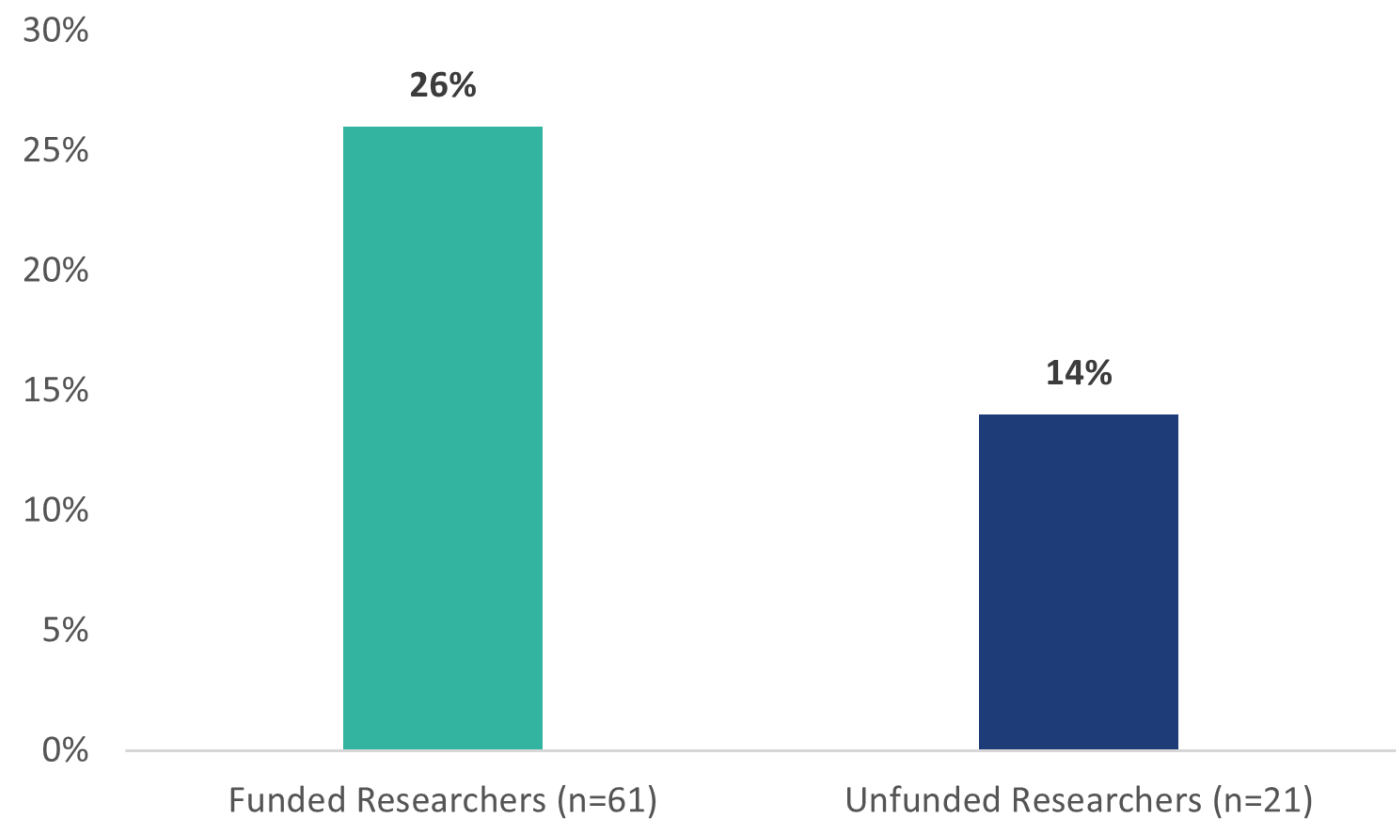


Source: Survey of Researchers.

▼ Text description of figure 7

Proportion of Funded and Unfunded Projects Pursuing Commercialization	
Funded Researchers (n=78)	78%
Unfunded Researchers (n=47)	45%

**Figure 8. Progress on the Market for Funded and Unfunded Projects Pursuing Commercialization (since 2016)**



Source: Survey of Researchers.

▼ Text description of figure 8	
Progress Towards the Market for Funded and Unfunded Projects Pursuing Commercialization	
Funded Researchers (n=61)	26%
Unfunded Researchers (n=21)	14%

The benefit of I2I funding to spur projects past a “go/no go” point in the commercialization process was described by some key informants and case study participants as important given the lack of other mechanisms to fund the commercialization of research in the Canadian research innovation landscape.

*“Well in the sense that I don't think [the technology] would be in the market if it wasn't for the grant. So, I don't know if it expedited it, I just don't think it would happen otherwise. And as I said during the I2I the work came out to sort of redo the chemistry and that improved things significantly.”*

— Key Informant

Consequently, the difference between funded and unfunded projects in continuing towards commercialization may be attributed to the role that financial support plays in moving projects past early-stage development. For example, survey results indicated just over half of the survey respondents whose projects did not receive an I2I grant (53%, n=47) were able to pursue their projects using other means but did not necessarily end up pursuing commercialization. It should also be noted that, most of these projects (88%, n=24) had to modify their scope. The remaining 47% of respondents whose projects did not receive an I2I grant (n=47), did not continue with their proposed projects and indicated that funding was a primary reason. Other factors that may have also contributed to differences between funded and unfunded projects and the extent to which they transferred their technologies to market include the ability to attract partners, and access to BRS, both important contributors to successful commercialization.

### Spotlight: I2I Early-Career Researchers

The evaluation explored opportunities and limitations related to early-career researchers (ECRs) accessing I2I grants. Some key informants described how institutional culture shapes the expectations for ECRs. For example, during the early stages of their career, new academics are often expected to focus on other academic-related objectives (e.g., publications) and on obtaining tenure. Consequently, this may influence the extent to which ECRs are involved in activities dedicated commercializing their research. However, some key informants believed that ECRs are more interested in technology transfer activities than in the past. It was speculated that this was because ECRs grew up in a more entrepreneurial landscape and are more interested in development and engagement of applied research.

Despite this interest, some key informants and case study participants also noted some challenges that ECRs may encounter in their efforts to commercialize their technologies, such as limited time, lack of funding, lack of resources such as dedicated students or lab space, and smaller networks of potential partners. Some ILOs representatives indicated that their office conducts outreach or targeted trainings/workshops with ECRs to support them with building their research/industry partnerships networks and the development of their business acumen.

In addition to bringing technology to the market, the data from the survey and from the ILOs 18-month post-grant reports (n=69) indicate that many of I2I funded projects transferred research results to a partner or user through mechanisms such as:

- **Technology Transfer Agreements (TTA):** According to the ILO 18-month post-grant reports, almost three quarters (74%) projects have had, on average, 3.72 technology transfer agreements. Of the 51 projects that involved a TTA, the most common type of TTA reported were the confidentiality agreements (53%), followed by licensing agreements (45%), option agreements (27%) and assignment or sales (16%).
- **Transfer of IP:** According to survey data, since 2010 about half of funded projects which attained IP (52%, n=61) transferred their IP to a partner, more often (53%, n=32) to the same partner that was part of their I2I application. The majority of survey respondents from this latter group (59%) further indicated that over 75% of their IP remains in Canada and almost half (44%) indicated that over 75% of their IP is used in Canada. In the few cases where little IP remained or was used in Canada, the primary reasons for IP to be transferred outside the country (as noted by 25% of respondents) was Canada's small market size, and lack of scale-up manufacturing.

### Spotlight: I2I Grants Supporting Early-Stage Technology Development (Case Study)

A Canadian research team discovered an innovative electronic waste chemical technology to extract gold in a less toxic and hazardous fashion than what has typically been used in the past. However, this technology did not naturally start out in the electronic waste sector where it currently resides. Rather the intention was to extract gold within the mining industry, but over time the research team realized that the mining industry had low interest in this new type of technology. Consequently, the team pivoted direction and found their way into the Canadian electronic waste, or gold recycling, field. The project's Phase I I2I grant allowed the team to increase the scope of materials and test out new technologies to adjust their focus towards gold recycling. Funding from the grant helped move a novel technology out of a beaker and supported implementation of a large enough scale that attracted partners and additional contributions which sustained the technology's trajectory towards the market.

## 3.3.2 Pathway for Technology Transfer

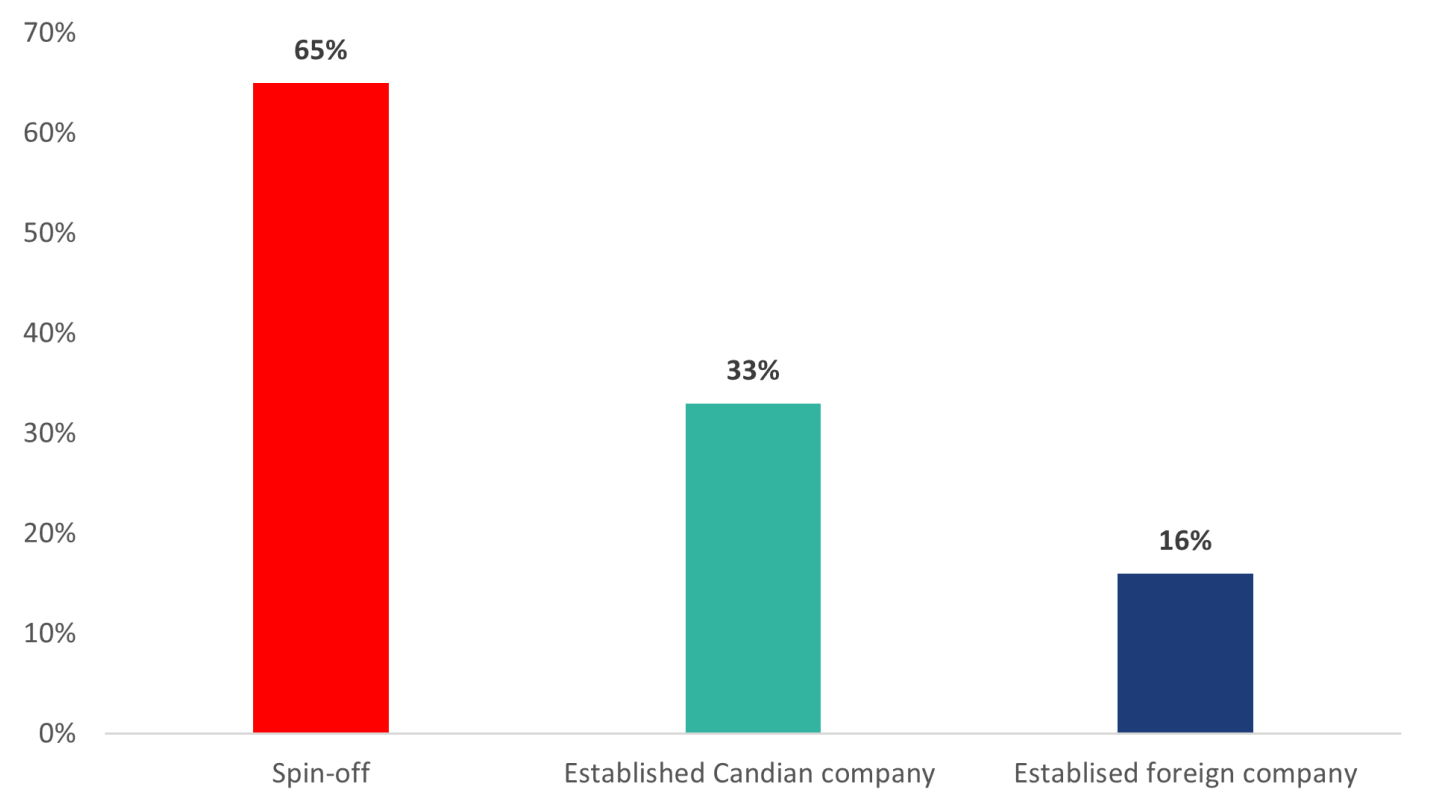
Transferring the technology to a partner (i.e., receptor company) is a critical step in the commercialization process. Some key informants and case study participants suggested that receiving an I2I grant may facilitate the attraction of receptor companies because of the grants’ ability to increase the perceived value and legitimacy of the technology which may encourage potential partnerships for Phase I or strengthen existing partnerships for Phase II.

*“Yes [I2I helps researchers to transfer their technology to market], because as they’re more advanced in their technology, the technology is already closer to market. So, when they go to pitch, they already have concrete results. They’ve already answered the questions people were asking, so they’re better prepared when they make their sales pitch to seed funds, venture capital funds to show that they’ve done their homework and they’ve already asked themselves the questions.”*

— Key Informant

Most key informants also indicated that potential partners that are willing and able to bring the technology to market (i.e., receptor companies) are most often SMEs or spin-offs and that there is limited access to larger or established Canadian companies. Interestingly, survey findings also demonstrate that spin-offs are a popular option to bring technology to the market, with the majority (65%) of projects funded since 2010 that have or will have technology on the market (n=55) having leveraged or plan to leverage this pathway (Figure 9). In comparison approximately a third of these respondents (33%) indicated using an established Canadian company to pursue commercialization and 16% used an established foreign company. Researchers could have used multiple pathways to transfer their technologies to market. The leveraging of the spin-off pathway was also noted by a majority of key informants across various institutions as they described an increased uptake of the use of spin-offs for commercialization projects, regardless of whether they are funded by the I2I grants. Survey results show that if considering only the funded projects with technology already on the market (n=25), most projects (68%) used the spin-off pathway, while a third (32%) transferred the technology to market through an established Canadian or foreign company.

**Figure 9. Type of pathway that was used or will be used by researchers with projects funded since 2010 and who pursued commercialization (n=55) to bring their technology to market**



Source: Survey of Researchers. Note this is a multiple-choice question.

▼ Text description of figure 9

Type of pathway	Spin-off	Established Canadian company	Established foreign company
Funded researchers (n=55)	65%	33%	16%

### Alignment Between Spin-offs and I2I Grants

Despite most funded projects using a spin-off to bring technology to market, key informants did not always view the I2I grants as well-suited for this pathway. About half of the key informants felt the grants were poorly designed for spin-off companies, primarily due to the selection process and eligibility criteria. For example, it was observed by a few key informants that the selection committee seemed to prefer funding projects that involved using an established company as the commercialization pathway because of the potentially high-risk levels associated with spin-offs.

*“It has been noticeable that NSERC I2I is biased against commercialization through [spin-off], and we are concerned by this trend. Our theory is that it is probably due to [spin-off] viewed as riskier however there is a more modern view that the support we receive from our community or within the institution overcome these risks. We are concerned that our [spin-off] in the past 5 years have not been seen as the way to go.”*

— Key informant

Additionally, almost a third (29%) of survey respondents that had a project funded with a Phase I grant (n=51) did not think they were eligible for subsequent I2I grants because they were using or planned to use the spin-off pathway. Several key informants felt there may be a potential eligibility gap, noting that disclosure of a dedicated partner in Phase I, such as a spin-off tended to push the project towards a Phase II grant. However, in such cases a Phase II grant presented barriers due to the requirement for matching funds, and it was suggested that it would be difficult for spin-offs that might be owned or partly owned by the researcher to access sufficient capital to support projects. In some cases, researchers would delay the creation of a spin-off company to bring their technology to market until after they received their Phase I grant to avoid being pushed to a Phase II grant. This created concerns that delaying the creation of the spin-off may impact the company's ability to seek funding from investors.

*“There's a much bigger focus on [spin-offs] than there was...that's probably the biggest change. That's not necessarily a, you know, research landscape change, but that's certainly the commercializing research tends to be focused in that direction a lot more now than it used to be. I do think that needs to sort of drive how programs that are intended for commercialization need to be delivered. Like again with I2I like I said, we can make it work for projects with inventor-led startups, but it's not necessarily ideally suited for that as it currently exists.”*

— Key informant

In addition, the participants of a few case studies where the lead researcher co-founded a spin-off mentioned that owning or being a majority share partner of a spin-off company is perceived as prohibiting the researcher's ability to apply for certain grants and funds including I2I Phase II grant.

### 3.3.3 Capturing Broader Impacts

The Canadian economy benefits from the creation and expansion of businesses because they can bring in annual sales revenue and create jobs that support GDP growth. In 2024, the Government of Canada released its Federal Budget that focused on implementing strategies for boosting economic growth through innovation, investment, and job creation across all sectors.<sup>66</sup> The expected outcomes of the I2I grants are aligned with these strategies with a focus on supporting business growth, job creation and a stronger economy. However, the multifaceted and complex nature of research commercialization, particularly within sectors that intersect NSE such as clinical trials for new medical technologies or deep technology, creates challenges for the measurement of long-term outcomes. As a result, it may take years before a technology is transferred to the market, and even longer to achieve those expected outcomes. In an effort to capture some of the long-term outcomes of the I2I grants, the scope of the survey and case studies was extended beyond the period since the last evaluation (i.e., longer than seven years) to begin in 2010.

