



## **Bridging the Gap:**

The Role of Innovation  
Intermediaries in Canada

*A summary of lessons and good practices  
based on existing knowledge*

# Bridging the gap: The role of innovation intermediaries in Canada

A summary of lessons and best practices from existing knowledge

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## About the author

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Stephen Miller is a Policy Fellow at Mitacs. Founded in 1999, Mitacs builds academic-industry collaborations across Canada, where top talent in Canadian and international post-secondary institutions is brought in to tackle industry challenges. Based in Vancouver, Stephen has previously worked in research and consultancy on innovation policy in the United Kingdom and in Belgium. He has led studies on the role of research and technology organizations (RTOs), and international research and innovation in renewable energy technology for the European Commission, among others.

## Acknowledgments

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## Executive summary

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This report examines the ‘what, why and how’ of innovation intermediaries: what they are, why they play a role in supporting innovation, and how they function. It draws on examples of intermediary practice in Canada, with a particular focus on their role in supporting collaboration between Canadian academic institutions (often universities, but also polytechnics and colleges) and businesses. The objective is to bring together findings from a broad range of reports and information resources, to synthesize and structure the ways in which innovation intermediaries operate to support innovation.

Since the early 2000s, innovation intermediaries have been widely recognized as organizations which serve an important role as transactional agents or ‘knowledge brokers’ in innovation systems.<sup>1</sup> By mediating the transfer and exploitation of innovation between other organizations and individuals, they accelerate innovation by supporting new combinations of information and network-based collaboration. They help their clients to ‘bridge the gap’ between early and late-stage innovation, often known as the ‘valley of death’. Based on previous research into the role of research and technology organizations, all innovation intermediaries can be seen to deliver three core functions:

1. Creating and sustaining *linkages* between organizations and actors. Innovation intermediaries act to create new connections between actors in an innovation system, and strengthen existing linkages.
2. Providing specific *services*. Following initial client engagement, innovation intermediaries provide hands-on services such as access to testing facilities, financing, portfolio advice, or searching for technology transfer opportunities (among others).
3. Supporting *strategic capability* in the innovation system. Innovation intermediaries can adopt and promote a long-term perspective, supporting the sustainability and long-term prosperity of their innovation systems by supporting the exploitation of new knowledge to generate positive socio-economic impacts.

Innovation intermediaries have very different approaches to delivering these functions. For example, a business accelerator might focus on risk mitigation through foresight and scanning, whilst supporting its start-ups through access to finance (including venture capital) and support for commercialization. In contrast, a university technology transfer office (TTO) may focus on spinning out commercially relevant knowledge from the university to the private sector, via intellectual property (IP) licensing.

In the context of academic-industry collaboration in Canada, innovation intermediaries have a significant ongoing role to play in supporting innovation. But as this report makes clear, invention does not necessarily lead to innovation. This distinction should serve as a foundation for intermediary approaches to supporting Canadian academic-industry R&D.

### BACKGROUND

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This is the first of two reports from a study to examine how Mitacs, acting as an innovation intermediary, supports innovation through academic-industry collaboration in Canada. Its purpose is to set the scene and present a framework for understanding intermediary practice. In the second report, this framework will be applied to investigate and understand how Mitacs operates in practice, with a view to gaining new insights into how an innovation intermediary can deliver value, and to generate transferable lessons for other Canadian innovation stakeholders.

Founded in 1999, Mitacs builds academic-industry collaborations across Canada, where top talent in Canadian and international post-secondary institutions is brought in to tackle industry challenges. The Mitacs business model is based on a strategy to apply one of Canada's core strengths – the talent and knowledge within its academic community – to an area of weakness; innovation activities in non-academic sectors. As of April 2022, the Mitacs network includes:

- 11,165 private sector and not-for-profit organizations since 2008 that have hosted interns and fellows across Canada
- 12,654 university researchers since 2008 across 81 universities
- 94 college, CÉGEP, and polytechnic partners
- 94 memoranda of understanding with partners across the Canadian innovation ecosystem, including other funding agencies such as NSERC, SSHRC, CIHR, Prompt, MEDTEQ+, and Genome Canada
- 52 funding agreements with international partners from 25 countries and regions, and the European Commission
- Integration into 14 graduate degree programs across the country
- 10,444 international students have travelled to Canada for internships since 2009
- \$885 million invested in collaborative research between 2010–11 and 2020–21
- 77,371 internships since 2008
- 37,959 career ready students since 2008
- 34,701 participants in professional skills courses since 2008

