

Report: Colleges & Universities Annual Commercialization Plans



Prepared by Intellectual Property Ontario for the Ontario
Ministry of Colleges & Universities

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Executive Summary

Intellectual Property Ontario's (IPON) supports the development and commercialization of intellectual property (IP) across Ontario's knowledge and innovation system. As part of this support, IPON reviewed the Annual Commercialization Plans (ACP) submitted by 23 colleges and 19 universities¹ within Ontario and in this report is providing key observations and recommendations to improve innovation and commercialization at the post-secondary level. As the next step in the rollout of the Commercialization Mandate Policy Framework, the ACPs describe plans to support institutional research and commercialization goals and ways to improve the IP creation process including technology transfer. The themes noted in the 2023 ACPs echo the themes of the 2019 Expert Panel on Intellectual Property (IP) report that led to the creation of IPON and help identify key areas for additional support.

IPON's recommendations are in part based on the gaps and opportunities identified by many of the post-secondary institutions including the following:

- a lack of access to market intelligence and expertise at colleges and universities, cited by 15 out of 19 university respondents, which hinders identifying the most promising IP for further development and investment;
- limited technology transfer resources which inhibit the overall output and impact of IP generated by universities and SMEs;
- a shortage of funding for advancing technologies from TRL3 to TRL6² which reduces the number of promising new products that can be further developed by Canadian companies and investors;
- a stated willingness to improve the technology transfer process through ongoing metrics collection and approval of relevant policies by most institutions; and,
- an explicit identification of areas where IPON can aid in IP capacity building to improve institutional best practices and policy implementation.

These observations highlight potential risks including lower than expected IP ownership and retention, lower than expected IP and technology with promising commercialization potential, and challenges in tracking successes over time. Thus, five primary recommendations have been formulated where IPON and other stakeholders could help mitigate these risks:

- **Recommendation 1.0:** Provide colleges and universities with relevant market intelligence and expertise to support commercialization, IP investment decisions, and licensing approaches, resulting in more potential commercialization opportunities and improved retention of high-value IP in Canada.
- **Recommendation 2.0:** Provide colleges and universities with support for increased IP capacity (through mentoring and education) as well as support for streamlining and improving the technology transfer processes.

¹ The ministry continues to engage and support the institutions with outstanding ACPs to ensure that these are submitted as soon as possible.

² Technology Readiness Levels, describing technology development stages.

See <https://ised-isde.canada.ca/site/innovation-canada/en/technology-readiness-levels> for more details.

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- **Recommendation 3.0:** Provide supports to IP holders at post-secondary institutions to further develop inventions that will increase the licencing value and likelihood of commercialization by Canadian companies and investors, which will support long-term economic impact.
- **Recommendation 4.0:** Continue operating the Joint Working Group for developing commercialization metrics to assess the outcomes of successful policy implementations, identify best practices, and generate case studies.
- **Recommendation 5.0:** Develop an overarching IP and commercialization strategy that incorporates Recommendations 1-4 and leverages existing programs at the provincial and federal level.

These recommendations are illustrated in Figure 1. Additional context for the observations, recommended actions, additional resource needs, and how these recommendations interlink are included in more detail below.

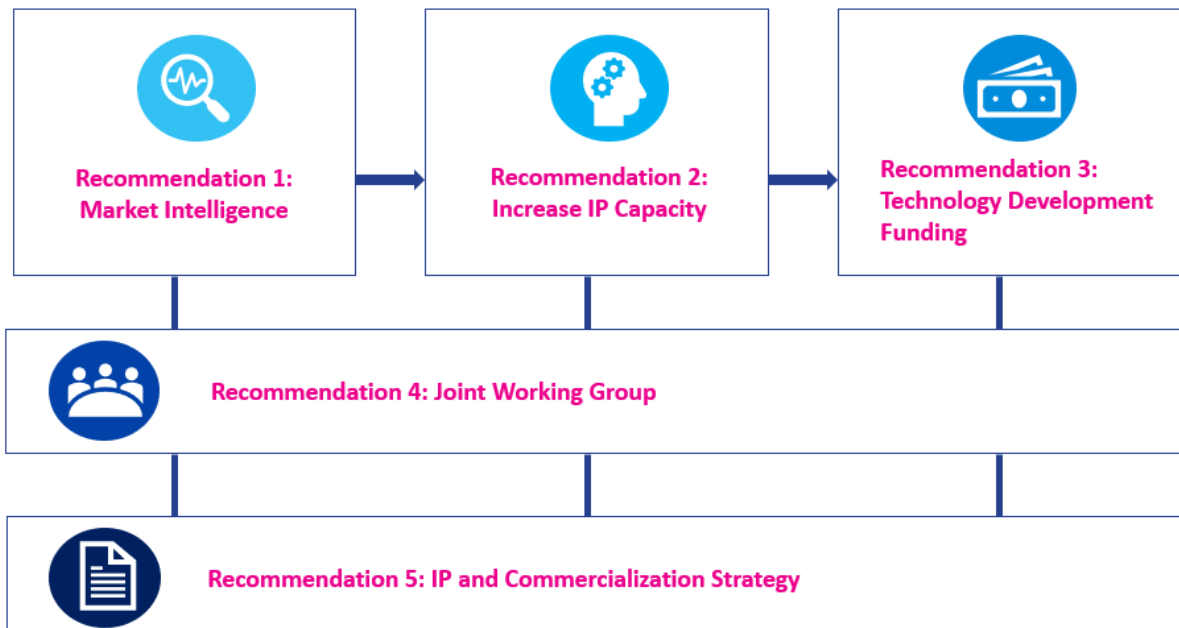


Figure 1: Five recommendations arising from an assessment of the colleges and university ACPs.