#### Economic Impacts



Evaluation findings demonstrate that I2I grants have funded projects that were able to generate results that align with creating benefits for the Canadian economy. For example, all six projects examined for the case studies were found to have created at least one Canadian company/spin-off to date. Additionally, of the 55 survey respondents with I2I projects funded since 2010 that had or will have a technology on the market, almost half (45%) have created a Canadian business or company (e.g., spin-off), while 11% have expanded an existing business or company. In some cases, these companies sell the technology internationally, bringing in revenue to Canada from across the globe. Also, these 55 projects have resulted in the creation of an estimated total of 356 jobs. In addition, 49% of these projects have at least one technology on the market for a total of 59 technologies.

When looking specifically at the survey results for I2I projects funded since 2010, that already brought a technology to market (n=25), the data indicate that the majority (60%) created at least one company, while 16% expanded an existing business or company. The majority of this group of respondents (64%) also noted that their projects created an estimated 236 employment opportunities, while almost three-quarters of projects (72%) have at least one technology on the market for a total of 48 products, goods or services.

### Spotlight: Potential for Partnerships, Job Creation and Economic Impact (Case Study)

A researcher at a Canadian university received an I2I Phase II grant to develop a cutting-edge technology which although useful, was found to be too niche and challenging to replicate by general manufacturers to merit being transferred to the market. However, the technology attracted attention from a multinational firm considered to be one of the world's largest manufacturers/distributors in the researcher's field. This firm became the partner for the grant to continue the commercial development of the technology.

The researcher also started a **Canadian spin-off company with 12 employees** in order to produce technologies that were complementary components to those they developed with their multinational partner. This partnership was described to be reciprocal, with the spin-off providing expertise and knowledge while the multinational firm provided distribution and business-related supports. From this partnership, the multinational firm moved one of their divisions to Canada, which became their first Canadian location, **employing over 50 people**. Over the years, the researcher's Canadian spin-off company became incorporated and built-up the operations of the multinational firm, becoming **one of the firm's six global strategic partners**.

Open now for over a decade, this company has many products (multiple of which were derived from the initial technology developed as part of the I2I Phase II funded project) and **supplies materials to a variety of countries** around the world. This organization continues to grow, with an estimated **\$1 million in annual revenue** that benefits the Canadian economy.

### *Institutional Impacts*

The evaluation identified that the I2I grants also had positive impacts on the universities where funded projects originated, such as revenues from the sales of technologies that were successfully transferred to the market. Moreover, some of the researchers of these successful projects were able to contribute to their university and help shape the next generation of Canadian innovators by sponsoring conferences, giving workshops or presentations, and providing mentorship to colleagues and trainees who were interested in the commercialization of technology. The visibility of these researchers in the business landscape was described by a key informant as an opportunity to encourage others within post-secondary institutions to explore potential commercial paths for their technology(ies).

### *Training Impacts*

The evaluation findings alluded to the fact that the I2I grants could also have longer-term impacts for students involved with funded projects, particularly their academic and career development. For example, all six case studies involved projects that created a spin-off company, which were described as pipelines for student training in an industry setting. For instance, students would be hired for summer internships while still attending university, and/or hired as an employee after graduation. In half of these cases (n=3), students involved with the I2I funded project continued to engage with the commercialization process after the grant or were hired by partner companies as experts regarding the technology associated with their project so they could continue to support its transfer to market. As an example of the opportunities students could experience when involved with I2I funded projects, one case study participant shared that the majority of the employees of the spin-off they created as a result of the I2I funding, are graduates from their host institution.

## Spotlight: Training Pathways Through I2I Grants (Case Study)

A researcher at a Canadian university received an I2I Phase I grant to develop their new electronic technology. The grant allowed the research team to **hire a student to assist the project and purchase hardware** that they would not have been able to afford otherwise, which supported further development of the technology in the lab. The student hired through the grant reported that they received a well-rounded experience through the grant that included hands-on training to build up **practical engineering skills** that they wouldn't have been able to acquire otherwise. These skills were specifically tailored to this I2I technology, which meant that this student became **an asset for the continued development and use of that technology**. This student was able to leverage their experience to get a job with the company that licensed the technology after graduation and **take on an important role to support its commercialization**.

This company continues to support students at the university's engineering program by creating opportunities for students to work with the company during the summers and/or after graduation to amplify their learning with practical hands-on experience. As such, the company acts as pipeline for students to build their skills and find employment.

More examples of success stories from the I2I funded projects can be found in [Appendix D](#).

## 3.4 Refresh and Modernize

### Key Findings

Some features of the I2I grants have remained static since they were first implemented twenty years ago, and which may impact the extent to which the grants and the projects they fund are able to achieve expected outcomes such as attracting partners and transferring technologies to the market. For instance, the amount of the grants has not increased since they were implemented and findings from the evaluation suggest that this has created challenges for funded projects, particular projects funded with an Market Assessment or a Phase I grant. There were also some concerns regarding the duration of the Phase I grants given that the majority (71%) of funded Phase I projects required an extension.

Overall, the evaluation found that the content of the applications for the I2I grants was considered to be reasonable, though the application was found to be quite lengthy. Additionally, findings from the key informant interviews suggest that there is a perceived lack of clarity and transparency regarding some of the application requirements and expectations for funded projects, which impacted the fairness of the merit review process. There was also a perceived lack of consistency regarding the feedback received by reviewers between different funding calls and for application resubmissions. Findings from the evaluation suggest that there is a misalignment around the expectations for the application and selection processes between different stakeholder groups. Some of the suggestions offered to address these misalignments include increased outreach and training by NSERC regarding the requirements and criteria for the application and selection processes.

There is an increased recognition from I2I stakeholders that EDI is an important consideration for R&D and commercialization, as the integration of EDI may broaden the applicability and use of technology amongst end-users. Findings from the evaluation indicate that while some researchers are considering EDI with respect to the composition of their research teams, as well as integrating EDI within the R&D and the commercialization process, there are opportunities for improvement. In general, the evaluation found that there is openness from researchers to learn about how best to incorporate EDI into their R&D and commercialization activities.

Reporting for the I2I grants, and in particular the Phase I and Phase II grants is somewhat complex as it is done by a variety of stakeholders (e.g., researchers, ILOs and partners) at different times and in different formats. While the NSERC I2I staff have made considerable efforts to collect data about the grants and ascertain their impact, the variety of reporting instruments created limitations, which challenged the validity and use of the data. Revising and streamlining the reporting instruments for the I2I grants would help to address these limitations and improve the usefulness and use of the data.

The I2I grants continue to be a cost-efficient with the annual costs of administration at approximately 9¢ per \$1 granted since 2016-17. The grant expenditures increased in 2020-21 as a result of the additional funding for the NSERC Lab2Market pilot program (see [Appendix E](#)).

The following section examines the key features of the I2I grants that were identified throughout the evaluation as potential limitations to the extent to which the grants and the projects they fund are able to achieve expected outcomes. In addition to identifying these key features, the evaluation also explored opportunities for NSERC to refresh and modernize the features to better respond to the needs of different stakeholders within Canadian research innovation ecosystem.

### 3.4.1 Amount of the I2I Grants

One of the main features of the I2I grants that evaluation participants highlighted as a particular challenge was the amount of the grants and the fact that they have not changed since their inception. Findings from the survey indicate that just over a third of respondents with funded projects for all three types of grants (36%, n=80) were dissatisfied and very dissatisfied with the amount of the I2I grant(s). According to most external key informants and survey respondents, the amounts of the grants are not reflective of the current costs of commercialization and have not kept up with inflation. Table 8 below illustrates the current amount of each grant and what the grant amount would be if it had been indexed to inflation. The environmental scan results show that the other grants similar to I2I Phase I, which are the Department of National Defense (DND) Competitive Projects phase 1a and the Pilot Innovation Funds (PIF) from Genome British Columbia, offer up to \$200,000 and respectively \$250,000. However, the DND is a priority-driven grant and PIF is domain and region specific.

**Table 8. Grant Amounts – Current and Indexed for Inflation**

Grant Type	Year of Inception	Current Maximum Grant Amount (\$)	Amount (\$) when Indexed for Inflation <sup>67</sup>
Market Assessment	2011	\$15,000	\$20,157
Phase I	2004	\$125,000	\$191,739
Phase IIa	2004	\$125,000	\$191,739
Phase IIb	2004	\$350,000	\$536,350

Efforts were made to better understand the reasons for this dissatisfaction with each of the I2I grants. With regards to the Market Assessment grant, a few key informants felt that the maximum amount of funding provided by NSERC is not enough to properly compensate the consultants who conduct market assessment studies based on their current rates and may result in reducing the scope and/or quality of market assessment reports. Currently NSERC covers three-quarters of the total cost of the market assessment, up to a maximum of \$15,000 with the institution or researcher providing the balance. However, rising inflation and the increasing cost of the research have diminished the purchasing power of the Market Assessment grants over the years. This may subsequently diminish the extent to which these market assessment studies can meet their objectives in providing information about the development status, viability and potential market success of a technology. Some key informants from large or medium universities noted that their institution will sometimes contribute a higher amount of additional funding for projects funded by an I2I Market Assessment grant, compared to what they used to provide in the past, to maintain the initial project scope. However, additional funding may not always be available and likely less so in smaller universities.

*"[We] put in more [money] because if we want to have a minimum number of interviews or similar activities for a market assessment, \$15,000 isn't enough. And that's often what we get criticized by NSERC for: if we don't have enough interviews, they don't want to fund our market assessment. [...] We're doing less in a given year because we have to put in a larger share from the University.*

— Key Informant

Over a third (39%) of survey respondents that received a Phase I grant and pursued the commercialization of their technology (n=61) indicated that they were dissatisfied and very dissatisfied with the amount of the grant. When examined further through key informant interviews, several of the issues associated with the amount of the grants were reaffirmed including the increasing costs of commercializing research. In particular, key informants pointed to the increasing costs of materials, as well as human resources such as students, technicians and consultants. It was further noted that the challenges with rising costs may be especially relevant for certain NSE-related sectors including biochemistry and deep technology, and also for health-adjacent fields.

There was less emphasis from key informants regarding the amount of the Phase II grants and its impacts on funded projects. In general, the evaluation findings suggest that the amount of the Phase II grants may be sufficient. Additionally, concerns were expressed by a few key informants that increasing the grant amount might create a risk for partners as it would increase the overall budget of funded projects and thus the required contribution amounts from partners.

### 3.4.2 Duration of the I2I Grants

When examining the duration of the I2I grants, it was found that the main concerns centered on the Phase I grants, which are up to 12 months with an opportunity for extension. Findings from the evaluation suggest that this is a short duration when compared to other sources of funding focused on supporting early-stage technology development, which tend to have a duration of up to 24 months or longer. A review of the I2I administrative data from 2016-17 to 2021-22 indicates that the duration of the Phase I grant may not be long enough for researchers to complete their I2I projects, as the majority of Phase I funded projects (71%, n=246) required an extension. Of the 174 projects that required an extension, just over a third finished within 18-months (37%), while approximately a third took between 18 and 24 months (33%) or more than 24 months (30%) to complete. Approximately 16% of the projects that required an extension also received a Phase Ib grant, which means they received top-up funding in addition to the extended timeline for their project.

Potential concerns with the duration of the Phase I grants were reinforced by the survey as more respondents with a Phase I funded project indicated a higher level of dissatisfaction with the duration of the grant (51%, n=61). Furthermore, several key informants indicated the 12-month duration for the Phase I grants was too short for researchers to complete their projects, especially when considering the time required to recruit students and build research teams. It was suggested by a couple of key informants that 18-months may be a more appropriate timeframe for the Phase I grants. It was also suggested that NSERC could increase the flexibility of the start dates for the I2I grants and in particular the Phase I grants. Generally, projects are expected to begin when the funding is provided, which is shortly after the announcement of the competition results. However, researchers may require additional time to get organized and/or to find necessary resources including students before starting their project.

### 3.4.3 Application and Selection Processes

As noted in section 1.2, each year, the I2I program offers four calls for project applications, which occur in January, April, June, and September. Overall, there were no significant concerns identified with the frequency of calls. However, it was suggested that it would be beneficial for the January call to be moved to the end of the month or into December (prior to the holiday season) as the current timeline has created challenges for applicants. In particular, applicants often had to work on their applications when finalizing their fall courses (e.g., grading exams) and/or over the winter break between semesters, during which time applicants may not be able to obtain approvals from institutional representatives as they may be out of the office.

Generally, key informants felt that the I2I application process was reasonable in terms of the type of information requests, as they helped the applicant put together a solid plan for their project including the transfer of their technology to market. Survey respondents also seemed to be generally satisfied with the application process, with almost half (46%) of respondents with a funded project for all three types of grants (n=80) indicating that they were satisfied with the ease of completing the application, while a third were neither satisfied nor dissatisfied (33%). However, 21% of the respondents holding a Phase I grant (n=61) were dissatisfied and very dissatisfied with the ease of completing the applications. It was also felt by some key informants and survey respondents that the application for the Phase I grant was quite lengthy and time consuming considering the duration of the grant.

*"[One-year duration of the I2I grants is] not commensurate with the burden of the application with respect to its length/requirements"*

— Survey Respondent

In addition to challenges with the length of the grant application, some key informant interviews perceived a lack of clarity and transparency regarding some of the application requirements for Phase I and expectations for funded projects. This perceived lack of clarity was noted by key informants in all of the different groups involved in the application and selection processes (external to NSERC) including researchers, ILOs, external reviewers, and members of the I2I selection committee<sup>68</sup>. In particular, key informants spoke about the confusion around whether or not IP must be obtained prior to application, if a market assessment (and in particular one funded by an I2I Market Assessment grant) must be completed before applying for a Phase I or Phase II grant, as well as expectations around technology maturity and the project risk level. There was also confusion as to whether projects with a spin-off company are eligible for I2I grant funding (as discussed in section 3.3.2). It was felt that this lack of clarity around application requirements influenced the extent to which some applications were funded. For instance, while some key informants perceived that the I2I steering committee did not support funding projects that were deemed to be "risky" (e.g., pursuing the spin-

off pathway, technologies that are in an early stage of development), conversely committee members felt that they did indeed support the funding of projects that were considered to be of a higher risk.<sup>69</sup> Additionally, about a quarter (23%) of survey respondents whose projects were not funded (n=47) noted that they felt that the lack of clarity regarding the application guidelines inhibited their ability to obtain I2I funding. One particular challenge that was raised by a few survey respondents with unfunded projects was the perception that the application required to share some strategic company information that went beyond what was possible to disclose from their perspective. They mentioned that sharing that information would have impeded them to protect their IP through trade secrets and protect their freedom to operate through open-source software.

In terms of the selection process, some key informants expressed concerns that it is “*a bit of a black box*”, and experienced frustration around the consistency and clarity of the review and selection of applications between different funding calls and for application resubmissions, as well as the quality and clarity of the feedback received from external reviewers and/or selection committee members. Examples were shared in which applicants would address the feedback received on their initial application only to find the application rejected when resubmitted, but for completely different reasons. The frustration over the perceived lack of clarity and transparency around the selection process was particularly evident among survey respondents whose projects were not funded (n=47) with just over half of respondents (53%) indicating that they felt the process inhibited their ability to obtain an I2I grant, while just under half (47%) felt the evaluation criteria was the problem. Additionally, just under half of respondents whose projects were not funded further noted that the feedback they received from the selection committee regarding their application was not useful in terms of their market assessment (45%), the scientific and technical merit of the proposal (40%), or the quality of the information provided regarding the potential for technology transfer (40%). While there were concerns from stakeholder groups regarding the selection process, several key informants directly involved with the process indicated that the issues were not solely related to issues with the process, but that the quality of applications has decreased in recent years.

Several key informants recognized the need to address the challenges around the application and selection processes, particularly the misalignments around the expectations of different stakeholder groups and offered suggestions for improvement. One suggestion was for NSERC to increase its outreach amongst stakeholders of the I2I grants to increase program visibility and offer training for ILOs, applicants, reviewers and selection committee members to learn more about the grants including the application requirements and selection criteria. It was felt that these efforts would help support the application and selection processes and may be particularly helpful for ILOs, especially in cases where there are high levels of staff turnover.