## What are innovation intermediaries?

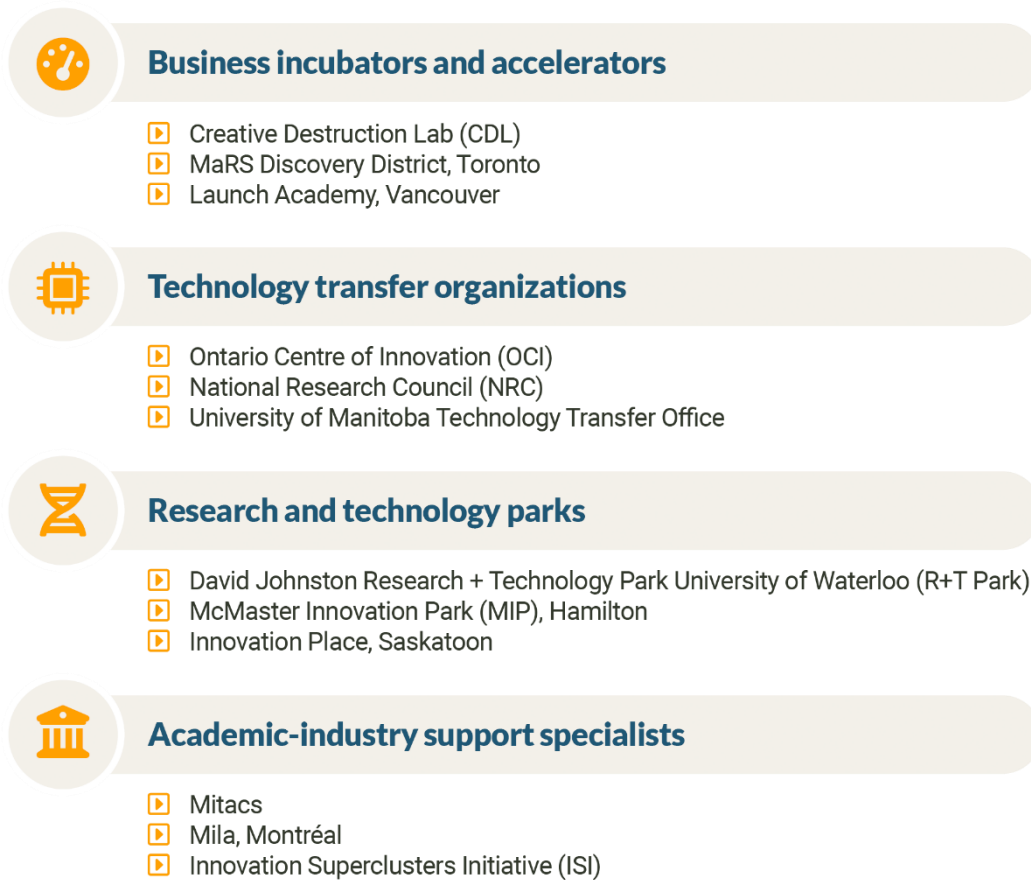
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**Innovation intermediaries are organizations that provide a supportive role for collaboration between two or more parties during various stages of the innovation process**

Innovation intermediaries are *organizations that provide a supportive role for collaboration between two or more parties during various stages of the innovation process.*<sup>2</sup>

Innovation intermediaries take a variety of organizational forms. They can be university TTOs, business incubators, business accelerators, public or privately funded innovation support agencies, or business associations. Some researchers even consider finance providers such as angel investors to be innovation intermediaries.<sup>3</sup> Intermediaries can be individuals, single-site organizations, or coordinated networks which act to connect various client institutions across regions or countries. Therefore, the label ‘innovation intermediary’ does not describe a specific form of organization or institution, but a general role or function defined by its relationship to innovative collaboration. Note that organizations which provide funding but have no active role in shaping collaborative innovation processes, such as federal and provincial grant-making bodies, are not generally considered to be innovation intermediaries.

**Figure 1: Canadian innovation intermediaries in Canada – selected examples**



Canada has many innovation intermediary organizations, ranging from science and technology parks, to incubators and accelerators, to public innovation intermediaries such as Mitacs (Figure 1 provides some examples). Tracxn – a data provider – lists 211 incubators and accelerators in Canada.<sup>4</sup> Business incubators and accelerators in particular have increased in numbers in recent years, and in at least one Canadian region they are now intensively competing with each other for public funding to deliver innovation support (Pacific Economic Development Canada (PacifiCan), British Columbia’s regional development agency, has had to engage an informal advisory committee to determine how public funding should be disbursed to them).<sup>5</sup>