Introduction

Purpose

The purpose of this report is to provide the Ministry of Colleges and Universities an assessment of the current state of innovation and commercialization efforts at the post-secondary level under the Commercialization Mandate Policy Framework (CMPF), and recommendations on ways to improve outcomes. The analysis is primarily based on the ACPs submitted by the institutions and includes insight from the applications submitted to IPON's call for proposals that described how 10 colleges and 13 universities would use support from IPON to augment their commercialization capacity. Experience from IPON's beta phase and insights from the 2019 Expert Panel on Intellectual Property report have also been factored into the assessment and recommendations.

Scope

This report does not consider the activities related to fundamental research that is undertaken for pure knowledge advancement. Rather, the insights and recommendations identified herein pertain only to research that has a direct path to commercialization as illustrated by Figure 2. Arguably, while all research has an ultimate benefit for society, some fundamental research will likely not have a direct or predictable path to commercialization, and by some measures take 17 years or more until there is an impact³. The distinction between innovation and fundamental research is lost when the term "research," and inventions resulting from research, are interchangeably referred to as "innovation." In this report, the discussion does not encompass the entirety of academic research missions, but only those aspects that involve research results that have an anticipated potential market application.



Figure 2: The commercialization continuum as proposed by the Joint Working Group as part of their efforts to develop metrics.

Diversity of Institutions

In undertaking this analysis, the diversity of institutions was considered. There are a varying breadth and depth of institutions across the province and therefore it is not possible to adopt a "one size fits all" approach to assessing the state of commercialization, developing metrics, and ways to improve outcomes. The size and focus of the institutions vary greatly across the province, especially when comparing colleges and universities. This diversity also reflects the lack of direct provincial funding for commercialization infrastructure supports for the institutions. Like the metrics under development as part of the CMPF, the intent of the recommendations presented herein is to take diversity into account, in recommending the right resources and guidance for each institution based on their needs and opportunities for growth and improvement.

³ [The answer is 17 years, what is the question: understanding time lags in translational research - PMC \(nih.gov\)](https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3111111/)

Opportunity for Stakeholders to Collaborate

With appropriate levels of resourcing and collaboration, all stakeholders have an opportunity to help improve the innovation ecosystem and increase economic benefit to Ontarians. A recent article published in IEEE underscores the importance of interpersonal relationships between the researcher and industry ecosystem in successful technology transfer⁴. Below you will find specific recommendations and the supporting observations that provide the context for understanding the collaboration rationale. The recommendations are summarized in Table 1 at the end of this document.

Overview

ACPs were submitted in early 2023 by 42 (95%) PSE institutions, including 23 of 24 colleges and 19 of 20 universities. These ACPs describe ongoing efforts being made by each institution to support their research and commercialization goals and improve the IP creation process. The themes noted in the 2023 ACP submissions echo the themes of the 2019 Expert Panel on Intellectual Property (IP) report that led to the creation of IPON.



The form that institutions filled out to complete the ACP was designed to provide a qualitative overview of their efforts, with the understanding that a more quantitative approach would be taken in future years after the Joint Working Group finalizes its recommendations for common metrics in early 2024 (see Recommendation 4.0). The responses varied in detail. For example, some respondents provided

expansive narratives while others provided a few succinct bullet points or anecdotal examples; few included quantitative data. Thus, it is not possible to draw quantitative conclusions, and even more difficult to group or compare institutions as this was not the intent of the request. It should also be noted that the colleges started with a common response template, underscoring the similar approach at most colleges to innovation and commercialization. Several colleges expanded on that template with specific examples, but most provided brief responses only. Therefore, the generalizations and summary included in this document should be understood in this context.

Policies

The CMPF was provided to institutions in early 2022 and outlined six elements that colleges and universities are expected to incorporate into their official policies as follows:

- A commitment to the management and protection of IP.
- Defined roles and responsibilities of relevant stakeholders.
- A commitment to increase IP capacity.
- An invention disclosure policy.

⁴ [Hurdles in University-Industry Technology Transfer: Why Research-Based Inventions are Not Transferred to the Market? | IEEE Journals & Magazine | IEEE Xplore](#)

- Guidance for relevant stakeholders regarding the commercialization of IP generated with the institution's resources in a manner that seeks to provide a net benefit to Ontarians.
- Guidance for stakeholders to expand institutional capacity through engagement with the innovation ecosystem.

The expectation was that the institutions would approve and post their official policies within this framework to serve as the baseline to measure improvement of commercialization outcomes over time. All colleges and three-quarters of universities (14) have approved and published policies, with the remainder expecting to pass them by the end of 2023. Three universities cited policies that were approved and in place prior to the CMPF.

In the ACPs, institutions were asked to describe initiatives related to their commercialization policy and areas of improvement. Observations include:

- **12 out of 19 universities and all colleges** mentioned increasing awareness of the policy and related supports available internally and externally.
- **11 universities** noted an intent to strengthen engagement with innovation partners, such as local incubators, centres of excellence, OCI, and IPON
- **9 universities** plan to expand education and training offerings related to IP and commercialization.
- **4 universities** mentioned they would seek efforts supporting a net benefit to Ontario in the context of policies and procedures.
- **Colleges** pointed out that they will be looking to improve processes and procedures in support of their policies such as IP disclosures, legal agreement templates, and increased training for staff.

Responses also included highlighting unique policy features:

- **5 out of 19 universities** described local ecosystems (e.g., agriculture, mining, food, etc.) that provided commercialization opportunities.
- **Colleges** have specific areas of expertise and applied research support—some were described, but not all provided detail, thus a comprehensive assessment of expertise is not possible based on the ACP responses.
- **6 universities** and 7 out of 23 colleges mentioned the local entrepreneurship ecosystem with incubators and accelerators as a unique feature of their policies.