*“I just think we need to provide support to ILOs, maybe an annual Lunch & Learn or webinar by an I2I expert. It would be helpful in the interpretation of the guidelines and the instructions to make sure that those in our office can provide guidance [...]”*

— Survey Informant

Despite the challenges with the application and selection processes, one area that was almost always referred to as a strength of the I2I grants, among all stakeholder groups, was the availability, responsiveness, flexibility and support offered by the NSERC I2I team.

### 3.4.4 Equity, Diversity and Inclusion (EDI)

While EDI considerations are not currently reflected in the literature or expected outcomes of the I2I grants, one of the goals for NSERC’s 2030 Strategic Plan is to create a diverse and inclusive research ecosystem that draws on a broader pool of talent, welcomes researchers with varied skills, establishes a common space for mutually respectful exploration, and decolonizes research practices to support First Nations, Inuit and Métis-led knowledge development and innovation activities.<sup>70</sup> Under this umbrella, the evaluation explored how stakeholders of the I2I grants perceived the role and relevance of EDI in relation to the grants and the funded projects to better understand how EDI considerations could be integrated into the grants in alignment with NSERC’s strategic plan.

Key informants perceived EDI as occurring at two junctures in relation to the I2I grants, both of which are in line with NSERC’s guidelines on integrating EDI considerations in research<sup>71</sup>. The first was in relation to the technology itself, including R&D as part of technology development and the business strategies implemented during technology transfer. The inclusion of EDI during R&D was often associated with a consideration of diverse end-users and/or ensuring that the technology responds to the needs of distinct populations, which may broaden the applicability of technology or increase interest of partners who focus on certain populations. However, it was also noted by several key informants that they perceived that EDI may not always be applicable during early-stage R&D, particularly in areas that intersect the NSE such as biochemical or lab-based fields. These perceptions were echoed by about a fifth of survey respondents (21%) with funded projects (n=113) who noted that the use of EDI within their efforts to transfer technology to market was “Not Applicable”.

The second juncture identified by key informants was in relation to the inclusiveness and diversity of the research team. When discussing EDI, key informants would almost always begin by speaking about the diversity of the research team involved with funded projects including how there were members of the team who were members of one or more equity-deserving groups (i.e., women, people with disabilities, Indigenous peoples, members of racialized communities, members of the LGBTQ2S+ community). It appeared that this was where key informants felt more comfortable speaking about EDI and/or had more experience when considering EDI in relation to research or I2I funded projects. In some cases, key informants would also speak about the diversity of the partner/partner organization involved with an I2I funded project. The diversity of the team and/or partner was described as helpful to broaden insights and creativity for funded projects.

When asked how EDI considerations could be further integrated within the I2I grants there were concerns around the perception of tokenism<sup>72</sup>, and that applicants may 'force' EDI into their project proposal in a way that places diverse populations at risk of harm in an effort to check the EDI box as required by NSERC. Other concerns related to EDI considerations were associated with the amount of time and money that is often required to meaningfully integrate EDI into projects, which funded projects may not have and the perception that such requirements may slow down the transfer of technology to market. Despite these concerns, there was an openness amongst key informants to learn more about how to meaningfully incorporate EDI into their R&D and technology transfer activities. It was also suggested that NSERC could approach the integration of EDI as part of the I2I grants by providing of EDI-specific training for applicants that educates them on how to incorporate this lens into their projects in a manner that supports the improvement of the technology and limits harm. Other suggestions around EDI include an open call for the I2I grants that is dedicated to researchers who are members of equity-deserving groups, or additional funding to support technology development with considerations of diverse populations and their specific needs.

### 3.4.5 I2I Grant Reporting

Reporting on the I2I grants is done by a variety of stakeholders at different times (as illustrated in section 1.3) and in different formats. For example, Phase I grants require a final report to be completed by the researcher (i.e., grant holder) at the end of a project (submitted in Word or PDF), as well as a report from the ILO 18-months after the project is finished (submitted through an online survey platform), and subsequent annual telephone follow-ups with the ILO. The Phase II grants have similar reporting requirements, as well as a mid-grant report to be completed by the researcher, and a report for partners to complete at the end of the grant. The purpose of these reports is to provide NSERC with an understanding of how grant funds are used, project activities undertaken and the extent to which funded projects were successful in transferring their technology to the market.

While the NSERC I2I staff have made considerable efforts to collect data about the grants and ascertain their impact within the Canadian research innovation ecosystem, there are some limitations to the reporting instruments and the data collected, which challenge the validity and use of the data. For example, over the years some of the data collection instruments have been revised, which limits the ability to examine trends over time. Additionally, the type and structure of questions and terminology may vary across reports, and the reports are not always completed or fully completed by researchers, ILOs or partners which limits the extent to which the data collected presents a wholistic understanding of the I2I grants. However, that is not to say that the data collected is not useful or used, but there are opportunities to improve the reporting for the I2I grants to further ensure that the quality and usefulness of the data to support learning and decision-making.

One opportunity for improvement would be to revise and streamline the reporting instruments for the I2I grants, including using the same platform and as many of the same or similar questions as possible across stakeholder groups. This could reduce some of the burden on NSERC in terms of facilitating data collection and could also improve the quality of the analysis and reporting as it would be possible to examine certain aspects of the program and the funded projects from multiple perspectives. Moreover, it would allow for the collection of new data that align with NSERC's 2030 strategic plan including EDI and student involvement with the I2I grants.

### 3.4.6 Program Cost-Efficiency

The cost-efficiency analysis included grants and administrative (both direct and indirect) expenditures from 2016-17 to 2022-23.<sup>73</sup> As presented in Table 9, during this period the total amount of I2I grants awarded across Canada was approximately \$47.3 million dollars (for 475 projects), and the total administrative expenditures was approximately \$4.5 million dollars. In 2020-21 the grant expenditures for I2I increased as a result of the funding provided for the NSERC Lab2Market pilot (please see [Appendix E](#)).

Administrative expenditures were examined in relation to grant expenditures to calculate the cost in cents to administer the program for every \$1 granted. Between 2016-17 and 2022-23, administering the I2I grants costs approximately 9¢ per \$1 granted. During the same period, the average cost to administer all of the programs under NSERC's Research and Technology Partnership

(RTP) Directorate (in which the I2I grants are housed) was 6¢ for every \$1 of grant funding. However, comparing the I2I grants with the overall administration costs for RTP must be considered with caution, as each program within the directorate has its own characteristics and requirements that may affect the level of administrative support required.

**Table 9. Operating Expenditures and Ration for NSERC's I2I Grants**

Fiscal years	2016-17	2017-18	2018-19	2019-20	2020-21	2021-22	2022-23	Total
Direct	\$428,685	\$503,497	\$595,784	\$559,771	\$609,291	\$359,161	\$389,507	\$3,445,696
Indirect	\$131,342	\$123,372	\$134,621	\$120,597	\$176,615	\$171,356	\$161,994	\$1,019,898
Total Operating Expenditures	\$560,027	\$626,870	\$730,405	\$680,368	\$785,906	\$530,517	\$551,502	\$4,465,593
Grant Expenditures	\$6,944,672	\$6,152,182	\$6,388,764	\$5,044,560	\$7,000,521	\$7,631,877	\$8,108,505	\$47,271,081
Total Program Expenditures	\$7,504,699	\$6,779,052	\$7,119,169	\$5,724,928	\$7,786,427	\$8,162,394	\$8,660,006	\$51,736,674
Operating Ratio (¢: \$1)	8¢	10¢	11¢	13¢	11¢	7¢	7¢	9¢

## 4.0 Conclusions and Recommendations

### 4.1 Conclusions

#### I2I Within the Canadian Research Innovation Ecosystem

Within the dynamic and changing landscape of the Canadian innovation ecosystem, NSERC's I2I grants continue to be responsive to federal priorities and the needs of post-secondary researchers and Canadian industry. In particular, the Phase I grants address a funding gap by providing support for early-stage research commercialization for all NSE disciplines. However, as noted in section 3.1.1, recent trends in the Canadian innovation ecosystem show a perceived shift away from basic research funding towards applied research, a fragmentation of funding across the Canadian research funding system, and limited availability of Canadian companies (i.e., partners) to act as receptors for the commercialization of technology. These circumstances may be contributing to an increasing number of I2I funded projects that are pursuing the option of using a spin-off company to transfer their technology to market, as they perceive this option as an easier pathway for commercialization.

#### Support for Promising Innovations

The commercialization process is not linear; but there are specific key outcomes that help move technology towards the market such as the achievement of intellectual property (IP) or the attraction of partners. By the end of their grants, most I2I funded projects had filed for patents and obtained patent protection for their technology. Additionally, I2I funded projects have generally been successful with their partnerships. For instance, most partners remained connected with their respective project following the end of the I2I grant.

The evaluation also found that following the end of the I2I grant, many funded projects were able to secure contributions such as financial support, in-kind resources, and BRS from a variety of different sources including private companies, different levels of government, university incubators, academic institutions and personal investors. BRS were mostly provided by university incubators, private companies, and academic institutions. Researchers with funded projects would primarily access BRS for business acumen or contact with industry networks. Findings from the evaluation suggest that more BRS were available to researchers at larger institutions compared to those at smaller institutions with potentially smaller networks or access to resources (e.g., incubators). Consequently, there may be opportunities for the I2I program to leverage complementary programs (e.g., NSERC Lab to Market Program) and other funders (e.g., university incubators, accelerators) to help researchers and students attain the BRS required to support their commercialization activities.

Although not an objective of the I2I grants, student involvement in I2I funded projects was identified as positive outcomes of the grants. The availability and the contributions of the students to support the commercialization process was found to be an important factor in project completion. There are also indications that the grants have a positive impact on student academic and

career development. As such, the evaluation points to an opportunity for the I2I program to recognize the role of the students in relation to funded projects.

### **Transfer of Technology to Market**

The I2I grants are expected to facilitate the development of technologies and their transfer to the market. However, it should be mentioned that longer-term impacts of the grants such as getting technology on the market and subsequent benefits including company growth and job creation can take months or years to realize.

Evaluation findings suggest that more funded projects continued to pursue technology commercialization and have or plan to have their technology on the market compared to projects that did not receive I2I funding. It was also found that funded projects were more likely to use a spin-off pathway to transfer their technology to market over the option of transferring the technology to a partner company. As previously noted, it can be a challenge to find partners to act as receptors for their technologies. However, the evaluation points to the notion that I2I grants, and in particular the Phase II grants, are not perceived as well-suited for the spin-off pathway. This is due to beliefs that selection committee members are averse to the risks associated with the spin-offs. It was believed that projects involving a spin-off would not be eligible for an I2I grant because the spin-off might be owned or partly owned by the researcher and/or it would not be able to provide the financial support required of partners for a Phase II grant.

The evaluation also illustrates various examples of positive impacts of projects funded by one or more I2I grants. These impacts include the creation and expansion of businesses and companies that generated revenue from national and international sales, as well as the creation of employment opportunities. Funded projects also had positive impacts on the universities where they originated including revenue from the sale of technologies transferred to the market, strengthening research networks and increasing the visibility of researchers who successfully commercialized their research who could encourage others to follow in their footsteps.

### **Refresh and Modernize**

Several features of the I2I grants have remained static since the grants were implemented over twenty years ago, which may impact the extent to which the grants and the projects they fund are able to achieve expected outcomes. For instance, the funding offered for Phase I and Market Assessment grants has not kept up with inflation or the rising costs of commercialization, which was noted as a challenge to the successful completion of funded projects. In some cases, funded projects required “top-ups” from the institution to achieve expected outcomes.

The evaluation suggests that there are opportunities to improve the application process for the I2I grants, including moving the January call for applications to later in the month or before the holiday season and revisiting the length of the application. Findings from the evaluation also demonstrate a lack of clarity regarding the eligibility requirements for researchers who choose to pursue a spin-off pathway and a disconnect on how the stated selection criteria for awarding funding are perceived by the internal and external stakeholders involved with I2I grants (e.g., applicants, ILOs, SC members). Moreover, it was found that the review process is perceived as lacking consistency and transparency and there are differing perspectives regarding the degree to which risky projects are funded. The evaluation also pointed to several inconsistencies across internal I2I performance monitoring instruments, highlighting the opportunity for their revision.

There is an increased recognition from I2I stakeholders that EDI is an important consideration in research and commercialization, and that the integration of EDI may broaden the applicability and use of technology amongst end-users. While some researchers whose projects were funded by one or more I2I grants have made efforts to integrate EDI within the composition of their teams and in their technology(ies), EDI remains a relatively new and uncertain area for them. However, many are open to learn about how best to incorporate EDI into their R&D and commercialization activities and they have suggested that NSERC consider providing EDI-related training and tools for I2I stakeholders to support these efforts. It is expected that such support would help improve the quality of applications, advance EDI considerations in funded projects and increase the visibility of the I2I grants.

## **4.2 Recommendations**

Certain features of the I2I grants are perceived to challenge the support they provide for research commercialization and the success of funded projects. Findings related to these features, as discussed in this report, led to the identification of opportunities for improvement and three areas of recommendation focused on helping the I2I grants achieve their objectives.

### **Recommendation Area #1**



**Modernize the suite of I2I grants to further align with needs of the Canadian research community and changing Canadian innovation ecosystem. This includes investigating opportunities to increase the funding amount for the Market Assessment and Phase I grants, reassessing the value-added by the Phase II grants and allowing in-kind supports by partners for Phase I grants.**

One of the most notable opportunities for improvement recognized throughout the evaluation is the need to increase the dollar value for Market Assessment and Phase I grants, to support the increasing costs associated with the commercialization of research within the Canadian research innovation ecosystem. The amount of the I2I grants have not changed since the program's inception. Therefore, the grants have not kept up with inflation and have approximately 50% less purchasing power than they did 20 years ago when first implemented. The evaluation found that the static amount of the grants often created challenges for funded projects including difficulties hiring the necessary team members (e.g., consultants, students), and paying for materials, intellectual property (IP), and other project-associated costs. Such challenges could subsequently have a negative impact on the extent to which projects were able to achieve their expected results.

While the amount of the Phase II grants was not an issue, the low uptake of these grants over the years suggests that there are opportunities to re-assess the value-added by the Phase II grants as part of the suite of I2I funding and within the research and innovation ecosystem. For instance, between 2016-17 and 2021-22, Phase II grants represented 5% of applications received and 5% of the grants awarded, and very few Phase I funded projects sought a Phase II grant<sup>74</sup>. It is unclear why there is low uptake of the Phase II grants by the research community. However, the evaluation uncovered the following factors that may contribute to this situation including the lack of receptor companies willing to participate in a Phase II grant, the inability of companies to fulfill the matching required for this grant, and other funding opportunities available for researchers and Canadian companies to develop and transfer technologies to the market. Additionally, it appears that more researchers are using spin-offs as the pathway for commercialization which is sometimes perceived as a pathway that is ineligible for I2I funding or that will limit the success of a grant application.

A final opportunity for modernizing the I2I grants that was identified during the evaluation involves NSERC's consideration of allowing partners to provide in-kind supports during a Phase I grant, should they wish to do so. Despite not being required, evaluation findings indicate that almost a third (30%) of Phase I funded projects receive some form of financial or in-kind support from the partner and that such supports yield several benefits including fostering additional partner involvement throughout a project, encouraging long-term partnerships (i.e., post-grant), and supporting further technology development and commercialization activities. However, it was also noted by key informants that such investments, and in particular financial support, could increase the risk of committing IP too early in the process and raise challenges for smaller companies with limited resources. Consequently, it is recommended that NSERC create allowances for partners of Phase I funded projects to provide in-kind supports to facilitate project activities but does not make this a mandatory requirement of the grant.

## **Recommendation Area #2**

**Update the program logic model to improve the alignment between the expected outcomes of the I2I grants and NSERC's strategic vision (e.g., student training, EDI), and revise the program reporting instruments to reflect these new outcomes and improve performance monitoring.**

There is an opportunity for NSERC to strengthen the extent to which the expected outcomes of the I2I grants align with key components of NSERC's strategic vision, which are outlined in [NSERC2030: Discovery. Innovation. Inclusion](#). In particular, NSERC could examine opportunities to integrate considerations related to student training and EDI (e.g., considering EDI at each stage of the research and commercialization process) into the theory of change for the I2I grants and have these components reflected in the program's expected outcomes.

Although training was not an expected outcome of the I2I grants, evaluation findings indicate that students participated in most funded projects. As a result of their participation, students gained valuable experience regarding the commercialization process and could leverage this experience towards future career opportunities. Students also provided many benefits for funded projects with the majority of survey respondents whose funded projects involved students indicating that student support was an important facilitator for project completion. While student participation may sometimes be challenging for I2I funded projects (e.g., funding for salaries, time, and student availability), evaluation findings suggest that the benefits outweigh the challenges and there is an opportunity for NSERC to integrate student training as an expected outcome of the I2I grants. This will also enhance the recognition of the students' contributions for funded projects, support and further align the I2I grants with NSERC's strategic vision.