Canadian intermediaries, or programs which deliver intermediary functions, have also enjoyed federal policy attention, such as through the Innovation Superclusters Initiative (2017-2022), which supports partnerships between businesses, researchers and intermediaries,<sup>6</sup> the Canada Accelerator and Incubator Program (CAIP) from 2014 to 2019, and the National Research Council of Canada Industrial Research Assistance Program (NRC IRAP).<sup>7</sup> In its 2016 budget, Canada’s federal government also committed to developing a performance measurement framework (PMF) for business accelerators and incubators – although publicly available information on the PMF Pilot indicates that the last tranche of data collected from incubators and accelerators was in 2019.<sup>8</sup>

## Why is there a need for innovation intermediaries?

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Innovation intermediaries exist to support firms, individuals, or universities in overcoming systemic or market-based barriers to innovation. Policymakers are increasingly aware of the value that well-functioning intermediaries can bring to regional and national innovation ecosystems.

**Innovation intermediaries exist to support firms, individuals, or universities in overcoming systemic or market-based barriers to innovation**

An understanding of the role of innovation intermediaries depends on a clear-eyed distinction between invention and innovation. Research and invention are critically important in globalized knowledge economies such as Canada. But they are not the same as innovation (Box 1).

Innovation is a complex and iterative process, and it resists neat and tidy dissection. Nonetheless, it can be helpful to visualize it in terms of a journey or continuum. This continuum starts from basic research (including ideation and conceptual development), through to applied experimentation and refinement, and concludes with operational readiness for active use and/or commercialization (Figure 2).

Some models extend the continuum further, for example to the wider diffusion and take-up of innovations across society and the economy. Innovation cannot deliver its potential value to society and the economy without the wider acceptance and adoption of new products, technologies, or services.<sup>9</sup> Ultimately, they are the vehicles for transformational change over time, affecting the ways in which we live and work. Everett Rogers, a communication theorist who developed an influential model for the diffusion of innovation, proposed that there is a tipping point at which adoption expands beyond a limited group of ‘early adopter’ users, and becomes mainstream. In this report, which focuses on the role of innovation intermediaries, an innovation continuum model which goes as far as implementation/commercialization serves our purpose. The focus of this report is on the agents of innovation, not the consumer. But at the same time, it should be remembered that successful innovation implementation, even if it only goes as far as take-up by early adopters – includes some diffusion, even if only at the very early stage. As outlined

in the following pages, innovation intermediaries can provide a range of services to support late-stage innovation scaling and commercialization. This is very relevant to Canada, which lags in business technology adoption in some areas.<sup>10</sup>

### Box 1: What is innovation? A use-based definition

The Organisation for Economic Co-operation and Development (OECD) defines innovation as:

**“A new or improved product or process (or combination thereof) that differs significantly from the unit’s previous products or processes and that has been made available to potential users (product) or brought into use by the unit (process).”**

OECD, 2018<sup>11</sup>

To qualify as innovation, a technology, product, or process must not only be novel, but must be *put into use* (operationalized or implemented) in some way. For the majority of product and technology innovation, implementation means being brought to market, or commercialized. This is the case for business innovation:

**“A business innovation is a new or improved product or business process (or combination thereof) that differs significantly from the firm’s previous products or business processes and that has been introduced on the market or brought into use by the firm.”**

*Ibid.*

Based on this understanding, it is clear that knowledge generation or invention alone, though important, is not innovation in itself.

**“In technical terms, invention is the process of coming up with a truly novel idea, while innovation is the process of using ideas to offer new or improved products and services at the same factor cost.”**

Breznitz, 2021<sup>12</sup>

This definition does not diminish the vital role of universities in innovation, but recognizes the difference between knowledge generation and knowledge application. The OECD definition also encompasses social innovation, by taking a perspective that is neither based on technocentrism, nor a reliance on financial profit as the only measurement of value.

Traditionally, universities – the main knowledge generating institutions in most economies – focus on the early stages in the innovation continuum (discovery and invention) and focus their resources on related activities. At the other end of the innovation continuum, profit-oriented businesses are more interested in committing resources to the later stages in the continuum, when a product, technology, or service has more obvious market and scale-up potential (Box 2).