Colleges noted their approach in supporting industry partner research and development (R&D) is conducted primarily via company directions and allows the industry partner to own all foreground IP. One college had an exception, allowing for an inventor-owned alternative, but typically followed the approach described above. This contrasts with most universities where faculty and students can own IP they develop as part of their research efforts. All except two universities have an inventor-owned IP policy where the researcher retains all IP ownership, with exceptions for sponsor requirements and joint development with other institutions. Approximately two-thirds of university respondents (13 out of 19) have a policy for mandatory disclosure while disclosure in the other six universities is incentivized by offers to support further development of the IP including patent support. Three universities reported

that they take ownership of the IP if the university is involved in the filing of the patent as an option for inventors and retain a percentage of royalties in that case, ranging from 15% to 50%.

Engagement with Companies

Institutions described their principles and goals for engaging with companies and how they plan to enhance those partnerships.

Colleges described four goals that drive partnering with companies:

- impact for the industry partner, seeking to benefit their business with improvements to their product offerings resulting in increased commercialization potential with new IP and growth;
- impact on students, providing experiential learning and increasing employability;
- impact on the college, providing opportunities for new knowledge and skills that enhance the curriculum offerings and expand the client base; and
- impact on society, supporting increased economic development and positive social outcomes for the community.

Colleges noted that they primarily engage with Ontario and Canadian small-to-medium size enterprises (SMEs), as larger companies and multi-nationals generally have sufficient resources for internal R&D. Expansion of these engagements with local SMEs is primarily limited by funding opportunities that support the projects, including NSERC Applied Research and Development and Mitacs Accelerate grants.

Universities varied considerably on how they described their principles and goals with respect to company engagement. Responses ranged from high-level strategic planning principles to providing details of specific industry interactions. Despite this variability, two themes emerged as described below.

- **Regional impact aspirations:** One common theme among universities was the desire to have a regional impact, specifically targeting local partners and supporting local start-ups through entrepreneurship programs. Universities frequently mentioned working within local networks to increase engagement with businesses, such as Ontario Founders Network, NextFor, and BioEnterprise, in addition to Regional Innovation Centres (RICs). One university previously commissioned a study to determine the university's impact on GDP and found that 97% of the impact was in the local city and province. Underscoring this bias towards local companies is the belief that it is much easier to work with Ontario and Canadian companies from both a legal and relationship perspective in addition to the benefit to Ontario and the local economy.
- **Global engagement considerations:** A second theme emerged regarding engagement with global companies. Universities indicated that they generally had the same goals and approaches as with other industry engagement while weighing the benefit to Ontario and Canada. However, four universities specifically mentioned research security as a growing concern in the context of work with global companies.

Engagement with Research & Innovation Intermediaries

The ACP form requested a description of the engagement with research and innovation intermediaries and how these ties would be enhanced over the upcoming year. Based on the ACP responses alone, it is difficult to assess the level of engagement with intermediaries due to the varying level of detail in qualitative responses. All universities mentioned intermediaries they work with, including the local RIC, OCI, Mitacs, NSERC, and local ecosystem supporting organizations. Colleges pointed out that they “no longer have a strong mechanism to work directly with OCI” as the current OCI funding programs fund companies directly and do not facilitate direct involvement by the colleges. To better understand the engagement of intermediaries, a quantitative assessment will be required and include measures and metrics such as the number of MOUs, collaborative projects, referrals, and networking event attendance.

Promoting Commercialization

Colleges promote innovation and commercialization by supporting company applied research while allowing them to retain ownership of the related IP. Ten out of 23 colleges added their substantial support of entrepreneurship that included events, training, and incubator space that promotes commercialization. Four colleges mentioned they provide funds to support research projects fostering additional innovation. To increase the number of



companies supported, two colleges described their strong collaborations with local economic development organizations, incubators, and RICs that refer businesses to the applied research offices. One of those added that they work with a local university and the other mentioned working with a local angel fund network for additional referrals.

Universities described promoting innovation and commercialization through their policies and support provided by technology transfer offices. They cited their IP policies—most being inventor-owned—that promote innovation by incentivizing the researchers to commercialize what they invent. Universities included descriptions of their technology transfer office which vary widely but generally include information and training about IP, managing and assessing invention disclosures, supporting patent development, and liaising with external legal support. Three universities mentioned they have a funding program to support de-risking of innovations. Almost all (17 out of 19) universities described student entrepreneurship programs that included incubator space, workshops, and access to mentors.

Plans to Enhance the Innovation Ecosystem

The ACP form requested plans in the upcoming year related to policy or resourcing initiatives. Colleges responded unanimously that they do not have resources (funding or personnel) to expand service

offerings beyond their current state. Thus, they took the opportunity to describe the resources and initiatives that would help advance the IP and commercialization efforts under the CMPF, including support they understood could come from IPON. These additional requests fall into three categories:

- **Education/training:** While many colleges reported listing the CIGI and U of T training modules on their websites, the colleges requested “more specific/appropriate teaching to colleges on IP creation, management and commercialization” and funding for professional development.
- **Commercialization expertise:** Colleges noted that applied research staff generally do not have the expertise to support IP-related efforts but could serve as a liaison to connect industry partners to the appropriate experts.
- **Processes and tools with a community of practice:** While colleges do not currently have the technology transfer expertise or processes, they expressed a willingness to implement such practices if appropriately resourced. They noted these resources should be combined with a “community of practice” that would enable colleges to learn from others including the university technology transfer offices.

One college mentioned some enhancements in the upcoming year to update research intake forms to capture commercialization potential and close-out processes to include IP disclosure and commercialization.