Regarding the EDI, findings from the evaluation indicate that while some researchers are integrating it within the research and commercialization activities, as well as in relation to the composition of their research team, there are opportunities for improvement and for NSERC to continue providing guidance and support. Additionally, NSERC should consider collecting self-

identification data for its I2I grants to monitor progress on increasing equitable and inclusive access to these grants.

Revisions to the program theory and expected outcomes of the I2I program will require subsequent changes to the program's reporting requirements as student participation and EDI are currently not adequately captured. It is also an opportunity for the program to review the current performance monitoring instruments as the evaluation identified several inconsistencies across these instruments including their format, terminology, and metrics. Many have been modified over time, creating challenges to the examination of longitudinal data. Additionally, there are gaps in the information collected. Revising the performance monitoring instruments would allow the program to align the various reports across stakeholder groups and points in time, as well as with similar instruments for other programs within NSERC's Research and Technology Partnerships Directorate.

### Recommendation Area #3

**Communicate with a focus on clarifying and repackaging information about the I2I grants, as well as identify new and strengthen existing pathways for dissemination amongst key stakeholders. This includes improving the transparency, clarity, and comprehensiveness of the details regarding the requirements for the application and review processes, as well as developing and expanding relationships with complementary programs and other funders.**

The evaluation found that over the years there has been a fair amount of confusion among stakeholders of the I2I grants regarding what is expected from applicants, particularly around the eligibility requirements, selection criteria, and review process. This confusion is more likely to occur for the Phase I and Phase II grants. For the eligibility requirements and selection criteria, findings from the evaluation indicate that there is a disconnect between what is stated in the program literature, what ILOs perceive as a successful application and how selection committee members interpret the selection criteria. For instance, it is unclear whether spin-off companies are eligible to receive I2I funding. Also, in the case of IP, more clarity is needed as to whether it is a requirement for the IP protection to be obtained before applying for a Phase I grant.

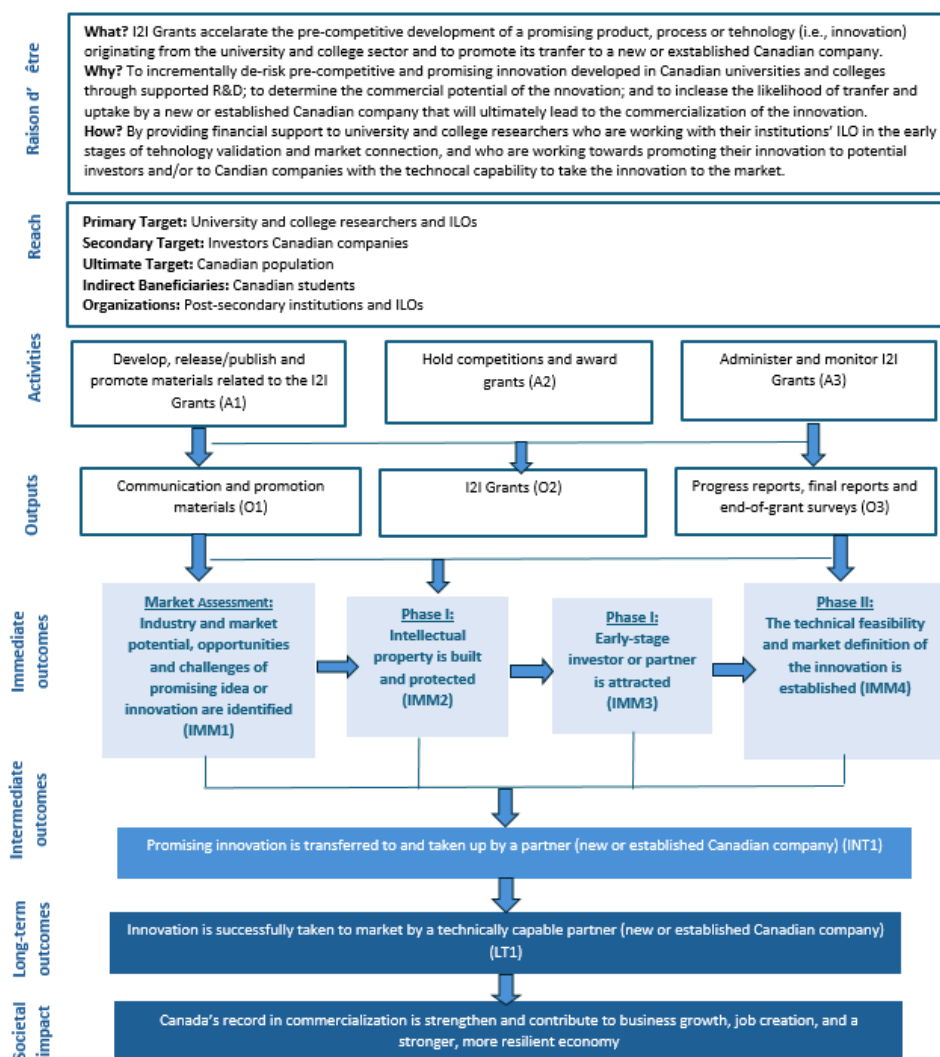
Another opportunity for improvement identified during the evaluation is the perceived lack of transparency regarding the review process. This process was noted as a source of frustration because of inconsistencies across funding calls and in the feedback received for initial submissions and subsequent resubmissions. It is also unclear what is considered to be a "risky" project and the degree to which such projects are funded. As a result, it is recommended that NSERC revise the literature for the I2I grants, specifically in relation to the application and review processes. Additionally, there are opportunities for NSERC to consider offering increased guidance, tools, and training for applicants, ILOs, and selection committee members to help each group navigate the application and review process.

Finally, there is an opportunity to leverage complementary programs (e.g., Lab2Market offered by some Canadian universities and the new NSERC Lab to Market Grants) and other funders (e.g., university incubators, accelerators) to help build new and expand existing relationships between the I2I program, the post-secondary institutions and (potential) industry partners. Such efforts could help increase the visibility of the I2I grants within the Canadian research innovation ecosystem and provide opportunities to address potential situations of confusion amongst stakeholders of the I2I grants, particularly around the application and review processes. Moreover, it was suggested throughout the evaluation that developing and strengthening such relationships could facilitate opportunities to provide researchers with business-related and other supports to help them in their commercialization activities and strengthen the Canadian research innovation ecosystem. Such relationships were noted as likely to be particularly advantageous for small institutions as they often have access to fewer resources.

## Appendix A. I2I Logic Model

This logic model includes a description of the I2I grant's *raison d'être* and reach. This model also delineates the I2I grants' activities, outputs, immediate outcomes, intermediate outcomes, long-term outcomes, and societal impacts. The logic model is presented visually in Figure 10 below with a narrative description of each component following.

### Figure 10. I2I Logic Model



## ▼ Explanation of figure 10

### Raison d'être

The objectives of the I2I grants are to accelerate the pre-competitive development of promising innovations (products, processes, or technologies) originating in the university and college sector and to promote their transfer to new or established Canadian companies. The I2I grants support the commercial potential of these innovations and increase the likelihood of their transfer to and uptake by new or established Canadian companies, ultimately leading to their commercialization.

The I2I grants achieve these objectives by providing financial support to university and college researchers who are working with their institutions' ILOs on the early stages of technology validation and market connection as well as on promoting their innovations to potential investors and/or to Canadian companies that have the technical capability to bring these innovations to market.

### Reach

#### Target groups

A target group is a set of individuals and/or organizations that experience a change of state as the result of the outcomes of a program. The primary target groups for the I2I grants are:

- university and college researchers; and
- university and college ILOs (or equivalent position).

The secondary target groups are:

- investors who invest mainly in pre-competitive Canadian innovations that have market potential; and
- Canadian companies with receptor capacity, technical capabilities, and market connections.

The Canadian public is the ultimate target group for the I2I grants, and the desired long-term societal and economic impacts of these grants are to enhance Canada's reputation for commercialization and to contribute to business growth, job creation and a stronger, more resilient economy.

### ***Indirect beneficiaries***

The indirect beneficiaries of I2I grants are Canadian students who participate in applied-research training and technology-transfer activities. Through this participation, they gain knowledge and skills specific to early-stage-technology validation and technology transfer.

### ***Beneficiary organizations***

Beneficiary organizations are groups, institutions or government bodies that are not targets for investments or grants but rather for selected activities that will bring about changes in them. The beneficiary organizations for I2I grants are post-secondary institutions.

### **Activities**

Activities are carried out by NSERC and are controlled by NSERC staff.

- *(A1) Developing, releasing, publishing, and promoting documents related to I2I grants* – NSERC publishes information about I2I grant opportunities on its website, including descriptions, eligibility criteria, selection criteria, application deadlines and other relevant information.
- *(A2) Holding competitions for and awarding I2I grants* – All eligible Phase I, Phase IIa and Phase IIb grant applications are peer-reviewed by external reviewers who are scientific or technical experts and often entrepreneurs and specialists in the fields concerned, as well as by the I2I selection committee. Unsuccessful applicants receive feedback from the committee, while both successful and unsuccessful applicants receive external reviewers' comments on the strengths and weaknesses of their proposal.
- *(A3) Administering and monitoring I2I grants* – NSERC's Finance Division administers and conducts financial monitoring of the I2I grants. It gathers financial information for NSERC-wide reporting, processes grant payments and carries out various monitoring activities to ensure compliance with regulations such as the *Policy on Transfer Payments*. In cases where the I2I grant holder is working with a partner, grant payments are disbursed on the condition that the partner has met its financial commitments to the project and confirmed its continued support.

### **Outputs**

- *(O1) Communication and promotional material* – Information on I2I grant opportunities is made available to potential applicants via the NSERC website and is updated annually.
- *(O2) I2I grants* – The I2I grants offers four different types of funding: Market Assessment; Phase I and Phase Ib; Phase IIa; and Phase IIb. Phase I and Phase Ib grants fund reduction-to-practice projects, while Phase IIa and Phase IIb grants fund technology-enhancement projects. (A complete description of each of these types of grants is provided in the I2I program description. The outcomes associated with each type of grant are described in the Immediate Outcomes section below.)
- *(O3) Progress reports, final reports, and end-of-grant reports* – Grant holders, ILOs, and partners (investors or companies) submit progress reports and/or final reports in accordance with the type of I2I grant that they have received. A final report provided by a partner company includes an assessment of the impact that the project has had on its organization as well as the plan to commercialize the project innovation. ILOs participate in a commercialization-activities survey 18 months after the end of the grant.

### **Outcomes**

The outcomes of I2I grants are expected to occur at various levels and at various points in time. The achievement of outcomes depends on the decisions that grant holders make and the activities that they carry out, over which NSERC has no direct control.

### ***Immediate outcomes (IMM1 to IMM4)***

Immediate outcomes are the direct results of the outputs.

I2I grants assist researchers in the early stages of technology validation and marketing and thus help them to bring technologies closer to market. Researchers can apply for each of the four different types of I2I grants independently or in sequence. Which type is appropriate depends on what stage of development the technology or innovation has reached and on whether the researcher is working with a partner. For example, a researcher might first apply for a Phase I grant (for a reduction-to-practice project), then apply for a Phase II grant (for a technology-enhancement project). Alternatively, for a technology or innovation that is already at a later stage of development, the researcher might skip Phase I and start with a Phase II grant.

When ILOs and researchers do not know the potential market for their technology, they may benefit by applying for a market-assessment grant before applying for a Phase I or Phase II grant. A market-assessment grant enables a researcher and their institution to hire an outside consultant to conduct an independent market assessment to identify the industry and market potential, opportunities and challenges of their promising idea or innovation (IMM1). This assessment can also be used to better position the proposed technology or innovation for subsequent I2I grant applications or other NSERC funding opportunities.

Researchers and ILOs may benefit by applying for a Phase I grant when they do know the potential market for their innovation; when they have determined to what extent it can be applied in that market or for its intended purposes; when potential receptor companies, end users, clients and industrial-value-chain stakeholders have expressed their interest; and, if the plan is to create a spin-off company, when experienced business mentors will be participating in the project. In projects funded by Phase I grants, prototypes are developed to demonstrate the market suitability of innovations, so that valuable intellectual property can be built and protected (IMM2).

In practice, this means that a well-defined process will be put in place to protect the intellectual property. Every Phase I grant application must include a partnership plan showing how early-stage investors or partners will be recruited (IMM3). This plan must include a go/no-go decision point for the partnership at the end of the Phase I project and must describe how the partnership will work—for example, how an early-stage investor will provide seed funding or how a company with the capacity to commercialize the technology will further develop the innovation for market. Phase I grant holders may choose to apply for Phase Ib supplements when their projects have high promise of securing investors or licensing companies. Although Phase I and Phase Ib funding serve the same goal, ILOs apply for Phase Ib supplements on behalf of projects when additional funding is required for the process of securing such investors or companies.

Phase II grants are the most appropriate funding option for researchers who have already established a partnership and have a well-defined process in place for protecting the intellectual property (note that at this stage, the intellectual property is usually protected). Researchers who have partnered with early-stage investors can apply for Phase IIa grants, while researchers who have partnered with new or established Canadian companies can apply for Phase IIb grants.

For Phase IIa grant applications, by researchers who have partnered with early-stage investors, thorough market research must be conducted, potential buyers must be identified, technology-transfer terms must be disclosed, and a budget that describes the future financial requirements and the plans for meeting them must be presented. The partnering investor must participate in the development of the technology-transfer plan, contribute at least one-third of the funding required for the project and have the financial capacity necessary to carry the project into Phase IIb or directly to market. If the research team plans to spin off a new company, then experienced business mentors must be involved. The end of the project must include a go/no-go point at which the decision is made whether to further develop the innovation through a new or established Canadian company.

For Phase IIb grant applications, by researchers who have partnered with companies, a prototype must already exist; a strong business plan must have been put in place; the receptor company's ability to manufacture, distribute and licence the product must have been demonstrated; adequate budgets are required to demonstrate that the product will go on to the manufacturing stage and commercialization at the end of the project; and if plans call for the creation of a spin-off company, then experienced business mentors must be participating in the project. Phase IIb grants enable partnering companies to conduct further market assessments, development activities, engineering work, and sales and marketing planning activities with the goal of producing a commercially viable innovation. The partner company must have or be able to acquire by the end of the project, the technical capability to undertake the work needed to bring the innovation to market. At the end of a Phase II grant, or thereafter, the project should have established the technical feasibility and market definition of the innovation (IMM4).

The time required to achieve I2I grant immediate outcomes (IMM1, IMM2, IMM3 and IMM4) varies greatly from one project to another, and these outcomes may occur at the end of the grant or later on.

**Intermediate outcomes (INT1)**

Intermediate outcomes are expected to logically follow once one or more immediate outcomes have been achieved.

The pathway from technology to market is not necessarily linear or the same for all innovations. It is influenced by multiple internal factors (such as the nature of the innovation and the relative performance of the technology) and external factors (such as the extent of market opportunities, the need for and access to financial support, and buy-in from business value-chain stakeholders). The diversity of paths from technology to innovation reflects the fact that any immediate outcome or sequence of immediate outcomes can potentially contribute to the intermediate outcome: a promising innovation’s being transferred to and taken up by a new or established Canadian company as a partner (INT1). This outcome is generally expected to occur up to four years after the end of the I2I grant. In practice, this outcome could also occur earlier, during the course of the grant. In some cases, it could even trigger an application for a Phase II project.

**Long-term outcomes (LT1)**

Long-term outcomes are the most important changes that can reasonably be causally attributed to an organization, policy, program or initiative and are the consequence of one or more intermediate outcomes. Long-term outcomes usually represent the *raison d’être* of an organization, program or initiative and take the form of sustainable changes of state among the beneficiaries (target groups).

The intermediate outcomes of I2I grants contribute to the commercialization of technologies and innovations from the university and college sector over a period of four to five years. By accelerating the pre-competitive development of these technologies and innovations and promoting their transfer to new or established Canadian companies, I2I grants reduce the risk associated with this process. When these grants reduce this risk sufficiently, they create opportunities for companies to assume the risk associated with commercializing these technologies or innovations. Thus, by creating these opportunities, I2I grants help technically capable new or established Canadian companies to bring these technologies and innovations to market successfully (LT1).

**Societal impacts**

Societal impacts are the broad impacts on society to which the I2I grants, along with many other NSERC programs and initiatives, contribute. Societal impacts are not usually measured at the program level, because of difficulties in tracking and attribution, but are instead assessed at the departmental or government-wide level by means of aggregate measures.