### Box 2: Barriers to academic-industry collaboration in Canada

A 2012 study by the Munk School highlighted that the Canadian innovation system has, “weak linkages between the knowledge generation process in institutions of higher education and the capacity of private firms to adapt the knowledge being generated for commercial purposes”.<sup>13</sup> According to this report, challenges to academic-industry knowledge transfer in Canada include:

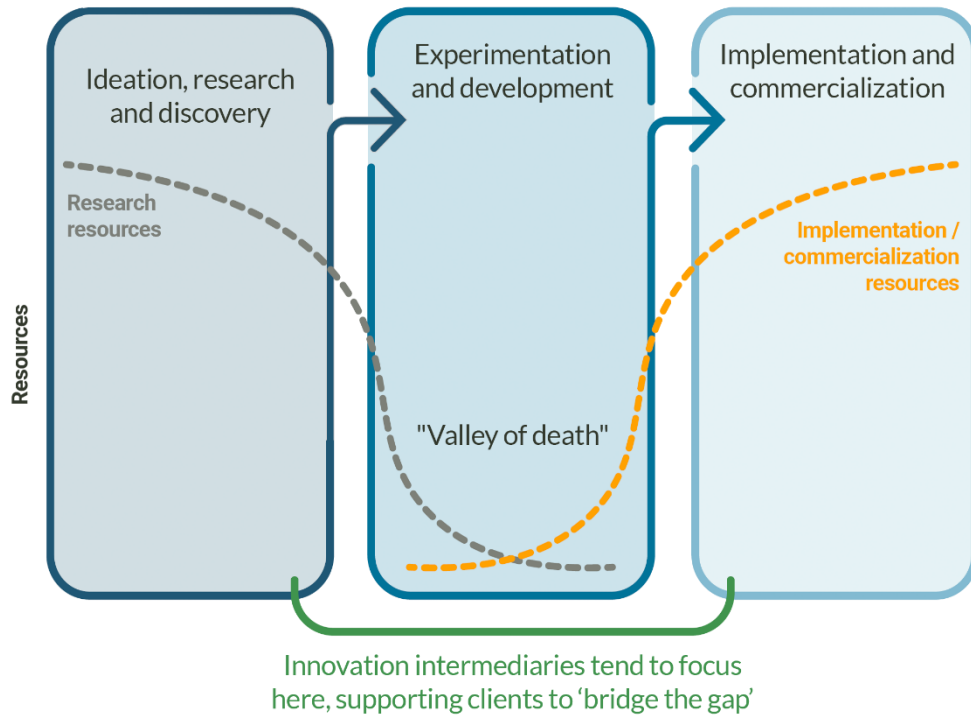
- A ‘cultural divide’ between academia and industry, including different timelines (some businesses may feel that universities lack a sense of urgency), and different rationales underpinning R&D.
- Lack of absorptive capacity on the industry side – as evidenced by low business expenditure in research and development in Canada. Larger firms (of more than 1,000 employees) are more likely to collaborate with universities.
- Collaboration varies by sector. Some academic disciplines are more given to collaboration, including mathematics, business and finance, and engineering.
- There are generally weak academic-industry technology transfer mechanisms. University TTOs may be under-resourced or inefficient. They are not always well integrated into their parent universities, and may be seen as an ‘auxiliary structure’.<sup>14</sup>

The gap between early and late-stage innovation is often known as the ‘valley of death’ (usually in the context of technology development) and sees the failure of many potentially promising innovations at the experimentation stage. This is often because of a lack of financing, talent, or other resources needed to drive trial-and-error development. These challenges can be disproportionately high for agents of social innovation, disadvantaged or marginalized groups, or where innovation is based on a not-for-profit rationale. As noted in Box 1, innovation should result in implementation and (hopefully positive) impacts, but these impacts are not limited to fiscal reward. Where the intended value of an innovation is measured in terms other than financial return on investment – for example, when tackling complex societal or environmental problems – it can be more difficult to communicate the case for resources, and to secure commitment from backers and stakeholders. For example, public innovation support schemes can be slow to recognize the value of intangible outcomes such as adjusted human behaviour, or environmental enhancement.<sup>15</sup>

Whatever its underlying rationale, innovation is always a high-risk activity; one meta-study found that success rates for new product innovation stand at only around 25%.<sup>16</sup> Crossing the valley of death is no easy task. It is here where innovation intermediaries can help.



Figure 2: The ‘valley of death’



Source: adapted from Markham et al., 2010<sup>17</sup>

In summary, the value of successful innovation intermediaries is their ability to enable or accelerate innovation processes which would otherwise stall or fail. By supporting client organizations along the innovation continuum, intermediaries help to ‘bridge the gap’ between ideas and outcomes. It is this gap where innovation intermediaries can help to reduce uncertainty and risk, and promote success for positive societal and economic impacts, in ways that are explored over the following pages.