Universities varied in their responses describing innovation plans in the upcoming year. These included (in order of most frequently mentioned):

- **Communication:** Socializing the updated policy and processes through emails, newsletters, townhalls, infographics and website updates.
- **Partnerships:** Increasing partnerships with local, Ontario, and Canadian commercialization intermediaries, industry associations, companies, and community organizations. Three universities noted they were recruiting someone to specifically increase partnership activity.
- **Staffing:** Two universities with smaller TTOs mentioned the need for additional staffing but lacked funding. Another smaller university mentioned expanding the staffing in their research office significantly over the next two years.
- **Entrepreneurship support:** Five universities mentioned enhancement of existing entrepreneurship efforts including course offerings, space, and programming.
- **Advisory boards:** Four universities noted they are creating advisory boards or committees to support their commercialization and innovation efforts.
- **Education:** Four universities mentioned education-related efforts as part of their plans in the upcoming year, with two noting they will expand the number of workshops for IP training and commercialization.
- **Process improvement:** Three universities plan to examine processes within their technology transfer office and related offerings throughout the university to increase efficiencies and improve clarity to researchers and students about support available for commercialization.

- **Unique initiatives:** There were several notable efforts that were mentioned by individual universities, including:
 - **Promotion & Tenure:** One university mentioned an initiative to incorporate innovation and commercialization into the promotion and tenure process, underscoring its importance and rewarding successful innovation.
 - **Special designation:** One university mentioned their intent to successfully achieve receiving an Innovation & Economic Prosperity Designation⁵ from the University Economic Development Association to advance their goals related to the innovation and entrepreneurial ecosystem.
 - **New industry innovation cluster:** Four universities had proposed, and now have received funding from IPON for, a collaboration to develop a Northern and rural innovation cluster on critical minerals, cleantech, and battery electric technologies.
 - **Technology Development funding:** One university plans to broaden eligibility of their technology development grant program to include student-led start-ups and local companies.
 - **Patent assessment committee:** One university launched a committee to reassess the market potential of each patent it holds that has not had any commercialization activity.
 - **IP scan:** One university is considering the development of a process to identify research projects that have commercial potential.

Support from IPON

The ACP questionnaire asked which gaps or opportunities could be specifically addressed by IPON to help institutions be more strategic with IP creation, management, and commercialization. The colleges reiterated the needs they described in the context of their plans to enhance their ecosystem (see previous section) while the universities took the opportunity to identify several areas in which they thought IPON could assist. These are depicted in Figure 3.

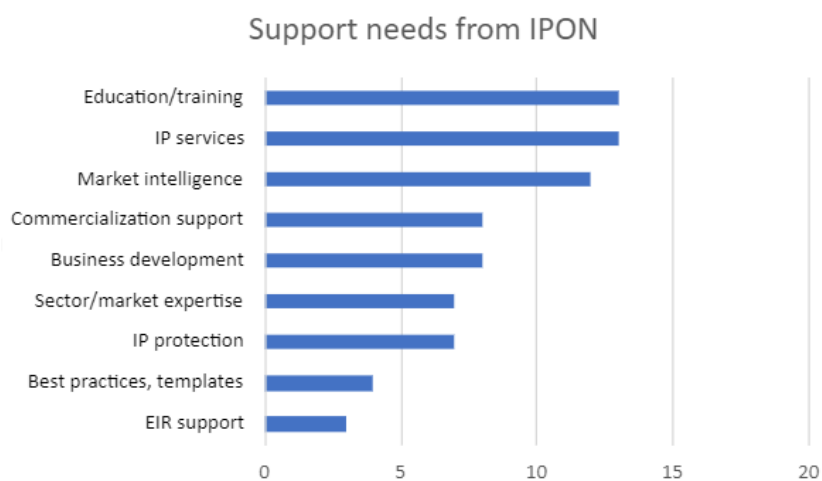


Figure 3: Commercialization supports IPON could provide cited by universities.

⁵ See the Association of Public & Land-Grant Universities page describing the Innovation & Economic Prosperity Designation: <https://bit.ly/3WO2PWQ>

The need for additional resources such as these was echoed among universities and colleges during IPON's outreach. In response, IPON launched a \$2M pilot funding program for colleges and universities to augment their innovation and commercialization efforts. Five colleges, one university, and one university consortium were awarded approximately \$300K each to expand their capacity for commercialization by hiring experts, expanding education and training for students, faculty and staff, and providing resources for companies to receive IP-related services. Impact results are expected in early 2024.

Encouraging IP Literacy

IP-related training and education varies widely among universities and 13 out of 19 mentioned their website as a source of information and links to training modules including those from the University of Toronto, CIGI, CIPO, and eCampus Ontario. Five universities mentioned customized training modules that they provide. Other training methods include entrepreneurship programs (11/19), workshops (10/19), one-on-one consultations (4/19), courses as part of degree programs (4/19), newsletters (3/19), and mentors (2/19).

Most of the colleges (18/23) mentioned the "IP in Applied Research" training module hosted by eCampus Ontario as the go-to literacy training for students and researchers, with one specifically mentioning it as mandatory for all students working on a research project. Websites were also mentioned frequently (17/23) as a source of information on IP policies and links to the CIGI and U of T IP training modules. Several cited additional training is provided through their entrepreneurship centres (13/23) and four colleges mentioned several courses offered for micro-credentials in IP and commercialization.

Metrics

All colleges and all but three universities provided a response to the optional question about metrics. Fifteen out of 23 colleges mentioned that the Heads of Applied Research of Colleges Ontario has a data subcommittee working on metrics that would be supplied to the Joint Working Group and 8 colleges noted they submit metrics annually to several associations such as Research Infosource and Polytechnics Canada. One college mentioned a 30-minute phone survey for industry to track the initial investments that they piloted in 2019. Almost a third of the universities (6 out of 19) provided some metrics they suggested could be part of the common set for commercialization; almost two-thirds (12 out of 19) listed the metrics they use internally or externally, with two mentioning they provide data to AUTM. As of this report writing, the IPON Joint Working Group has convened twice and is well underway to define common commercialization metrics.

Recommendations

The observations above highlight potential opportunities related to IP understanding, advancement, ownership, and retention; IP and technology potential for commercialization; and for tracking progress and successes. Therefore, five primary recommendations are provided below, with key actions outlined for IPON, MCU, MEDJCT, and colleges/universities. Recommendations 1-3 build upon each other, while recommendations 4 and 5 are overarching.