Over time, technically capable Canadian companies that take technologies and innovations from the university and college sector to market will help to strengthen Canada’s reputation for commercialization, leading to benefits such as business growth, job creation, and a stronger, more resilient Canadian economy.

**Appendix B. I2I Evaluation Matrix**

The following pages provide an evaluation matrix that contains indicators and data sources to address each of the above evaluation questions.

**Table 10. I2I Evaluation Matrix**

Evaluation questions	Indicators	Methods and data sources					
		Document and Literature Review Environmental Scan	Administrative and financial data and file review	Interviews with ILOs	Interviews with key stakeholders	Survey of researchers (funded and unfunded)	Case Study
Implementation: <i>Design, implementation, and its factors</i>							
Efficiency: <i>Use of resources in relation to the production of outputs and results and to the progress towards the achievement of expected results</i>							

Evaluation questions	Indicators	Methods and data sources					
		Document and Literature Review Environmental Scan	Administrative and financial data and file review	Interviews with ILOs	Interviews with key stakeholders	Survey of researchers (funded and unfunded)	Case Study
1. To what extent do the design and delivery features of the I2I Program effectively and efficiently support the development of promising technologies and their transition to successful commercialization?	Evidence and perceptions on the appropriateness of each of the I2I funding options (i.e., Market Assessment/Lab2Market, Phase 1 and 1a and Phase 2a and 2b) in terms of:						
	<b>Indicators specific to each phase:</b>						
	<b>Market Assessment and Lab2Market</b>						
	1.1. Evidence and perceptions of Lab2Market's added value		X	X	X	X	
	1.2. Evidence of utilization of the MA		X	X	X	X	
	<b>Phase 1 and 1b</b>						
	1.3. Grant duration (i.e., 6 months for Phase 1b, various durations by sector/discipline, longer duration for Phase I)		X	X		X	
	1.4. Partnership level of engagement (e.g., opportunities to involve partners and their level of commitment, for example if in-kind contributions could be authorized)		X	X	X	X	
	<b>Indicators applicable to all phases</b>						
	1.5. Extent to which I2I program responded to the needs identified by the stakeholders and the shifts in the broader research commercialization landscape			X	X	X	X

Evaluation questions	Indicators	Methods and data sources					
		Document and Literature Review Environmental Scan	Administrative and financial data and file review	Interviews with ILOs	Interviews with key stakeholders	Survey of researchers (funded and unfunded)	Case Study
	1.6. Role and level of involvement of industrial liaison officers, (specifically for Phase 1b, the entry point, the amount, the process, the expected outcomes.)		X	X	X	X	
	1.7. Grants dollar value (evidence and perceptions of how much money in each phase of the innovation is achieving its intended results)		X	X	X	X	
	1.8. Selection process: 1.8.1. pertinence of the selection criteria (e.g., including a training component, having a partner for phase I) 1.8.2. perception of the selection committee tolerance to risk 1.8.3. Perceptions regarding appropriateness of frequency of calls		X	X		X	



Evaluation questions	Indicators	Methods and data sources					
		Document and Literature Review Environmental Scan	Administrative and financial data and file review	Interviews with ILOs	Interviews with key stakeholders	Survey of researchers (funded and unfunded)	Case Study
	1.9. The Extent to which researchers engage mentors/partners who can provide business-related support to help with the commercialization process (e.g., business acumen, assistance from university incubators, access to market information, etc.) a) Factors that facilitate or challenge the engagement of mentors/partners who can provide business-related support. b) Opportunities to improve connections between researchers and mentors/partners that can provide business-related support for the commercialization of technology	X		X	X	X	X
	1.10. Consideration of equity, diversity, and inclusion principles (descriptive information based on the existing admin data) (inclusion of the career stage for researchers) 1.10.1 The extent which diverse researchers are able to access and be successful with I2I grants (i.e., career stage of researcher)	X	X	X	X	X	X
	1.11. Ratio of administrative costs to total costs compared to other similar programs		X				

Evaluation questions	Indicators	Methods and data sources					
		Document and Literature Review Environmental Scan	Administrative and financial data and file review	Interviews with ILOs	Interviews with key stakeholders	Survey of researchers (funded and unfunded)	Case Study
Effectiveness: <i>Achievement of expected results</i> <sup>15</sup>							

Evaluation questions	Indicators	Methods and data sources					
		Document and Literature Review Environmental Scan	Administrative and financial data and file review	Interviews with ILOs	Interviews with key stakeholders	Survey of researchers (funded and unfunded)	Case Study
2. To what extent I2I grants have contributed to the achievement of the immediate results associated with each I2I funding option?	2.1. Extent and nature of intellectual property protection (e.g., patent protection, non-disclosure or confidentiality agreements, trademarks, copyrights, industrial design registrations, etc.) 2.1.1. Proportion of research that filed intellectual property protection at the end of the grant <u>76</u> 2.1.2. Proportion of research that obtained intellectual property protection 18 months after the end date of the grant <u>77</u> 2.1.3. Proportion of research that obtained intellectual property protection at the time of the survey <u>78</u>		X	X		X	
	2.2. Evidence regarding the extent to which projects attracted a partner at the end of a grant, by phase and sector (i.e., national, or international partners, venture capitals, spin-offs, manufacturer or user companies)		X	X		X	X
	2.3. Extent and nature financial and in-kind contributions committed and received from partners and other sources (i.e., investors) for both funded and unfunded projects to assess difference in ability to generate additional funding		X	X		X	

Evaluation questions	Indicators	Methods and data sources					
		Document and Literature Review Environmental Scan	Administrative and financial data and file review	Interviews with ILOs	Interviews with key stakeholders	Survey of researchers (funded and unfunded)	Case Study
	2.4. Proportion of projects that proceed as planned or with modifications (e.g., reduced scope, increased timelines, with other sources of funding?)		X	X		X	
	2.5. Evidence and perceptions of the impact of COVID-19 on the progress and results of funded projects	X		X	X	X	X

Evaluation questions	Indicators	Methods and data sources					
		Document and Literature Review Environmental Scan	Administrative and financial data and file review	Interviews with ILOs	Interviews with key stakeholders	Survey of researchers (funded and unfunded)	Case Study
3. To what extent have I2I grants contributed to the transfer and adoption of innovations by partners and their successful uptake to market (new or established Canadian companies)?	3.1. Proportion of innovation supported by I2I that have been transferred [compared to unsupported innovations, if data is available]			X		X	
	3.2. Proportion of market research grants that subsequently submitted a Phase I application (and success rate)		X				
	3.3. Proportion of Phase I grants that subsequently submitted a Phase IIa & b application (and success rate)		X				
	3.4. Time to market for I2I-supported innovations compared to non-I2I-supported innovations		X	X		X	X
	3.5. Stakeholders' perception of I2I's contribution to the commercialization of innovations		X	X	X	X	X
	3.6. How the intellectual property was used and by whom (i.e., Canadian companies vs. foreign companies)		X	X	X	X	X
	3.7. Evidence and perceptions regarding the technical feasibility and definition of the market innovation at the end of the grant, 18 months after the end date of the grant and/or at the time of the survey (e.g., number of new companies created, annual sales revenues resulting from innovation, number of jobs created as a result of the innovation)		X	X	X	X	X

Evaluation questions	Indicators	Methods and data sources					
		Document and Literature Review Environmental Scan	Administrative and financial data and file review	Interviews with ILOs	Interviews with key stakeholders	Survey of researchers (funded and unfunded)	Case Study
	3.8. The innovation is being successfully taken to market by a technically capable partner (new or established Canadian company)		X	X	X	X	X
	3.9. Impacts and achievements that I2I Grants had on the technology transferred and partners' organization (e.g., developed new products and services, contributed to organization' productivity, organization's competitiveness, contributed to policy, met regulatory requirements, etc.)			X	X	X	X
	3.10. Extent to which student/trainees are involved in the I2I grants and the nature of training/mentoring offered		X			X	X
	3.11. Perception of facilitators and challenges for technology transfer			X	X	X	X
<b>Relevance:</b> <i>Continued need of program and alignment with federal government priorities, roles, and responsibilities</i>							

Evaluation questions	Indicators	Methods and data sources					
		Document and Literature Review Environmental Scan	Administrative and financial data and file review	Interviews with ILOs	Interviews with key stakeholders	Survey of researchers (funded and unfunded)	Case Study
4. What niche does the I2I program occupy in supporting technology transfer with the Canadian innovation ecosystem?	4.1. Evidence and perception of the extent to which I2I continues to meet the need for bringing technologies towards the market in Canada	X		X	X	X	
	4.2. Evidence on Canada's challenges in closing the gap between research and commercialization	X		X	X		
	4.3. Evidence on gaps filled by I2I grants to foster innovation in Canada	X		X	X		
	4.4. Evidence regarding the level of overlap or complementarity of the I2I program with competing federal programs and any opportunities for collaboration	X			X (NSERC only)		
	4.5. Evidence on the level (degree) of alignment/conformity between I2I grant objectives and NSERC and Government of Canada priorities (e.g., EDI alignment, IP strategy, research security?)	X					

## Appendix C. Detailed Methodology

This section outlines the methodology undertaken to complete the evaluation of I2I. The descriptions below may be supplemented with further methodological information included in each corresponding technical report.

### Primary Data Collection

#### Survey of I2I Applicants (Funded + Unfunded)

A survey was conducted amongst researchers who applied for I2I funding. The survey was distributed in two waves, one for researchers who received funding between 2010-11 to 2021-22 and one for researchers who applied between 2015-16 to 2021-22 but did not receive funding. Although this evaluation focuses on fiscal years 2015-16 to 2022-23, the sample of funded researchers

includes funded projects since 2010-11 allowing to evaluate the long-term impacts of projects initiated before 2015, thereby assessing sustained effects and outcomes over a longer timeframe. The one fiscal year difference with the evaluation timelines was necessary to allow the funded researchers to finish their grants.

These two surveys were used to compare outcomes of researchers who received an I2I grant with researchers who applied but did not receive a grant. They aimed to develop a representative picture of nationwide views and experiences with I2I in areas of design and implementation, impacts and achievement, and strengths/areas for improvement. Questions investigated the differences in responses based on the funding stream that applicants had applied for to help better understand avenues that contribute to commercialization.

Four hundred ninety-four (n=494) funded researchers were invited to complete the funded researchers survey with 121 completing the survey. The response rate was 24%. Two hundred thirty (n=230) unfunded researchers were invited to complete the applicant survey with 47 individuals completing the survey. The response rate was 20%. Both respondent groups were determined to be representative of the overall sample population. Table 11 represents characteristics of funded researcher respondents.

**Table 11. Characteristics of Funded Researcher Survey Respondents (n=121)**

Characteristic	N	%
<b>Regional Distribution</b>		
Ontario	54	45%
QC	34	28%
BC	14	11%
Prairies	11	9%
Atlantic	8	7%
<b>Total</b>	<b>121</b>	<b>100%</b>
<b>Grant Type</b>		
Market Assessment	19	16%
Phase I	75	62%
Phase Ib	18	15%
Phase IIa	2	2%
Phase IIb	7	5%
<b>Total</b>	<b>121</b>	<b>100%</b>
<b>Fiscal Year (range)</b>		
2010-2014	41	34%
2015-2017	36	30%
2018-2021	44	36%
<b>Total</b>	<b>121</b>	<b>100%</b>

Table 12 represents characteristics of unfunded researcher respondents.

**Table 12. Characteristics of Unfunded Researcher Survey Respondents (n=48)**



Characteristic	Number (N)	Percentage (%)
<b>Regional Distribution</b>		
Ontario	25	51%
QC	11	23%
BC	6	13%
Prairies	6	13%
Atlantic	0	0%
<b>Total</b>	<b>48</b>	<b>100%</b>
<b>Grant Type</b>		
Market Assessment	4	9%
Phase I	36	75%
Phase Ib	1	2%
Phase IIa	4	8%
Phase IIb	3	6%
<b>Total</b>	<b>48</b>	<b>100%</b>
<b>Fiscal Year (range)</b>		
2015-2017	14	29%
2018-2022	34	71%
<b>Total</b>	<b>48</b>	<b>100%</b>

### Key Informant Interviews

Interviews were conducted with a series of different stakeholders, both internal and external to I2I program operations. Internally, interviews were conducted with the selection committee members, I2I program staff, and NSERC management; externally interviews were conducted with ILOs representatives and Phase II partners. The purpose of the interviews was to gain qualitative insights into the program, including to learn more about preferences, suggestions, experiences, and opportunities with program implementation, effectiveness, and impact.

A summary of the number of stakeholders included can be found in Table 13, below:

**Table 13. Overview of Key Informant Interviews**

Stakeholder Group	Number of Completed Interviews
<b>Internal Stakeholders</b>	
Program Staff/Leadership	5
Selection Committee Members	6
<b>External Stakeholders</b>	
Industry Liaison Office Representatives	17

Stakeholder Group	Number of Completed Interviews
Phase II Partners	8
<b>Total</b>	<b>36</b>

The interviews data analysis included both an inductive and deductive approach to coding to capture the emerging codes/themes. Table 14 presents the scale used to describe qualitative data throughout all analysis (e.g., with both internal and external stakeholders).

**Table 14. Scale to describe qualitative findings in report**

Word(s) used to describe range	Range in percentage (%)
<b>All/almost all</b>	Findings reflect the views and opinions of 90% or more of respondents.
<b>Large majority</b>	Findings reflect the views and opinions of at least 75% of respondents, but fewer than 90% of respondents.
<b>Majority/most</b>	Findings reflect the views and opinions of at least 50% of respondents, but fewer than 75% of respondents.
<b>Some</b>	Findings reflect the views and opinions of at least 25% of respondents, but fewer than 50% of respondents.
<b>A few</b>	Findings reflect the views and opinions of at least two respondents, but fewer than 25% of respondents.
<b>Others</b>	Findings reflect the views of one respondent or an array of views that have no quantifiable value.

## Case Studies

To support the overall evaluation of NSERC's I2I grants, six case studies were conducted to showcase projects from grantees that successfully commercialized innovations. The focus of the case studies was to capture effectiveness and impact of the I2I funding for projects in the commercialization process and to the extent possible, trace the path of supported projects from innovation to commercialization. Although the scope of this evaluation is primarily focused from 2016-17 to 2022-23, the scope of the case studies included projects funded as early as 2010-11. The case study scope was extended to support identification of long-term impacts of the grant, as it can take projects many years to proceed through the commercialization process.

The case study data was derived from three lines of evidence: document review, web search, and key informant interviews. The three data sources are complementary to each other and focus on the collection of qualitative information. A brief depiction of these data sources can be found in Table 15.

**Table 15. About Case Study Data Sources**

Method	Description
<b>Key Informant Interviews</b>	Up to 4 key informant interviews were conducted per case study (with researcher, partner, ILO representative, trainee, or other as identified by project team). The goal of these discussions was to explore how the I2I grant supported innovations along the pathway to be successful in reaching commercialization and capture impact stories that support evaluation questions. Interviews were also be leveraged to refer the evaluation team to additional collaborators or documents that could be included when scheduling additional interviews or during the document review/web search.
<b>Document Review</b>	Documents examined for each case study included grant applications for Phase I and II, final reports, market assessment reports (when relevant and available), and ILO follow-up reports. The review provided insight into project type, funding, and trajectory of commercialization during the I2I funding, and supported learnings about the implementation the project.
<b>Web Search</b>	A web search was done for each case study to explore additional information about the project technology. This included an exploration of any spinoff companies or additional funding sources received by the project and helped situate the innovation in the larger Canadian context.

The Table 16 below presents an overview of case study representation.

**Table 16. About Selected Case Studies\***

Case Study	Grant Year	Grant Type	Sector	Region	Partner
CS01	2015/16	Phase I	Biomedical Engineering/ Medical Devices	Atlantic Canada	Canadian startup (PI is co-founder)
CS02	2010/11	Market Assessment + Phase I	Engineering/ Ocular Pathologies	Ontario	Canadian Incubator (PI is on Board)
CS03	2015/16	Market Assessment + Phase I	Chemistry/ Mining	Prairies	Canadian spinoff (PI on Board of Directors)
CS04	2016/17	Phase I	Nanotech/ Clean Materials	Prairies	Canadian spinoff (PI is co-founder)
CS05	2013/14	Phase II	Physical Sciences/ Optical Imagery	Quebec	Canadian spinoff (PI is co-founder and president)
CS06	2015/16 to 2018/19	Market Assessment + Phase I + Phase II	Biophysics	West Coast	Canadian Startup (PI is founder)

\* Information shared is intended to be high-level, to provide context to the project without identifying the involved research team.