## How do innovation intermediaries act?

All effective innovation intermediaries – i.e., those which are successful in boosting client innovation – share core common functions:<sup>18</sup>

1. Creating and sustaining **linkages** between organizations and actors. Innovation intermediaries act to create new connections between actors in an innovation system, and strengthen existing linkages.
2. Providing specific **services**. Following initial client engagement, innovation intermediaries provide hands-on services such as access to testing facilities, financing, portfolio advice, or searching for technology transfer opportunities (among others).
3. Supporting **strategic capability** in the innovation system. Innovation intermediaries can adopt and promote a long-term perspective, supporting the sustainability and long-term prosperity of their innovation systems by supporting the exploitation of new knowledge to generate positive socio-economic impacts.

It is important to note that these functions are not independent of each other, and that each individual innovation intermediary will balance them in different ways. These functions are further explored over the following pages, with a general focus on academic-industry collaboration.

## LINKAGES

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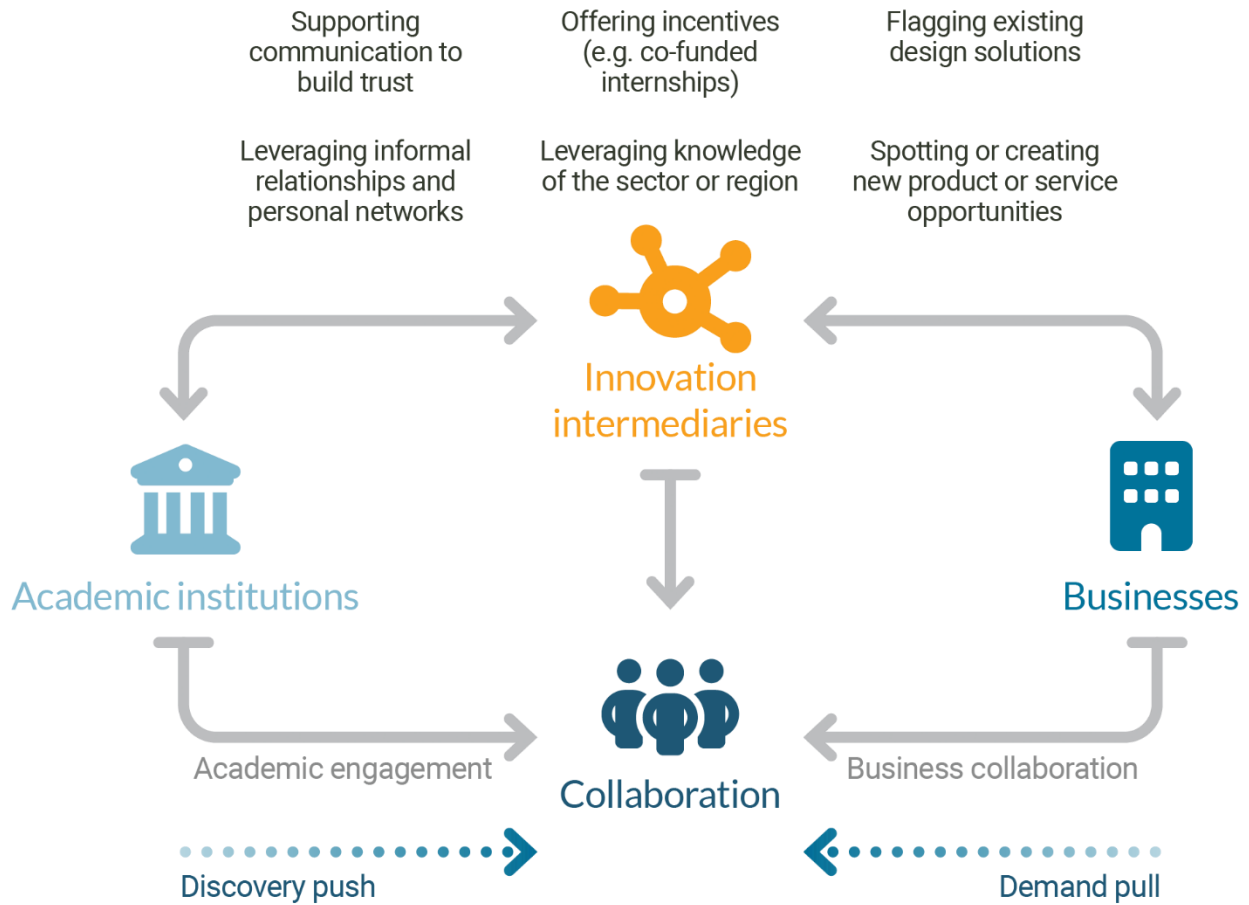
Innovation does not take place in isolation. Successful innovation in our globalized economy is based on knowledge transfer, which in turn relies on cooperation between innovation stakeholders. The post-war model of ‘closed innovation’, pioneered by large corporations such as Bell, using large in-house research and testing facilities, is today neither economically viable nor efficient from a process perspective. It has long since been overtaken by a more flexible and dynamic ‘open innovation’, based on the sourcing, exchange, and licensing of information between firms, academia, and individuals.<sup>19</sup>

**Canada’s innovation performance depends on a healthy and dense network of communication, collaboration, and cooperation between organizations**

Like other economies, Canada’s innovation performance depends on a healthy and dense network of communication, collaboration, and cooperation between organizations. Innovation intermediaries act to create and strengthen linkages by creating new connections and supporting these relationships. The relationship between academic research departments as major knowledge generators, and businesses as net knowledge users, is central to open innovation.