Recommendation 1.0: Provide colleges and universities with market intelligence and expertise to support commercialization, IP investment decisions, and licensing approaches, resulting in more potential commercial opportunities and improved retention of high-value IP in Canada.

Key Observation

- The lack of access to intelligence supports (e.g., market intelligence and IP expertise) hinders early identification of the most promising commercialization opportunities and connecting innovations to Canadian companies to support further development and investment.

Context

Over two-thirds of universities require market intelligence to assess invention disclosures and determine which ones are worth additional investment. They use various sources such as market reports, proprietary databases (e.g., Patsnap, IN-PART, Pitchbook), and experts in specific sectors. Three universities called out their entrepreneur-in-residence programs as one source of experts that support commercialization. In addition, although not selected due to limited funds, two applications to IPON's pilot program requested funding for such an effort. Additionally, nearly half of the universities find market data helpful for business development, including identifying potential licensees and assisting start-ups. However, many universities lack the resources to access custom market data and expert networks. Centralized IP resources like IPON, along with education and IP intelligence services, can address this resource gap more affordably and efficiently. The Joint Working Group acknowledged the benefits of centralized access to databases and experts for institutions at its May 2023 session, suggesting that IPON provide this as a centralized agency.

Colleges also would benefit from market intelligence to improve project selection and their R&D services for SMEs. Supporting the highest value R&D projects and assessing market needs and commercialization plans for partnering companies can be enhanced with the right market understanding. Unlike universities, colleges do not retain any generated IP, as their focus is on providing hands-on experiences for students through applied research services to companies. Thus, in addition, colleges would need support for in-house commercialization experts that can help companies with their IP strategy and market assessment for their projects coupled with impact tracking (see Recommendation 4.0).

Universities and colleges exhibit a strong engagement with local and Canadian companies. In many cases, institutions proactively seek local company collaborations, and some include a "benefit to

Canada" clause in their research agreements as collaborative efforts are much easier when the company is local or Canadian, with a secondary stated reason of benefit to the local community. Although data were not requested, two universities noted that most of their industry sponsored research projects are from Canadian companies. One indicated that over the last three years, their sponsors and funding were mostly Canadian-based (>75%) with over 50% coming from Ontario-based companies. The other institution noted that roughly two-thirds of their sponsored research agreements are with Ontario-based companies. Colleges reported that company projects are almost exclusively with local SMEs. Furthermore, entrepreneurship programs with nearby accelerator/incubator spaces are a common feature at most colleges and universities. While the distribution of IP licensing by universities was not discussed in their annual commercialization plans, providing access to market intelligence, experts, and matchmaking services will likely increase the licensing of university-generated IP to Canadian companies. This information will enable a) better decisions in determining which inventions have the most promising market opportunities; b) informed development pathways to increase marketability; and c) identification of potential partnering and licensing opportunities with Canadian companies in relevant markets.

The engagement level between post-secondary education institutions and the Ontario Centre of Innovation (OCI) and Regional Innovation Centres (RICs) in the broader innovation ecosystem varies widely based on responses. Colleges mentioned that OCI's focus on direct-to-industry funding prevents them from working with OCI. Interactions with RICs were reported as ranging from significant with many collaborative efforts to relatively weak engagement, indicated by the absence of specific descriptions or mentioning of RICs. Further investigation is needed to better assess engagement levels through indicators such as funding amounts, referrals, or specific outcome measures resulting from interactions with intermediaries.

Recommended Actions

- **1.1 (IPON):** Provide centralized access to intelligence market reports and databases. Continue developing mentor and industry matchmaking services and work with post-secondary institutions identified by Recommendation 1.2 that have a need for support.
- **1.2 (MCU):** Within the next year, gather research on successful executive- or entrepreneur-in-residence programs to identify best practices and collaborate with IPON with respect to how the market intelligence resources can be distributed.
- **1.3 (MEDJCT):** Evaluate ways to increase connections of innovation intermediaries (e.g., RICs and OCI) and research institutions to increase flow of information to and from Canadian companies (e.g., research output and market input).
- **1.4 (Colleges and Universities):** Develop or improve standard operating procedures and checklists for disclosure assessment and due diligence utilizing market intelligence resources.

Anticipated Outcomes

- Increased efficiencies through improved decision support in identifying inventions with the most promising market opportunities, increasing likelihood of downstream economic impact.
- Increased likelihood of licensing technologies to Ontario- and Canada-based companies.
- Improved commercialization strategies for SMEs to increase downstream economic impact.

Recommendation 2.0: Provide colleges and universities with support for increased IP capacity (through mentoring and education) as well as support for streamlining and improving the technology transfer processes.

Key Observation

- Limited technology transfer resources inhibit the overall output and impact of IP generated by colleges, universities, and SMEs.

Context

The current engagement between college applied research offices and companies do not take into consideration strategic IP development as part of the partnership as noted above. As a result, the companies engaged in government-funded R&D services from colleges receive little support in assessing the commercialization path of their R&D, nor is a decision to provide funding based on an assessment of the likelihood of commercialization. There is no downstream tracking or management of the IP to measure or monitor impact. Many colleges are willing to provide IP-related services but do not have the resources or know-how. Thus, IPON recently launched a pilot program to fund five colleges to explore several models in deploying an IP service in conjunction with their R&D project support; as of this writing, it is too early to assess the effectiveness of this effort.

IPON received feedback from universities regarding the hindrance of under-resourcing for commercialization efforts and the wide variation in IP development approaches among institutions. The variation in approaches is influenced by the institution's size and investment focus, as universities prioritize knowledge advancement through teaching and research. While aiming to transfer knowledge into real-world impact, universities support technology transfer activities to commercialize research and inventions, even if the researchers may not have optimal commercialization experience. To help address this, IPON recently launched a pilot program and funded two universities to address these challenges and expand IP development services, with the intent to provide replicable models. Results are expected in early 2024.