## Secondary Data Review

### Administrative Data

The analysis of the administrative data provided program description information which helped to contextualize the findings from the other lines of evidence. The Table 17 below provides a snapshot of data sources included. Data analyzed included applications and program's follow-up data covering the period of April 2016 to March 2022. The follow-up sheets included information regarding Market Assessment results (i.e., outcomes, industry sector and consultant name), and information regarding Phase I and Phase II (i.e., other subsequent phase, industry sector, project status, outcomes description, spin-off company name, year technology hit the market, and technology summary) as a follow-up after grant completion. The data in these files was collected manually by the program staff. They were collected through emails sent to the ILOs at least one year after receiving the ILOs final reports. Due to the fact that the data from the follow-up sheets were sometimes incomplete the analysis for this evaluation included only the variables related to the project status and the outcomes' description.

**Table 17. Summary of data source**

Data source	Number of files	Sources
Administrative data	937	NSERC Award Management Information System (NAMIS)
Market Assessment Follow-Up Sheet	165	Program manual entry
Phase I and II Follow-up Sheets	60	Program manual entry

### Researcher Reports

Secondary data also included the analysis of the final reports submitted by researchers for Phase I and Phase II. Phase I reports cover the period from 2016-17 to 2022-23 while Phase II reports cover the period from 2010-11 to 2022-23 to ensure capture of longer time outcomes. Data from Phase I researcher reports were extracted directly from NAMIS. A total of 178 reports were due at

the time of the evaluation, of which 134 were received and analyzed. As for the data on Phase II, we identified 38 Phase II projects that were completed during the reporting period, however 8 of them did not have a final report. Thus, the analyses for the researchers' final reports covers 134 Phase I projects and 30 Phase II projects, for a total of 164 reports.

## Partner Reports

Partners on the Phase IIa and IIb projects were also required to submit a final report describing their contributions to the projects and the impacts that the grants had on their organizations. The analysis of partners' final reports covered the period of 2010 to 2022. It is to be noted that only Phase IIa and IIb grants need to have a formal partner who has to contribute with cash and In-kind. Therefore, only Phase IIa and IIb grants have the requirement to collect data from the partners on the project. Between fiscal years 2010–2011 and 2021–22, there were 38 Phase IIa and Phase IIb grants completed, 25 for which the program received the final reports from partners. Of the 38 grants completed 8 were Phase IIa and 30 are Phase IIb. Of the 25 final reports received from partners, 22 were for Phase IIb, and 3 were for Phase IIa, of which only 2 had relevant information.

## Phase Ib Reports

The Phase IB grants are extensions of Phase I with funds. They are provided to successful Phase I grants who have attracted potential partners, but for which they need additional time before the potential partners accept to take on the technology. Between 2016–17 and 2022–2023, 34 Phase IB grants were awarded. Of the 34 projects, 30 reports were retrieved from the I2I program folder. One of them was in a non-comparable format, so 29 reports were analyzed for the purpose of this study.

## ILO Reports

The ILOs are also required to complete a report in a format of an on-line survey for each Phase I and Phase II grant funded for a researcher at their institution. The analysis of the ILOs reports covered the period of 2016–17 to 2020–21. It is important to note that the ILOs survey is sent 18 months after the end of the grant, therefore for the 271 Phase I and Phase II grants awarded after 2016 and completed before 2020, only 101 were asked to report their results and 85 completed the survey. In 2020 the program changed its reporting system for the ILOs and modifications have been made to the template and questions.

As a result, the 85 reports received since 2016 were in two different reporting systems. During the analysis of the ILOs reports it was decided not to report on the 16 cases in the old report format due to limited resources and difficulty in mapping the questions with the most recent version of the template, therefore the analysis of the ILOs data is based on 69 reports.

## Literature Review

The literature review addressed the relevance questions about the need that I2I grants address in the Canadian innovation ecosystem and the existing challenges for research commercialization. It also looked at the best practice examples in term of technology transfer, IP policies and incorporating EDI in the research commercialization process.

The following questions were used to inform the searching for the literature review.

### Literature Review Questions

1. What are the needs in term of innovation and commercialization in Canada?
2. What are the challenges Canada is facing in term of innovation?
  - a. How did the commercialization and innovation landscape evolve?
  - b. What are the best practices from highly innovative countries?
3. What are the best practices in incorporating EDI in commercialization process?

For the purpose of this literature review, recent Government publications were reviewed first (e.g., 2017 to 2022–23 budget, House of Commons papers). Grey literature from the Canadian Council of Academy (CCA) and from other organizations was used to address best practices in highly innovative countries as well as the state of art of innovation in Canada and the challenges that Canada is facing. Peer reviewed articles were included to look at best practices in term of EDI and the how has the commercialization and innovation landscape evolved.

Government priorities were addressed by the Budgets and Throne Speeches documents that were found on the Government of Canada website. NSERC's Strategic Plan (NSERC 2030: Discovery. Innovation. Inclusion) was also considered and can be found on NSERC website. The Council of Canadian Academics (CCA) website offered many resources and reports on Canada's research and

innovation ecosystem. Statistics Canada and l'institut de la statistique du Quebec and the Organization for Economic Co-operation and Development (OECD) websites were also used as resources. Search engines such as Google and Google scholar were utilized to find scientific papers.

## Environmental Scan

The environmental scan was conducted to inform the evaluation on the niche that I2I grants address in Canada's commercialization ecosystem. Therefore, the scan focused on funding opportunities targeted at university researchers. The funding opportunities solely directed to businesses and start-ups were not systematically collected and will not be reported in a consistent way. This environmental scan was divided into three parts which all have a slightly different focus and scope.

1. **Canadian ecosystem:** looking at the funding opportunities that the Canadian innovation landscape offers to researchers in order to help them move out the technologies they develop, from the universities and to the market. To be included in this section the funding opportunities needed to be similar to the I2I grants (i.e., Market Assessment, Phase I, or Phase II). However, no funding opportunities like Market assessments were found. To note that we considered out of scope the governmental aid and funds for events and conferences.
  - a. This section included Canadian funding initiatives in NSE from federal<sup>79</sup>, provincial<sup>80</sup>, as well as not-for-profit<sup>81</sup> and university incubators and accelerators. The municipalities and private initiatives were explored to a lesser extent due to time and resource constraint.
2. **International student component:** looking at best practices on how to incorporate student training component into grants for researchers that focus on supporting commercialization.
  - a. Countries were selected based on their similarities with the Canadian political and research eco-system (i.e., United States of America, United Kingdom, France, Australia, Germany).
3. **International equivalent to Lab2Market Pilot:** looking at design aspects from international programs equivalent to NSERC Lab2Market Pilot.

Lastly the search for this scan was done over two periods of time, the Canadian ecosystem search ended in June 2023, the search for the other sections took place between August and September 2023. Any funding opportunities launched after these dates were not included.

## Appendix D: Success Stories of I2I Funded Projects

The following success stories illustrate examples of how the I2I grants helped researchers and their teams to bring their technologies to market and create spin-offs companies.

### Success story #1:

NSERC's Market Assessment and Phase I I2I grants allowed Dr. Stephen Foley, Associate Professor with the Faculty of Chemistry at the University of Saskatchewan, and his team to pivot direction and find an innovative electronic waste chemical process to extract gold with less toxicity and hazardous waste. Funding helped move their novel process out of a beaker to a scale that got the attention of partners. The team appeared on Dragon's Den which helped amplify their reach to potential partners and investors. They created a spin-off company, Excir ([Excir | Recycling | Precious Metals | Circular Economy](#)), patented and licenced the gold extraction process drawing international attention from partners in Canada and around the world. Most recently, the UK's Royal Mint partnered with this Canadian company to use their patented chemical processes to help reduce the environmental impact of e-waste and set new standards in sustainable precious metals globally. Graduate students Hiwa Salimi and Loghman Moradi were very involved in the project as well, and instrumental in getting Excir off the ground, showing the important role that the students play in advancing the innovations in post-secondary institutions.

### Success story #2:

A research team led by Dr. Jonathan Veinot, professor at the University of Alberta, was supported to scale nanoparticle materials and adapt their processes to accommodate a diverse and broad range of related products. The lead researcher co-founded an academic spin-off company, Applied Quantum Materials (AQM) Inc ( <https://www.aqmaterials.com/aqm-team>) to create the nanosilicon particles with a quantity and quality that no one else has been able to duplicate. The company's expertise in this niche area has drawn interest from around the world as companies look to purchase their products. Currently, the company makes revenue in Canada from the distribution of products to international customers that range from academics to large companies in countries such as the United States, Europe, Japan and Korea.

### Success story #3:

Dr. Sabrina Leslie (she/her, PhD), Associate Professor at University of British Columbia, founded a spin-off company, ScopeSys Inc. ([ScopeSys - Home](#)) to commercialize a disruptive microscopy technology in the space of genomic medicines and nano materials with the support of three I2I grants; 1) a market assessment grant to understand the market and potential uses of their innovation, 2) Phase I grant to support the creation of a marketable prototype, 3) Phase II grant co-funded by the spin-off company itself and focused on the application to two kinds of genomic medicines. To validate its value proposition and begin to build high-value relationships with biopharma, ScopeSys Inc. provides services to biopharma, for whom they make measurements and characterize RNA therapeutics and lipid-nanoparticle delivery processes. These commercial activities are aligned with the company's values of disseminating its valuable technology to advance science and to meeting patients' and society's needs. Today, ScopeSys supports 7 full-time employees (2 software developers, 1 Analytics lead, 1 Product and instrumentation lead, and 3 Biotalent co-op interns). Like other startups, it hires consultants for operations and accounting. To further its applied research, it supports 2 Mitacs post-docs. The lead researcher Dr. Leslie has received multiple awards such as the Women Entrepreneurship Fund award and the Young Investigator Award of the Biophysical Society of Canada, for her outstanding contributions in the field of single-molecule biophysics and recognition of energizing the translation of her innovations to practice. She has been elected to the Royal Society of Canada's College of New Artists, Scholars and Scientists and is internationally recognized for her passion and expertise in technology, translation, and supporting diversity.

## Appendix E: NSERC Lab2Market Pilot Review

### Introduction

This companion report presents an overview of the methodology and the findings for the review conducted for the Natural Science and Engineering Research Council (NSERC's) Lab2Market Pilot. This report outlines the findings related to the pilot, which was examined as part of the larger evaluation of the NSERC Idea to Innovation (I2I) grants.

### Program Description

In 2022, NSERC partnered with Toronto Metropolitan University (TMU) to offer the NSERC Lab2Market Pilot which gave research teams (i.e., researchers and students<sup>82</sup>, supported by their Industry Liaison Offices (ILOs)) the opportunity to assess the commercial potential of their technologies. The NSERC Lab2Market Pilot offers support for a period of 4 months by providing training, workshops, mentorship and networking opportunities for research teams that want to develop their commercialization skills. While the activities supported by the grants primarily focus on training and mentoring students to develop their commercialization knowledge and skills, researchers apply for the grants and support the students throughout the project. Researchers are also welcomed and encouraged to participate in the Lab2Market activities to be better placed to support their students to bring technologies to market.

During the program, the students assume the role of Entrepreneurial Lead (EL) and learn how to conduct a market assessment for their technology. They also have the opportunity to be guided by a mentor who is a subject matter expert. NSERC assumes all of the costs of participating in the Lab2Market Pilot and awards a grant of a maximum of \$20,000 for each project: \$5,000 to cover the fees of TMU Lab2Market programs consultants<sup>83</sup>, \$10,000 as a stipend for the student to compensate them for their time; and \$5,000 for the project's principal investigator (referred to as the researcher) for project-related expenses such as travel, mentoring and consultations.

Since inception, the NSERC Lab2Market Pilot offered 4 competitions, as follows: January 2022, June 2022, January 2023, and January 2024. Due to the timing of the 2023-24 evaluation of the NSERC I2I grants, only the NSERC Lab2Market Pilot grants awarded from the January 2022 competition could be examined based on available data. For that competition, 49 applications were submitted, and 48 grants were awarded across 25 post-secondary institutions, resulting in a 98% success rate. The number of grants awarded per post-secondary institution varied between 1 and 4 grants. Most of grants were awarded to researchers from large post-secondary institutions (67%), followed by medium (29%) and small (4%) post-secondary institutions. The majority of the grants were awarded to post-secondary institutions located in Ontario (44%), followed by Quebec (17%), British Columbia (13%) and Alberta (13%). Almost all the grants (94%) were for applications submitted in English.

## Scope and Purpose

The NSERC Evaluation Division in collaboration with Ference & Company conducted an evaluation of NSERC's I2I grants in conformity with the requirements of section 42.1(1) of the *Financial Administration Act* and the Treasury Board of Canada Secretariat *Policy on Results* (2016). This evaluation was leveraged to also examine the relevance, implementation, and impact of NSERC's Lab2Market Pilot. The findings of the examination of this pilot are presented below. The scope of this review includes only the 48 grants awarded as part of the January 2022 competition. At the time of the evaluation, it was not certain if the NSERC Lab2Market Pilot would continue beyond the pilot stage.

## Methodology

The methods used for the review of the NSERC Lab2Market Pilot include: an examination of the NSERC's administrative data, an environmental scan, a survey with Lab2Market funded researchers and key informant interviews (KIs) with various stakeholders involved in the NSERC Lab2Market Pilot.

The environmental scan looked at programs with similar objectives offered internationally including the role and training of students, grant duration, funding amounts and Equity, Diversity and Inclusion (EDI) considerations. Countries were selected based on their similarities with the Canadian political and research eco-system. The similar programs found included: the United States National Science Foundation's Innovation Corps (I-Corps™), the United Kingdom's Innovation-to-Commercialization of University Research (ICURe) program, Australia's Commonwealth Scientific and Industrial Research Organization ON Prime program, and France's Bpifrance i-PhD program.

A survey was sent to all researchers who received an NSERC Lab2Market Pilot grant from the first competition (n=48). However, only 5 researchers responded with a 10% response rate. Due to the low number of the survey respondents these results were used to contextualize the other evaluation findings and not presented separately. Also to better illustrate some of the findings, this report includes references to some of the survey results from the evaluation of the NSERC's I2I grants when the findings of that survey were equally relevant for the NSERC Lab2Market Pilot.

In addition, a total of 25 interviews were conducted with 26 key informants including: researchers, students, mentors, representatives from ILOs and members of the TMU team. Table 18 shows the distribution of the interviewees by type of participant group.

**Table 18. Number of interviewees across the type of stakeholders**

Type of stakeholder	Researchers	Students	Mentors	ILOs representatives <sup>84</sup>	TMU representatives	Total
Number of interviewees	4	4	4	12	2	26

Key informants were selected based on the following criteria: status of the project (i.e., completed), the size of post-secondary institution where they worked or studied, geographic distribution and language. The starting point was the identification and selection of a sample of researchers who completed their projects and met the criteria above. Following this identification, the corresponding students (i.e., those involved with the research team) and the ILOs representatives from the researchers' host institution were contacted to be able to acquire multiple perspectives regarding individual grants/funded projects.

The analysis of interview data used both deductive and inductive approaches to capture the emerging themes across the data. Given the qualitative nature of key informant interview data, and the fact that a low number of interviews were conducted among the different groups, the analysis in this report will use terminology that conveys a general sense of strength of opinion regarding particular issues, using the agreement scale described above for the overall evaluation of the I2I grants (e.g., "few" "some", "many") (See Appendix C, Table 14 for more details).

## Limitations and Mitigation strategies

The following limitations were encountered as part of the examination of NSERC's Lab2Market Pilot:

- **Difficulty in obtaining the contact information of some of the key informants.**

The NSERC Lab2Market Pilot had the contact information of the researchers, ILOs representatives and Lab2Market team at TMU, but not of the mentors and students involved with individual projects. Therefore, contact information for mentors and students was attained from researchers and the TMU team using a snowball sampling approach. Some key informants were unavailable or declined to participate in an interview. The evaluation team prepared for such situations by creating a list of back-up interviewees. Additionally, to encourage participation in the evaluation, the team made consistent and multiple attempts to contact potential interviewees, used various communication methods (e.g., phone, email), and explained the importance of their contributions in this evaluation.

- **Difficulty in getting all the relevant information.**

Not all key informants were able to answer all interview questions. For example, some of the key informants had limited knowledge about the NSERC Lab2Market Pilot and the extent to which the grant was leveraged by researcher and the research teams at their institution. In the spirit of inclusion, the evaluation team welcomed partial or limited responses from those key informants to be included in the analysis.