How do successful innovation intermediaries support new linkages (or renew old linkages) between academia and businesses? This depends, in part, on the characteristics of the universities and businesses. Since the 1990s, universities have increasingly sought to deliberately generate positive socio-economic impacts from research via a so-called ‘third mission’. This includes commercializing new research and technologies, particularly through spin-outs or academic-industry collaboration.<sup>20</sup> For example, Westport Fuel Systems (formerly Westport Innovations) and Abgenix Pharmaceuticals are examples of successful spin-outs from the University of British Columbia.<sup>21</sup> Both started out by building on research breakthroughs by academics at these institutions (in the fields of combustion engine technology and methods for the production of antibodies respectively) before successfully scaling up. Canadian polytechnics and colleges also tend to focus on applied research and commercialization through collaboration with industry. For example, Conestoga College in Kitchener, Ontario, developed an R&D partnership with Greentec, an e-waste recycling business to address technical challenges around the separation of waste. The result of this collaboration was a robotic cell, known as Project Lexi, developed to dismantle hard drives.<sup>22</sup>

**Figure 3: Connecting for collaboration; innovation intermediary practices**



Source: author

Where universities and industries search for reliable collaborative innovation partners, innovation intermediaries can act as a trusted broker to bring both parties to the table on the basis of mutual or complementary interests. In general, “universities use the brokers to seek partners for their externally funded research programmes while the firms use the brokers to shape research programmes to meet the perceived needs of the industry.”<sup>23</sup>

**Box 3: Key concepts – discovery push, demand pull, academic engagement and business collaboration**

‘Discovery push’ and ‘demand pull’ relate to the *strategic orientation* of academic institutions, businesses, and individuals that are engaged in innovation. They are defined as follows.

**Discovery push** is about introducing new technologies, products, or services that have perceived value potential, based on the hope or expectation that end users will be interested. Advocates of discovery push usually believe that their innovation will meet an unmet ‘invisible’ need, i.e., one which end users are not aware of (an ‘unknown unknown’). Perhaps the best-known example of successful discovery (technology) push is the Apple iPad, which created a previously non-existent market for tablets. Discovery push is often driven by advances in science and technology, such as breakthroughs in materials science, which can lead to *disruptive innovation*. This also means that it can stem from basic

and early stage research of the type carried out in universities – hence the ‘discovery push’ arrow on the left-hand side of Figure 3 above.

**Demand pull** is about meeting the identified needs of technology, products, or services end users. It is commonly used to underpin *incremental innovation*, and based on market research to identify the ‘job-to-be-done’ by intended customers. Demand pull is often used by businesses in mature markets with well-established demand, such as the combustion engine car market.<sup>24</sup>

It is also important to highlight that these associations are based on overall trends. Of course, there are many exceptions such as academic institutions engaged in incremental innovation, or large firms attempting to ‘push’ new market-untested innovations. Discovery push and demand pull offer a useful dichotomy to understand how organizations approach innovation, but they are not mutually exclusive. Indeed, most successful innovations are based on a mix of push and pull factors. One of the services commonly offered by innovation intermediaries is market testing, intended to reduce uncertainty about future demand for new technologies (Figure 5).<sup>25</sup>

**Academic engagement** is defined as “knowledge-related collaboration by academic researchers with non-academic organizations... [it] represents an important way in which academic knowledge is transferred into the industrial domain; many companies consider it significantly more valuable than licensing university patents.”<sup>26 27</sup> From an intermediary perspective, it is useful to become familiar with the engagement stance taken by universities, polytechnics, colleges and academics. For example, some have formal policies encouraging engagement, and some have proactive technology transfer offices which encourage knowledge transfer. The University of Waterloo in Ontario, for example, makes its Intellectual Property (IP) Rights Policy #73 openly available, and uses it to encourage academic engagement by safeguarding the inventor.<sup>28</sup>