Most universities in Ontario have an inventor-owned policy. To incentivize protection and IP development, most universities offer services for assessment and patenting, sometimes in exchange for partial ownership. Some universities expressed the need for additional staffing and legal services support, albeit without supporting data, highlighting underdeveloped technology transfer and commercialization support. Insufficient staff was also mentioned for tasks such as invention disclosure review and post-licensing portfolio management. This would suggest that additional staffing support, and support to develop standardized templates, would aid in increasing licensing and collaboration that advances IP development and IP awareness generally.

IP-related training and education vary significantly among post-secondary institutions. Many universities and colleges refer to external training modules on their websites, but the effectiveness of these approaches remains unknown due to the lack of data. While most universities have

entrepreneurship support programs, these programs primarily cater to entrepreneurs and may exclude researchers who possess valuable IP but are not actively pursuing business ventures. Therefore, two-thirds of the universities and all colleges expressed the need for additional support in education and IP awareness, particularly in professional development. The common theme emphasized the importance of tailored training for specific audience needs, highlighting the need for a strategic approach that can be developed by IPON, potentially in collaboration with the Ontario Research and Commercialization Alliance (ORCA), a group of technology transfer and commercialization professionals from universities and colleges across the province. (This group provides professional development opportunities through sharing of best practices and networking through email list-servs and annual in-person meetings.)

Recommended Actions

- **2.1 (IPON):** Expand the post-secondary funding program beyond the initial pilot, augmenting efforts by working with, and supporting, organizations such as the Ontario Research and Commercialization Alliance to encourage and disseminate commercialization best practices and professional development activities.
- **2.2 (MCU):** Consider the provision of additional funding and support for technology transfer infrastructure (e.g., staffing; IP legal services, developing standardized templates) to build or augment capacity at colleges and universities and sharing of best practices, through support or augmentation of the existing IPON PSE Pilot program; align funding and resources with overall IP and commercialization strategy (for further details see Recommendation 5).
- **2.3 (Colleges and Universities):** Participate in ORCA and best practice sharing to streamline processes and provide professional development opportunities for staff.

Anticipated Outcome

- Increased capacity for supporting more and improved commercialization of R&D outputs from universities, colleges, and companies, increasing the total scale of downstream economic impact.

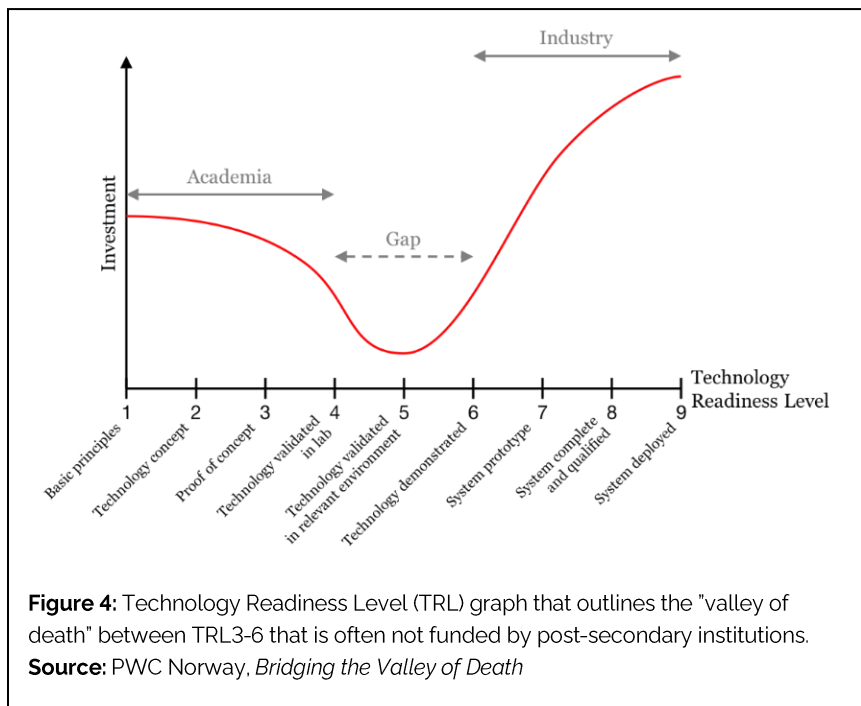
Recommendation 3.0: Provide supports to IP holders at post-secondary institutions to further develop inventions that will increase the licencing value and likelihood of commercialization by Canadian companies and investors, which will support long term economic impact.

Key Observation

- The shortage of funding for advancing technologies from TRL3 to TRL6, the so-called “valley of death” (see Figure 3), reduce the number of attractive products for further development by Canadian companies and investors.

Context

While universities primarily focus on teaching and research, many have thriving commercialization and entrepreneurship programs that aim to apply knowledge for societal benefit. Although central technology transfer offices incentivize disclosure with evaluation and patenting services, they may not cover all IP development activities, such as proof-of-concept and prototyping. Grant programs supporting technology development at early stages



(e.g., TRL 3 to 6) offer an opportunity to capture and support developing IP, with some universities and colleges providing funds (\$10-15K) for small projects. Expanding these programs with additional provincial funding and implementing standards for quality control and data collection could support more IP generation. This would increase the quantity and quality of commercialization opportunities and align them with ecosystem support programs, including those offered by IPON.