- **Low response rate for the survey with funded NSERC Lab2Market pilot researchers**

Only 5 researchers that received a NSERC Lab2Market Pilot grant responded to the survey that was conducted as part of the evaluation of the I2I grants. It is possible that the low response rate is a result of the fact that the researchers are not as involved in the funded projects as students often took the lead role. This limitation was mitigated by interviewing multiple key informants and using the survey data to contextualize the findings.

## Findings

### The Need for the NSERC Lab2Market Pilot and its Added Value

**NSERC Lab2Market Pilot addresses the need for expertise and training in research commercialization within the Canadian research innovation ecosystem.** Post-secondary researchers, and students have the technical knowledge regarding their technology but do not have the knowledge on how to transfer their technology to the market. Findings from the evaluation of the I2I grants show that there is a real need for business-related supports (BRS) to support researchers and students with understanding and navigating the commercialization process. This is particularly true for small institutions which generally do not have as many resources in this area. Many key informants identified the challenge to find BRS resources and relevant mentors in the Canadian entrepreneurial landscape. The I2I evaluation findings also identify the importance of student involvement in I2I funded projects, and although all of the projects funded by an I2I Phase I grant and 70% of projects funded by a Phase II grant involved students, training in research commercialization was not consistently provided. This shows that many students are involved with I2I grants and also a need for BRS training to help these students advancing their technologies to market. The I2I funded researchers that were surveyed felt there was a need for more training of students in areas related to research and entrepreneurship (44%) and findings from the I2I evaluation key informant interviews indicate that the NSERC Lab2Market Pilot was seen to address this gap and as a very useful resource to train students in research commercialization.

**NSERC's Lab2Market Pilot is valued and perceived as a positive addition to NSERC's suite of funding. The activities offered through these grants provide the curriculum, education, mentorship and networking for researchers and students to develop their entrepreneurial knowledge and skills.** The most important contribution of the NSERC Lab2Market Pilot identified by key informants was the student involvement in all the market research activities, as well as the knowledge and skills they acquired to build their commercialization expertise. In addition, the mentorship and the networking opportunities offered through the pilot were perceived as mechanisms that empowered the students with entrepreneurial skills that will help them in their future research efforts and careers. Having access to mentorship was mentioned by many key informants as being very valuable because the students had many questions, and benefitted from having someone to engage with and discuss the details of their projects. Mentors helped students make connections, helped them overcome the challenges they may have encountered, or pointed them in the right direction so they could move faster with their market research. The majority of key informants also spoke about the importance of networking and that the NSERC Lab2Market Pilot helped students connect and collaborate with businesses and other organizations. Many recognized that this likely would have not been possible without the existence of the NSERC Lab2Market Pilot.



*“...Lab2Market is an investment in increasing the skills and the knowledge of the individual that’s taking the study. It’s very different and I think in my view it’s a better investment. It’s rather see that you know, train someone to be able to go and find some of these questions for themselves.”*

— Key informant

*“Lab2Market was a big facilitator for doing the market assessment for the technology. If I had to do it by myself that would have been not weeks, but maybe months. Also, probably the Principal Investigator would have done that using the university resources and maybe external resources. So, it was definitely a big help. (...) From my point of view was very useful. I definitely know again which people to target and how, and also of course was successful for the NSERC I2I grant which is key to my research at this moment for sure.”*

— Key informant

**A few key informants saw the NSERC Lab2Market Pilot as complementary to the traditional I2I Market Assessment grants**, with an emphasized focus on training students who want to be engaged in research commercialization. The NSERC Lab2Market Pilot helped with market decisions by integrating end-users, as a way to test an idea before deciding if to continue or not with the technology development. A couple of key informants mentioned that the NSERC Lab2Market Pilot enabled research and development of the technology in real time, by engaging the student with the potential beneficiaries of the technology and allowing the project to advance more efficiently, saving time and resources. NSERC Lab2Market Pilot was seen as giving the student and researchers the option for conducting the market assessment themselves depending on their needs and circumstances of each project, as compared to the traditional I2I Market Assessment grants for which consultants would undertake the study. One key informant for example pointed to the fact that for the traditional I2I Market Assessment grants the consultant who is usually an expert in the field would undertake the study and the number of interviews could be quite limited by the cost. In comparison, students lead the projects funded with the NSERC Lab2Market Pilot grants, and although they did not have much experience with this work, the researchers felt they had more flexibility on how many interviews the students could conduct. The data collected from the additional interviews was useful helping with more and direct knowledge about the market and the viability of their technology.

## Results and Impacts

**The NSERC Lab2Market Pilot helped students build their business training and professional development and provided opportunities to build connections and pursue the commercialization of the technology.**

**Business, technical and soft skills:** All the key informants mentioned that the training offered through NSERC’s Lab2Market Pilot helped students to develop their business skills, technical skills and communication skills, both oral and written. Students learned how to contact and communicate with various groups of national and international stakeholders who were experts in the field or potential beneficiaries of the technology. Overall, the activities associated with the pilot really helped students to expand their horizons and build their networks. For instance, they learned how to conduct interviews, how to synthesize findings and write the market assessment reports. It was suggested that the opportunities to make connections with various stakeholders will serve the students for the rest of their careers.

*“I still look back at the lecture slides from time to time. Because commercialization is like a constant, it’s not something that you can just accomplish and then you are constantly going back and cycling over and over.”*

— Key informant

*« Ça m’a ouvert aussi l’esprit d’un point de vue d’être capable de contacter des gens. C’est parce que j’ai eu des entrevues avec de gens en Turquie, aux États-Unis, en Europe; donc j’ai vraiment eu des contacts à travers le monde. Je n’aurais jamais été confronté à ces gens-là d’une autre manière, peut-être. »*

— Key informant

**Academic and professional development:** The NSERC Lab2Market Pilot offers students the opportunity to see if commercialization is a viable career path for them. Many key informants mentioned that learning about the business world enriched the academic and professional experience of students, helping them to better situate their career’s aspirations and future plans. In

some cases, students learned that the entrepreneurial world was not something they were interested in, while others continued to pursue this path. Another benefit of the pilot was the fact that the students had opportunities to receive training without having to formally pursue another specialization as part of their studies.

*"I think commercialization is such a giant, giant topic. It definitely met my learning goals of what I could learn within this time frame. I definitely think there is still so much to learn, but that's kind of probably a lifelong journey."*

— Key informant

Even in the cases when they did not continue with transferring their technology to market, the NSERC Lab2Market grants allowed students and researchers to gain entrepreneurial skills and helped them to make decisions about their future career.

**Helping with the advancement of the technologies to market:** NSERC's Lab2Market Pilot helped students to explore the impact of their technology on the targeted population, bringing an important benefit to the development of their project. A couple of key informants mentioned that the research to explore the potential market for the technology really influenced them to make changes to the technology or to adapt it to a certain population to make it more applicable. It was felt that the insight to change the technology would not happen without the guidance received under the NSERC Lab2Market Pilot. Some key informants indicated that the NSERC Lab2Market Pilot allowed participating teams to discover the market opportunities and advance their technologies closer to the market. Also, a small number of survey participants indicated that they have filed a patent application and/or a Provisional Patent Application (PPA) related to the technology associated with their Lab2Market Pilot grant.

The projects that received an NSERC Lab2Market Pilot grant were demonstrating a wide range of technology readiness levels. For instance, some teams had an idea and a little bit of initial data, while others had a technology that could be probably licensed and used commercially in a matter of months. A few teams created start-ups in order to bring their technology to market, others adapted the original technology to other domains where they saw new applicability, and others simply learned more about their research commercialization. In a few instances the students and researchers applied for subsequent grants such as an I2I Phase I grant a Phase II grant to facilitate the ongoing development of their technology.

**One area that was identified for improvement** in terms of the students' involvement with the NSERC Lab2Market Pilot is the quality of the market reports. Some key informants believed the quality of the market assessment reports is not as high as the ones produced by the professional consultants through the I2I Market Assessment grants. This was identified as a problem because they would have liked to use these reports as part of the application for other grants such as I2I Phase I and felt that this ability was limited given the poor quality of the reports.

*"You pay a consultant for whatever the cost is, but the point is for them to prepare a market assessment report that you get at the end of it and that certainly wasn't what anyone I've talked to any of the entrepreneurial leads had when they were done. They had a lot of that information in their heads, but it wasn't like articulated in any meaningful way. And that's a bit of an issue because I am working on a Lab2Market Built application right now based on the project that had gone through sort of the initial phase, which you would think would be good because you know the student has done a lot of this market assessment work through that process and they had a lot of that information, but not in a way that they could meaningfully articulate to me, in a way that I can actually act on, and integrate it into the application for the Lab2Market Built."*

— Key informant

## Design and Delivery

Overall, the NSERC Lab2Market Pilot was viewed positively by all the key informants interviewed, regarding the level of student involvement that the grant made possible, as well as the business training, curriculum and workshops, accesses to mentors, and networking opportunities offered. There are however some features of the pilot that were identified as opportunities for improvements:

**Grants are too short and very intense:** The grants for the NSERC Lab2Market Pilot have a duration of 16 weeks. Most of the interviewees who spoke about the length of the grant believed that it was too short, and several called for a more realistic assessment of the time commitments and the level of effort required for the work to be conducted (i.e., market assessment). It was felt that it would be good for the grant to be longer, perhaps an extra three or four weeks. Several interviewees mentioned that the

interviews took longer than expected as it took time to be able to connect with the potential interviewees in order to complete the required number of interviews (n=100). Also, the level of effort for writing the market assessment report was higher than anticipated.

*"When I saw the first version of the call it said like 20 hours' time commitment per week. And then after I started submitted things, the next version I saw said 30 hours per week and then I was actually spending like 50 hours per week".*

— Key informant

*"It would be very helpful if the duration of the project can be longer and with a bit more support for student stipend as we had to conclude our project at a critical point for commercialization. It took us a while to find other funding to continue with conversations with stakeholders, which resulted in a delay in our market assessment and scaling up the project."*

— Key informant

**Grant value is not enough to cover the students' time:** While the grants provide \$10,000 to be paid to the students, many key informants mentioned that the amount is not enough to account for the students' time and the intensity of their work for the 4 months during which they are fully immersed in this training and market assessment. It was felt that the grant value should be increased to reflect the time and intensity of the work completed by the students and some key informants further mentioned that the increase should also be reflective of the student's academic status and level of training (i.e., undergraduate, Masters, Doctoral, Post-Doc).

*"Je trouve que 10 000\$ pour ce qu'ils appellent l'entrepreneur chef, qui est généralement l'étudiant principal qui va recevoir la subvention et qui va faire le travail, c'est très peu en fait. Puis ça ne tient pas compte du fait que l'étudiant est en maîtrise, au doctorat ou au post-doc et qu'il va être presque à temps plein sur ce projet, de faire son étude de marché. »*

— Key informant

When compared with the other international programs, the grants for NSERC Lab2Market pilot have a longer duration (16 weeks vs 9.33 on average) but offer less funding (\$10,000 CDN versus 57,000 CDN on average)<sup>85</sup>.

**Most ILOs had little involvement with projects that participated in NSERC's Lab2Market Pilot:** In general, the ILOs have not had much involvement with the NSERC Lab2Market Pilot beyond providing the letter of support required for application to the pilot. They are also generally unaware of the pilot. A couple of interviewees thought the ILOs could be more informed about the activities and training sessions offered by the TMU in order to further inform and encourage researchers and students to participate in these activities offered by NSERC Lab2Market Pilot. Moreover, unlike the situation with the I2I Market Assessment grants, the ILOs do not receive a copy of the market assessment reports completed as part of the NSERC Lab2Market Pilot. Having the market assessment reports would help the ILOs when assisting researchers and students in the event they would like to apply for another grant in order to demonstrate the viability of the technology.

*"We are a tool that they (ILOs) can use. They so not have to really solely vet these research students that are coming to them and want support from the university. This could be a pre-tech transfer office kind of engagement program. So, these students come to us, they do the market assessment and then they can go to their tech transfer offices with this, there's commercial potential here."*

— Key informant

**Confusion between different Lab2Market Programs (NSERC and TMU collaboration vs. programs offered by other universities):** There is some confusion as to the difference between the NSERC Lab2Market Pilot offered by NSERC through TMU and the Lab2Market programs offered by other universities. The national Lab2Market program is a network that has hubs across Canada including many universities in British Columbia, Alberta, Prairies, Ontario, Quebec and Atlantic provinces.<sup>86</sup> A few interviewees spoke to the need to clarify the branding of NSERC Lab2Market Pilot and show how it is different from the other Lab2Market including a higher grant amount. The grant value of the NSERC Lab2Market Pilot is \$20,000, compared to the other Lab2Market, which offers grants up to \$15,000. The difference in funding reflects the additional \$5,000 that NSERC provides for the team at TMU to cover the cost for the training and mentoring activities offered to students and researchers.

**Greater involvement from the researchers is needed so they can better support the students on moving the technology to market:** A few interviewees believed that it would be good for the researchers to be more involved in the training and networking activities offered by the NSERC Lab2Market Pilot so they can better support and communicate with the students involved with their projects. Greater involvement from the researchers would also increase the opportunities for researchers to be exposed to the training and networking activities, which could further improve project results. However, it was recognized that there are few incentives for the researchers to participating in the training and networking activities as they are very busy, and they are not receiving any financial compensation for their time.

**Better alignment between the NSERC Lab2Market Pilot and other NSERC funding opportunities:** The majority of the interviewees appreciated the core components of the NSERC Lab2Market Pilot such as dedicated student involvement, business training, curriculum, workshops, as well as accesses to mentors and networking. It was felt that it would be great if these components could be integrated in other NSERC programs. However, there are various opinions regarding how the integration of these components could be accomplished. A few interviewees believed the NSERC Lab2Market Pilot, and the I2I Phase I grants could be combined and offered simultaneously since market research should be on-going. On the other hand, other interviewees emphasized that the NSERC Lab2Market Pilot components could be an option *but not a requirement* for the I2I Phase I grant to allow for some flexibility (i.e., the addition of a market assessment for Phase I grants when relevant).

**EDI considerations:** Most of key informants recognized the importance and the added value of EDI and EDI-related considerations in research and technology. However, they were not sure of the best way to integrate such considerations into their projects. One of the most common ways to integrate EDI within their research that was identified by key informants was the recruitment of students who are members or one or more equity-deserving groups. When asked how EDI could be integrated in the creation of the technologies, key informants felt that this would be more challenging and would involve more time and resources, which are not always available. However, some key informants spoke about the advantages for including the EDI considerations into the development of the technologies such as: having more diverse opinions from different stakeholders during the development of the technology, gaining a better understanding of the market including the potential beneficiaries and buyers of the technology with a focus on equity-deserving groups, and understanding underrepresented markets. All these can create new opportunities.

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<sup>1</sup> Business Development Bank of Canada, Glossary: <https://www.bdc.ca/en/articles-tools/entrepreneur-toolkit/templates-business-guides/glossary/business-accelerator>

<sup>2</sup> Statistics Canada. "A profile of Canada's highly qualified personnel," Government of Canada. <https://www150.statcan.gc.ca/n1/pub/88-003-x/2007002/10331-eng.htm>.

<sup>3</sup> Ibid., "Intellectual Property," <https://www.bdc.ca/en/articles-tools/entrepreneur-toolkit/templates-business-guides/glossary/intellectual-property>.

<sup>4</sup> <https://www.bdc.ca/en/articles-tools/entrepreneur-toolkit/templates-business-guides/glossary/patents>.

<sup>5</sup> Ibid.

<sup>6</sup> IGI Global. "What is Academic Spin-Off". <https://www.igi-global.com/dictionary/academic-spin-offs/51041#:~:text=A%20University%20spin%20off%20is,from%20an%20ordinary%20business%20enterprise>.

<sup>7</sup> Technology Transfer Central. "What is Technology Transfer?" [https://techtransfercentral.com/what-is-technology-transfer/#:~:text=Technology%20transfer%20\(or%20tech%20transfer,turned%20into%20products%20and%20commercialized](https://techtransfercentral.com/what-is-technology-transfer/#:~:text=Technology%20transfer%20(or%20tech%20transfer,turned%20into%20products%20and%20commercialized).

<sup>8</sup> Gensler. The Rise of Academic Incubators. <https://www.gensler.com/blog/the-rise-of-academic-incubators#:~:text=What%20is%20an%20academic%20incubator,for%20idea%20exchange%20on%20campus>.

<sup>9</sup> Business Development Bank of Canada. "Venture Capital," <https://www.bdc.ca/en/articles-tools/entrepreneur-toolkit/templates-business-guides/glossary/venture-capital>.