**Business collaboration:** In general, “Firms that cooperate with external partners are also more likely to reap benefits from research collaboration with universities.”<sup>29</sup> The following are all generally correlated with a greater propensity to engage in collaborative innovation: the distance of a business from its nearest academic institution; complementarity between academic research specialisms and industry sector(s)<sup>30</sup>; business size; and signalling (i.e. visibly sharing knowledge to “convince prospective partners... of the opportunities available from engaging in a good R&D project”).<sup>31</sup>

In this situation, the main challenge for the innovation intermediary is to first *understand* the innovation interests of prospective clients, based on the best knowledge available (including if their strategic orientation is based on discovery push or on demand pull). Armed with this knowledge, the intermediary is in a better position to *identify* and *communicate incentives* for collaboration to both sides (Figure 4).

**Figure 4: Intermediary steps for creating or renewing linkages**

Source: author

Of course, innovation intermediaries do not always initiate collaboration. Firms, individuals, and universities often contact each other and establish new connections, with no intermediary involvement. But even in these cases, innovation intermediaries can be approached by collaborative partners seeking support in the innovation process.

As well as understanding the push/pull orientation of prospective clients, innovation intermediaries positioned between universities and industry benefit from an awareness of 1) academic engagement from universities and individual academics, and 2) the business collaboration stance adopted by individual firms.

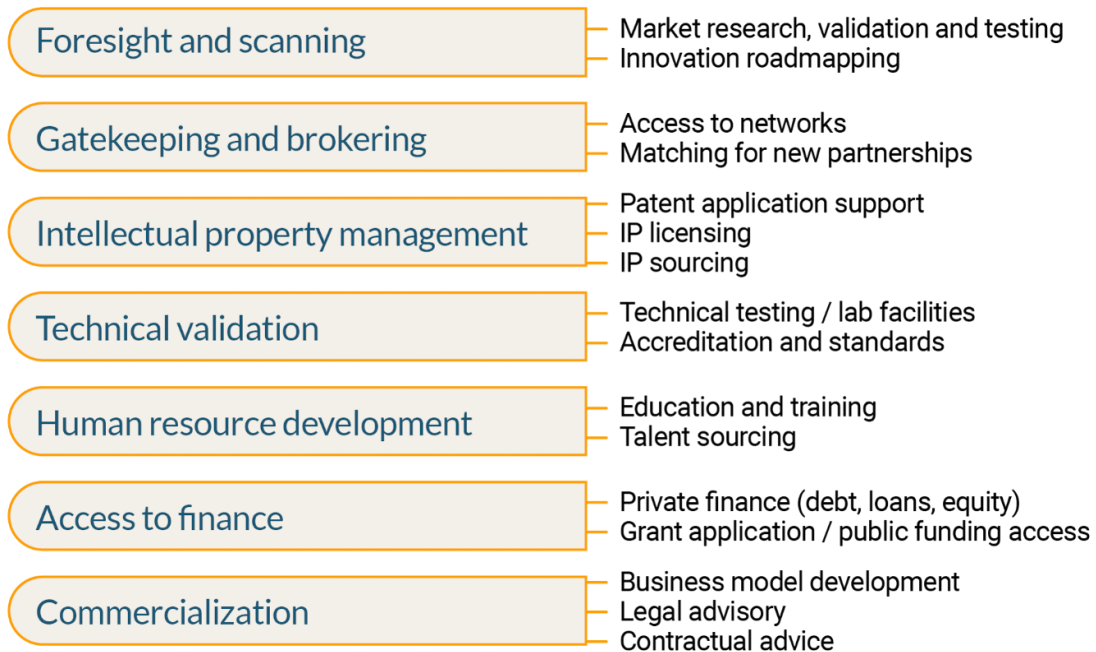
Armed with an understanding of prospective client needs, motivations and interests, the next challenge for an innovation intermediary is to *identify appropriate incentives* for collaboration. Incentives are based on areas of potential synergy or complementarity in R&D and innovation. In the case of academic-industry collaboration, incentives differ to each party, but, “Convincing is a matter of framing a common issue that is considered a problem by potential actors in the innovation system.”<sup>32</sup> For public innovation intermediaries in particular, the promise of co-funding for collaborative research can be a powerful universal incentive for dialogue. A particular challenge in finding incentives for academic-industry collaboration is overcoming the ‘cultural divide’ – the differing norms, expectations, and ways of working between universities and businesses.