Unlike universities, colleges provide applied research services to companies to further develop their products, allowing the companies to maintain ownership over IP. However, the colleges do not perform assessments of the viability and value of the projects (see Recommendation 1.0), nor do they track the outcomes from the projects to assess the overall impact. Furthermore, as their primary customer is industry, incentives are lacking to encourage researchers to access the college’s applied research office services. In Quebec, College Centres for Transfer Technology (CCTT) receive stable funding for operations. Based on informal conversations with college representatives, if colleges were provided similar stable operational funding by the province, they could expand their client base to

include university projects that have not yet been launched into a company. That funding could include resources to track impacts beyond the project period and support IP services for evaluating projects. Furthermore, the funding could be leveraged by supporting or augmenting membership of NSERC's Tech-Access Canada (TAC) program, largely based on the Quebec CCTT model. Through that program, NSERC provides each college-based applied research office with approximately \$350,000 per year in the form of 5-year renewable grants. The program supports 64 TACs with a total annual budget of \$7.25M⁶. Currently, 15 Ontario colleges are TAC members.

The colleges and universities indicated in their ACP reports that additional funding would address commercialization challenges, confirmed by individual conversations with PSE representatives during the initial development of IPON. However, IPON notes that there is considerable funding in the ecosystem that support a variety of commercialization programs and there was little discussion in the ACPs regarding how the PSEs collaborate or leverage existing programs to offset the commercialization challenges. There may be other opportunities to work closely with existing programs to find efficiencies for the requested supports. Working with organizations such as ORCA that can effect change among peers at universities and colleges would be a good starting point.

Recommended Actions

- **3.1 (IPON):** Expand IP strategy support services, matchmaking and mentoring programs to inventors and TTO/ARO staff at colleges, universities, and related entrepreneurship programs.
- **3.2 (MCU):** Investigate what long-term supports can be provided to college applied research offices that enable additional technology development. Enable support of university projects and promote tracking of project outcomes. Augment funding programs for universities (like the ISED Lab-to-market program) that can increase the value of university-generated IP and encourage tracking of inventor-owned IP or investigate what existing programs can be leveraged to achieve the same outcomes.
- **3.3 (MEDJCT):** In all industry funding programs, incorporate review criteria that includes IP development strategy, dedicated resources to support the IP development, how joint IP will be managed, and how the IP will create a net benefit to Ontario.
- **3.4 (Colleges and Universities):** Universities to work towards incentivizing the central support of inventor-owned IP as that would potentially capture high-value IP opportunities for commercialization. Universities should look to colleges for potential R&D support.

Anticipated Outcome

- Enhanced capacity and efficiency in de-risking innovations from universities, colleges, and companies increase the likelihood and scale of downstream economic impact. This approach increases the likelihood that technology is developed by those most equipped for each stage and promotes improved commercialization of R&D outputs.

⁶ Hampel, R. and K. Doyle (2019), "The Technology Access Centre Grants in Canada: Case study contribution to the OCED TIP Knowledge Transfer and Policies Project."
<https://stip.oecd.org/assets/TKKT/CaseStudies/4.pdf>

Recommendation 4.0: Continue operating the Joint Working Group for developing commercialization metrics to assess the outcomes of successful policy implementations, identify best practices, and generate case studies.

Key Observation

- The ongoing efforts of metrics collection and approval of policies by most institutions demonstrate a widespread willingness to improve IP development and commercialization.
- The efforts of the Joint Working Group will help identify key outcome measures that will assess the success of policy implementation and programmatic interventions such as those resulting from the recommended actions as described in this report.

Context

As evidence that institutions understand the importance of measuring operational throughput and outcome impact, most of the institutions were supportive of metric development and responded to the optional question in the ACP form. Almost two-thirds of universities (12) and colleges (13) included a list of their annual metrics. The JWG has developed a workplan and intends to have a set of metrics that will be collected in future ACP reports by Spring 2024. Recognizing that Ontario colleges and universities are diverse, and may be at a different point in their journey to adopt common measures and metrics as standards, the JWG is using the following principles to align collaborative discussions with the goal of consensus on all recommendations:

- **Time and cost to implement:** Some metrics may require 2-3 years for full implementation in institutions, either for data collection or outcome monitoring. Measures and target metrics that support an assessment of impact across institutions offer opportunities for external or centralized tracking and management.
- **Consistency and flexibility:** Core common measures and metrics will be recommended across all institutions and optional “non-core” metrics may be recommended to provide flexibility and reflect the unique emphases of various institutions. To ensure consistency and reduced effort in reporting, measures and metrics will be clearly defined and aligned with other similar commonly used metrics and data sources (e.g., those from federal groups, Regional Innovation Centres, AUTM).
- **Idea to commercialization continuum includes economic prosperity:** Metrics will be identified across the IP and commercialization continuum, even for those stages that may fall outside given institutional mandates, including “downstream economic indicators” such as jobs created, products developed, and revenue generated. The intent here is to identify approaches earlier in the process that have a greater impact downstream.
- **Success stories:** The recommended measures and metrics will lend themselves to identifying case studies and stories that illustrate economic success.

All colleges have approved and published their commercialization mandate policy frameworks (CMPF), reflecting an organizational culture in support of commercialization efforts. They described improving and advancing the CMPF policy through:

- increasing IP commercialization literacy and awareness, through internally provided training and the anticipated support from IPON;
- increasing awareness and utilization of IP support organizations such as IPON and RICs; and,
- evaluation of policies and procedures to demonstrate net benefit to their local region and Ontario.

The colleges have emphasized that company partners using their research facilities and services maintain ownership of IP, and no colleges provide any related services for generated IP as the AROs do not have the expertise. Thus, to improve innovation and commercialization outcomes, colleges noted the need for professional development for ARO staff and are looking to IPON's input for expanding their service offerings that will enable them to support their clients with market assessments, IP development, and other considerations for their R&D.

Three-quarters of universities (14) have approved and published their CMPF policies, while the rest are expected to do so later this year. This has prompted universities to reassess their IP policies and support for commercialization. Two-thirds (12) have committed to increasing awareness, almost half (9) aim to enhance partnerships with local stakeholders, and a fifth (4) have emphasized evaluating commercialization approaches to ensure a net benefit to Ontario. Additionally, an equal number have formed new advisory committees to improve commercialization efforts and output.