- <sup>10</sup> It should be noted that NSERC does not expect that projects funded by a Phase I grant will subsequently seek a Phase II grant. However, the evaluation findings demonstrate that there does not appear to be a natural progression from one grant to the next and that there may be a disconnect
- <sup>11</sup> For the purposes of this evaluation, the term “technology” is used to encompass the entities developed from I2I grant innovations such as processes, products, goods, and services.
- <sup>12</sup> NSERC Idea to Innovation grants: [https://www.nserc-crsng.gc.ca/Professors-Professeurs/RPP-PP/I2I-INNOV\\_eng.asp](https://www.nserc-crsng.gc.ca/Professors-Professeurs/RPP-PP/I2I-INNOV_eng.asp)
- <sup>13</sup> Normally, participating companies must be Canadian. Companies outside Canada may also be considered as partners provided, they can demonstrate that there will be clear and direct benefits to the Canadian economy as a result of their participation. [https://www.nserc-crsng.gc.ca/Professors-Professeurs/RPP-PP/I2I-INNOV\\_eng.asp](https://www.nserc-crsng.gc.ca/Professors-Professeurs/RPP-PP/I2I-INNOV_eng.asp)
- <sup>14</sup> For the period of this evaluation (2016-2017 to 2021-2022), only one college applied, and it was not approved for a grant.
- <sup>15</sup> A detailed description of each phase of I2I funding is available at [https://www.nserc-crsng.gc.ca/Professors-Professeurs/RPP-PP/I2I-Innov\\_eng.asp](https://www.nserc-crsng.gc.ca/Professors-Professeurs/RPP-PP/I2I-Innov_eng.asp)
- <sup>16</sup> The uptake of I2I by Canadian colleges is explored further by the Colleges Community and Innovations (CCI) Evaluation.
- <sup>17</sup> A logic model serves as a roadmap that identifies the linkages between the activities of a program or grant and its expected short-, medium- and long-term outcomes and societal impact.
- <sup>18</sup> The Central Limit Theorem generally advises against employing inferential statistics with sample sizes below 30, however, there was a modification to align with the specific parameters and objectives of this evaluation.
- <sup>19</sup> The Central Limit Theorem generally advises against employing inferential statistics with sample sizes below 30, however, there was a modification to align with the specific parameters and objectives of this evaluation.
- <sup>20</sup> Baum, J.K., Dodd, M., Tietjen K., Kerr J., (2017), Restoring Canada’s Competitiveness in Fundamental Research: The View from the Bench, Global Young Academy, Retrieved from: <https://globalyoungacademy.net/wp-content/uploads/2017/06/GYA-2017-FundResearchReport-LoRes.pdf#:~:text=innovation%20across%20Canada%E2%80%99s%20research%20landscape.%20Fundamental%20research%20was%20hit>
- <sup>21</sup> Galushko, V., & Sagynbekov, K. (2014). Commercialization of university research in Canada: what can we do better? International journal of business administration, 5(5), 1.
- <sup>22</sup> Larivière V, Macaluso B, Mongeon P, Siler K, Sugimoto CR (2018) Vanishing industries and the rising monopoly of universities in published research. PLoS ONE 13(8): e0202120. <https://doi.org/10.1371/journal.pone.0202120>
- <sup>23</sup> Galushko, V., & Sagynbekov, K. (2014). Commercialization of university research in Canada: what can we do better? International journal of business administration, 5(5), 1.
- <sup>24</sup> Kelly Holloway & Matthew Herder (2019) A responsibility to commercialize? Tracing academic researchers’ evolving engagement with the commercialization of biomedical research, Journal of Responsible Innovation, 6:3, 263-283, DOI: 10.1080/23299460.2019.1608615
- <sup>25</sup> Bouchard, et al. (2023). Report of the Advisory Panel on the Federal Research Support System. <https://ised-isde.canada.ca/site/panel-federal-research-support/en/report-advisory-panel-federal-research-support-system>
- <sup>26</sup> Canadian Council of Academics (2021), Powering Discovery, The Expert Panel on International Practices for
- <sup>27</sup> Canadian Council of Academics (2018), Competing in a Global Innovation Economy: The Current State of R&D in Canada, The Expert Panel on the State of Science and Technology and Industrial Research and Development in Canada, <https://cca-reports.ca/reports/competing-in-a-global-innovation-economy/>
- <sup>28</sup> OECD (2020), OECD Research and Development Expenditure in Industry 2020: ANBERD, OECD Publishing, Paris, <https://doi.org/10.1787/c86631b8-en>.

- <sup>29</sup> Canadian Council of Academics (2021), Powering Discovery, The Expert Panel on International Practices for Funding Natural Sciences and Engineering Research, <https://cca-reports.ca/reports/international-practices-for-funding-natural-science-and-engineering-research/>
- <sup>30</sup> Canadian Council of Academics (2018), Competing in a Global Innovation Economy: The Current State of R&D in Canada, The Expert Panel on the State of Science and Technology and Industrial Research and Development in Canada, <https://cca-reports.ca/reports/competing-in-a-global-innovation-economy/>
- <sup>31</sup> For the purposes of this evaluation, a spin-off company refers to a “university spin-off”, or a legal entity formed by researchers with the objective of commercializing a specific technology/ IP developed at their institution. Neither 'spin-offs' nor 'start-up' has an exact definition, and the two terms are sometimes used interchangeably. For the purposes of this evaluation, a start-up company references a legal entity that is formed outside a university setting formed with the objective of commercializing a specific technology/ IP developed at the institution.
- <sup>32</sup> Government of Canada (2002). Canada’s innovation strategy: New Ideas-New opportunities Industry Canada. <https://publications.gc.ca/collections/Collection/lu4-5-2002E.pdf>
- <sup>33</sup> Bouchard, et al. (2023). Report of the Advisory Panel on the Federal Research Support System. <https://ised-isde.canada.ca/site/panel-federal-research-support/en/report-advisory-panel-federal-research-support-system>
- <sup>34</sup> NSERC-CRSNG. (n.d.) NSERC 2030: Discovery, Innovation, Inclusion. / [doc/NSERC2030/StrategicPlan\\_PlanStrategique\\_en.pdf](#)
- <sup>35</sup> The years the administrative data is provided here are different than those of the evaluation scope (i.e., 2016-2017 through 2022-2023) because this data was unavailable at the time of the evaluation.
- <sup>36</sup> The program success rate is calculated as the proportion of the awards divided by the number of applications received for each grant.
- <sup>37</sup> One possible contributing factor for the low number of applications from small universities could be, as this evaluation will show, the fact that these universities have limited capacity for their ILOs, so the researchers don’t have the same level of support for commercializing their research as in a medium or large university.
- <sup>38</sup> Colleges were removed from the list of NSERC’s eligible institutions to make the comparison feasible since no colleges have I2I grants for the period of this evaluation.
- <sup>39</sup> Pearson’s Chi-squared test was performed at a significance level of 0.05 to test if there is a difference between the distribution of eligible universities and the distribution of I2I applications by university size.
- <sup>40</sup> Pearson’s Chi-squared test was performed at a significance level of 0.05 to test if there is a difference between the distribution of eligible universities and the distribution of I2I applications by region.
- <sup>41</sup> Gbadegeshin, S., Natsheh, A., Ghafel, K., Mohammed, Koskela, A., Rimpilainen, A., Tikkanen, J., Kouppala, A. (2022). Overcoming the Valley of Death: A New Model for High Technology Startups. Sustainable Futures (4): 100077
- <sup>42</sup> Natsheh, A., Gbadegeshin, S., Ghafel, K., Mohammed, O. (2021). The causes of valley of death: A literature Review. Conference Paper: 15<sup>th</sup> International Technology, Education and Development Conference.
- <sup>43</sup> Khademi and K. Ismail, “Commercialization Success Factors of University Research Output” J. Teknol., vol. 3, pp. 137–141, 2013.
- <sup>44</sup> Ismail N. and S. Sidek, “Determinant factors for commercializing research products in Malaysian public universities,” Int. J. Innov. Technol. Explore. Eng., vol. 8, no. 6 Special Issue 4, pp. 780–787, 2019, DOI: 10.35940/ijitee.F1157.0486S419.
- <sup>45</sup> NSERC Raison d’être, mandate and role: who we are and what we do: [https://www.nserc-crsng.gc.ca/NSERC-CRSNG/Reports-Rapports/DP/2022-2023/supplementary/t5\\_eng.asp](https://www.nserc-crsng.gc.ca/NSERC-CRSNG/Reports-Rapports/DP/2022-2023/supplementary/t5_eng.asp)
- <sup>46</sup> Phase I reduction-to-practice projects are designed to advance promising technologies in order to attract early-stage investment and/or to build valuable intellectual property (e.g., strengthening the commercial value of the technology, broadening patent claims or strengthening licensing opportunities) in anticipation of transferring the technology to a new or established company.

- <sup>47</sup>Kim Y.-J. and S. J. Shin. 2017. "What Causes Technology Commercialization to Succeed or Fail after Transfer from Public Research Organizations," *Asian J. Innov. Policy*, vol. 6, no. 1, pp. 23–44, 2017, DOI: 10.7545/ajip.2017.6.1.023.
- <sup>48</sup>Canadian Intellectual Property Office (2019). IP Canada Report 2019. <https://ised-isde.canada.ca/site/canadian-intellectual-property-office/en/ip-canada-report-2019>
- <sup>49</sup>Universities Canada (2017) – University intellectual property and technology transfer, Universities Canada's submission to the Standing Committee on Industry, Science and Technology, Retrieved in December 2023 from: <https://www.univcan.ca/wp-content/uploads/2017/06/university-intellectual-property-and-technology-transfer-submission-june-2017accessible.pdf>
- <sup>50</sup>Galushko, V., & Sagynbekov, K. (2014). Commercialization of university research in Canada: what can we do better? *International journal of business administration*, 5(5), 1.
- <sup>51</sup>Pearson's Chi-squared test with Yates' continuity correction was performed at a significance level of 0.05 to test if an association exists between intellectual property protection and funded or unfunded researchers.
- <sup>52</sup>Pearson's Chi-squared test with Yates' continuity correction was performed at a significance level of 0.05 to test if an association exists between intellectual property protection and funded or unfunded researchers.
- <sup>53</sup>For the purpose of this evaluation, partners during the grant refer to organizations that were Phase II contributors or provided Phase I Letters of Support. However other organizations besides these initial partners could have been involved and provide financial and/or in-kind contributions to the project along the way. Partner refers to the intended receptor organization that could commercialize the technology and not potential users of this technology.
- <sup>54</sup>Wong J. 2010. Commercialization strategies of technologies: lessons from Silicon Valley. *Journal of Technology Transfer*. 35:225-236.
- <sup>55</sup>NSERC discourages partner engagement for Phase I grants based on the idea that such contributions too early in the technology transfer process could result in the premature commitment of technology which can be detrimental to the growth and development of innovations.
- <sup>56</sup>"Other" included opening a new company based on the project or the technology developed by the project (n=6)
- <sup>57</sup>Note that this section describes the contributions of all the partners across the three types of grants (i.e., MA, Phase I and Phase II).
- <sup>58</sup>A large proportion (25% did not know the answer to this question and were not counted in the denominator)
- <sup>59</sup>The I2I grants for most of the funded projects represented by the survey data ended at least a year prior to the survey.
- <sup>60</sup>Figure shows the top seven sources of investment.
- <sup>61</sup>Tweheyo, G., Abhaho, E., Verma, A. (2022). The Commercialization of University Research Outputs: A Review of Literature. *Texila International Journal of Management and Business* 8(2):144-162
- <sup>62</sup>For the purposes of this report, the term student also includes postdoctoral fellows.
- <sup>63</sup>NSERC-CRSNG (2022). Raison d'être, mandate and role: who we are and what we do. [https://www.nserc-crsng.gc.ca/NSERC-CRSNG/Reports-Rapports/DP/2022-2023/supplementary/t5\\_eng.asp](https://www.nserc-crsng.gc.ca/NSERC-CRSNG/Reports-Rapports/DP/2022-2023/supplementary/t5_eng.asp)
- <sup>64</sup>NSERC-CRSNG. 2022. NSERC 2030: Discovery. Innovation. Inclusion. Strategic Plan. [https://www.nserc-crsng.gc.ca/doc/NSERC2030/StrategicPlan\\_PlanStrategique\\_en.pdf](https://www.nserc-crsng.gc.ca/doc/NSERC2030/StrategicPlan_PlanStrategique_en.pdf)
- <sup>65</sup>To compare the percentage of funded projects to unfunded projects, survey data was stratified to reflect the common reporting period (i.e., since 2016).
- <sup>66</sup>Government of Canada. (2024) Economic Growth for Every Generation. <https://budget.canada.ca/2024/report-rapport/chap4-en.html>
- <sup>67</sup>Inflation calculations were completed using the Bank of Canada's inflation calculator ([Inflation Calculator - Bank of Canada](#)). Values were drawn using the year of inception and "current year" as 2024.

<sup>68</sup>Please refer to section 1.2 for an overview of the role and responsibilities of external reviewers and the selection committee.

<sup>69</sup>Steering committee members classified projects to be of high risk if they: planned to transfer the technology to a crowded market, had no or weak IP, lacked commercial application, did not have a partner, or if the technology was not advanced enough.

<sup>70</sup>NSERC-CRSNG. 2022. NSERC 2030: Discovery. Innovation. Inclusion. Strategic Plan. [https://www.nserc-crsng.gc.ca/doc/NSERC2030/StrategicPlan\\_PlanStrategique\\_en.pdf](https://www.nserc-crsng.gc.ca/doc/NSERC2030/StrategicPlan_PlanStrategique_en.pdf)

<sup>71</sup>NSERC guide on integrating equity, diversity and inclusion considerations in research. [https://www.nserc-crsng.gc.ca/NSERC-CRSNG/Politiques-Politiques/EDI\\_guidance-Conseils\\_ED1\\_eng.asp](https://www.nserc-crsng.gc.ca/NSERC-CRSNG/Politiques-Politiques/EDI_guidance-Conseils_ED1_eng.asp)

<sup>72</sup>Tokenism may be defined as “the practice of doing something (such as hiring a person who belongs to a minority group) only to prevent criticism and give the appearance that people are being treated fairly” (Britannica Dictionary. Retrieved from: <https://www.britannica.com/dictionary/tokenism>)

<sup>73</sup>A program's administrative expenditures include both the direct and indirect costs of administering the program. Direct costs comprise both salary (excluding employee benefits) and non-salary costs which are primarily related to the process of administering the grants. Non-salary costs also include a share of costs associated with corporate representation of a program and general administration for NSERC. Other direct costs associated with administering the programs, such as post-award management (which is a centralized function carried out by the Finance Division), and indirect costs, such as council-wide corporate services that support all programs (e.g., finance, human resources and IT), cannot be provided at the program level. Note: The method used to calculate efficiency ratios was changed for tri-council programs as of 2019-20. These changes have been implemented retrospectively (i.e. 2016-17 to 2018-19) for longitudinal comparison purposes.

<sup>74</sup>It should be noted that NSERC does not expect that projects funded by a Phase I grant will subsequently seek a Phase II grant. However, the evaluation findings demonstrate that there does not appear to be a natural progression from one grant to the next and that there may be a disconnect

<sup>75</sup>Where possible, we will distinguish between the results obtained before and after the introduction of the Lab2Market pilot project.

<sup>76</sup>Data will come from the researcher's final reports.

<sup>77</sup>Data will come from the ILO post-grant reports.

<sup>78</sup>Survey that is part of the data collection for the I2I evaluation.

<sup>79</sup>Included any of the federal agencies, departments, or ministries.

<sup>80</sup>Included any provincial ministries, or provincial funding agencies.

<sup>81</sup>Not-for-profit organizations include recognized nation-wide organization (e.g., Mitacs, Genome Canada) or recognized provincial organization (e.g., RSRI's, Genome BC).

<sup>82</sup>Although Lab2Market program theory does not specify, post-doctoral (i.e., post-docs) are also eligible and can participate as Entrepreneurial Leads. For the purpose of this report the term “students” will also include the post-docs.

<sup>83</sup>NSERC organized and run the competitions for the Lab2Market Pilot, while the TMU provided the training and mentoring activities to students and researchers.

<sup>84</sup>The number of ILOs interviews is higher compared with the other groups of interviewees as the examination of the NSERC Lab2Market Pilot leveraged the opportunity to ask questions about the pilot in some of the interviews with ILOs conducted as part of the broader evaluation of NSERC's I2I grants.

<sup>85</sup>The I-Corp program is awarding USD\$ 50 000, I-CUR offers 35 000 £, and I-PhD offers 30 000 €. The duration for these programs varies between 7 and 12 weeks.

<sup>86</sup>This information is based on what was available on the Lab2Market website (<https://www.lab2market.ca/>) at the time of reporting.