Recommended Actions

- **4.1 (IPON):** Continue supporting the universities in their efforts to improve and refine technology transfer processes for increased alignment with their commercialization policies. Continue supporting colleges in their efforts to augment and streamline their services to support improved commercialization and IP development with their client companies.
- **4.2 (MCU):** Simplify the request for information in the ACPs, introducing qualitative measures and metrics and incorporating lessons learned from the Joint Working Group with a focus on key improvement areas.
- **4.3 (Colleges and Universities):** Continue as planned with evaluating commercialization efforts and ways to improve collaborations with other institutions, innovation ecosystem supports, and partnerships with industry.

Anticipated Outcomes

- Increased understanding of institutional commercialization capacities and metrics associated with successful outcomes.
- Success stories and case studies to inform best practices.
- Increased IP awareness and increased benefit to Ontario.

Recommendation 5.0: Develop an overarching IP and commercialization strategy that incorporates Recommendations 1-4 and leverages existing programs at the provincial and federal level.

Key Observation

- From observations at JWG discussions, experience from IPON's beta phase, and feedback in the ACP reports, it is evident that there is a gap in an overarching IP and commercialization strategy that links government approaches to institutional needs, funding allocations, and industry engagement.

Context

Pressures around IP ownership, commercialization activities and research security are being felt by post-secondary schools. Institutions approach these pressures using their own resources combined with a myriad of supports from the provincial and federal government, but there is no overarching strategy to best identify what works and what additional programmatic supports are needed. As an example of a mismatch of program supports and needs, IPON was directed to incorporate Ontario Research Fund – Research Excellence (ORF-RE) recipients into its beta phase. However, the agency found very few eligible recipients because the bulk of ORF-RE projects support fundamental research with no near-term or predictable path for commercialization. An overarching IP and commercialization strategy would provide clarity to minimize these gaps in understanding and expectations, in addition to helping guide the development of supporting efforts across the commercialization continuum to drive impact and economic value from investments.

Based on the experience in the development of IPON and the assessment from the ACP reports, as described in the previous four recommendations, gaps include IP valuation approaches, best practices/SOPs for TTO such as standard licensing terms, approaches to bridge the “valley of death,” and identification and collection of relevant metrics. During the development of this proposed overarching strategy as part of Recommendation 5.0, opportunities for improvement could be refined and understood, which could include identifying where best practices and standardized license term development and adoption can be best implemented, and alignment and longitudinal tracking of metrics as innovations move from a PSE into market-based programs supported by MEDJCT.

Recommended Actions

- **5.1 (IPON):** Provide expert IP advice on the development of an overarching commercialization and IP strategy that considers lessons learned from the beta phase, on-going work with the CMPF, ongoing provincial and federal innovation programs, and additional research security considerations, which will support more effective management of commercialization collaboration between universities and companies. Continue assessment with other stakeholders, such as other IP funders, and incorporate needs, plans, and services into an overarching programmatic strategy aligned with recommendations in this report.
- **5.2 (MCU):** Support the development of an IP and commercialization strategy that incorporates advice from IPON and other Ministries as required. Provide additional details regarding existing



and past related programmatic efforts for understanding outcomes and lessons learned and continue to support IPON's outreach and MOU development with other IP stakeholders. Revise and improve the ACP process based on lessons learned in this first round.

- **5.3 (Colleges and Universities):** Share existing insights and best practices that will inform a cohesive strategy.

Anticipated Outcomes

- All stakeholders will have clearer understanding of existing and needed programmatic supports and how they will efficiently support advancing commercialization and IP outcomes.

Summary and Conclusion

The opportunities presented here represent key findings based on a review of the colleges and universities ACPs submitted in March 2023. A summary of the recommended actions is included in Table 1 below. Some are already part of ongoing efforts and are included to underscore the need to continue as planned. Other actions may require a modification of IPON's mandate and modest funding allocations. Several approaches may require broader programmatic efforts that should be aligned with existing programs at the provincial and federal level as part of Recommendation 5.0.

In conclusion, IPON has tremendous opportunity and many willing partners to improve technology transfer and research and development supports that will result in increased economic impact from Ontario's postsecondary education institutions.

Table 1: Summary of recommendations

Recommendation	Approach / Recommended Action	Funding/Managing	Impact on Colleges	Impact on Universities	Impact to PSEs if not implemented
1.0 Provide access to market intelligence	Provide industry matchmaking services and panel of mentors	In IPON business plan; in process	X	✓	Inefficient investment of resources, lost opportunities for commercialization
	Centralized provision of market reports and patent databases	MCU/IPON	✓	✓✓	
	Provide executive- or entrepreneur-in-residence program support	MCU	X	✓	Fewer successful start-ups
2.0 Augment technology transfer capacity	Provide strategic approach to IP awareness education/training	In IPON business plan; in process	✓✓	✓	Missed opportunities for IP development
	Collaborate with ORCA to support dissemination of best practices and professional development	IPON	✓✓✓	✓✓	Slow/minimal adoption of improved practices
	Provide directed technology transfer infrastructure funding	MCU or IPON	✓✓✓	✓✓	Reduced IP development resulting in fewer commercialization opportunities
3.0 Support commercialization acceleration	Provide stable funding to AROs to enable support of university projects and tracking.	MCU	✓✓✓	✓	Underutilized applied research resources at colleges, missed opportunity for university collaboration
	Support/augment technology development funding programs	MCU/MEDJCT	X	✓	Less commercialization output
4.0 Support Metrics Development	Support the Joint Working Group to develop appropriate metrics	In IPON business plan; in process	✓	✓	Lack of understanding of outcomes, impact
5.0 Assess overarching strategy	Provide expert advice on commercialization supports strategy	IPON	✓	✓	Missed opportunities for synergies; programmatic gaps and inefficiencies