Innovation intermediaries operate in regions or industries with many unknowns. No intermediary can have perfect knowledge of the activities and interests of unconnected innovation stakeholders. For example, unless a business is visibly signalling its intention to collaborate, it can be difficult for an intermediary to know if it has a role to play. In such cases, intermediaries benefit from their informal connections and access to tacit knowledge. Intermediary organizations are made up of individuals, whose experiential knowledge and reputational standing can be of immense value in creating new collaborative opportunities, building trust, and encouraging certainty. Personal networks and connections, built up over time, lead to informal leads and knowledge flows, helping an intermediary to spot new and mutually advantageous collaborative innovation opportunities, and then to communicate with credibility.

Innovation intermediaries are not just matchmakers. After an initial dialogue between clients has been established, they play an ongoing role ‘at the table’ to accelerate the transformation of knowledge and ideas into impactful innovation. Working with or supporting their clients, innovation intermediaries co-create solutions to overcome innovation challenges. They do this by providing a range of services (Figure 5).

**Working with or supporting their clients, innovation intermediaries co-create solutions to overcome innovation challenges**

**Figure 5: Common innovation intermediary services**



*Source: author, with category elements from Howells, 2006*

The services offered by innovation intermediaries are shaped by several considerations: the organizational form of the intermediary, their operating model (i.e., for-profit or not-for-profit, and if they have a remit to support public policy goals), whether they are ‘owned’ by another institution (such as a university), and – in theory but not always in practice – the most urgent innovation needs of their intended clients.

For example, business accelerators usually support start-ups in the late stages of the innovation continuum. Accordingly, accelerator services might focus on risk mitigation through foresight and scanning, whilst supporting its start-ups through access to finance (including venture capital) and support for commercialization, such as refining and scaling the business model. In contrast, a university TTO might focus on ‘spinning out’ commercially relevant knowledge to the private sector through IP licensing, or by matching academics to potential business collaborators. Because TTOs serve their parent institutions, their services tend to be built around ‘discovery push’.

The common objective for all intermediary services is the advancement of projects along the innovation continuum via knowledge transfer and transformation, supporting clients to overcome a variety of barriers.

- **Foresight and scanning** are about anticipating economic, social, environmental, and political changes or trends, to equip innovators with the knowledge to minimize risks and adjust the development trajectories of early-stage technologies, products, or services. Intermediaries providing these services often conduct market trends analysis – sometimes through direct market research with user groups – and can make use of foresight methods such as horizon scanning. Innovation roadmapping is a related strategic planning method used in innovation management. Roadmaps typically plot various internal and external elements which impact the development pathway of a technology, product, or service, and are visually represented on a timeline. An advantage of innovation roadmapping is its versatility; it can be applied at any level from the macro-scale – such as a globalized technology domain – to the micro-level, such as an individual innovation project deliverable.
- **Gatekeeping and brokering** services leverage the network centrality held by (successful) innovation intermediaries. This centrality can be extremely difficult, if not impossible, to achieve by other organizations in the innovation ecosystem (with the possible exception of universities). For this reason, innovation intermediaries manage and grow client and partner relationships with great care, to be better able to leverage their client and partner networks. The National Research Council of Canada Industrial Research Assistance Program (NRC IRAP) is a good example of how brokered networks can underpin a service offer. IRAP’s many Industrial Technology Advisors (ITAs) provide its main clients – Canadian SMEs – with access to “an extensive network of regional, national, and international partners” in a textbook brokering role.<sup>33</sup> Membership-based ‘gated networks’ are also commonly available as part of intermediary service offers, and are typically supplemented with events and workshops to provide face-to-face networking, knowledge transfer and business development opportunities to members. For profit-oriented innovation intermediaries, mediated network services have the bonus of being a useful cross-selling platform for other services like training courses.
- From an intermediary perspective, **IP management** services serve two purposes. Firstly, they support progress in the early part of the innovation continuum by establishing strong collaborative relationships between clients, based on formally agreed IP ownership terms and/or confidentiality agreements. An established model in academic-industry collaboration is IP licensing, where the academic institution enters into an agreement with a firm to develop and commercialize its knowledge. For example, the University of British Columbia successfully licensed a new prostate cancer treatment to Roche, a pharmaceutical company, in 2015.<sup>34</sup> This arrangement was mediated by the University-Industry Liaison Office, an innovation intermediary. Secondly, intermediaries can support their clients to navigate the legal complexities of safeguarding and capturing the value of new innovations. Although protecting IP is often equated with patent applications, this is not necessarily the optimal strategy, particularly when intangible products or services (such as software applications) are the focus. Intermediaries themselves can sometimes also generate revenue through IP arrangements, by accepting a stake in IP ownership or securing a percentage of royalties as compensation for their advisory services.
- **Technical validation** services provide clients with access to testing facilities. Such facilities are usually physical, though they tend to be capital-intensive and so are held by relatively fewer,

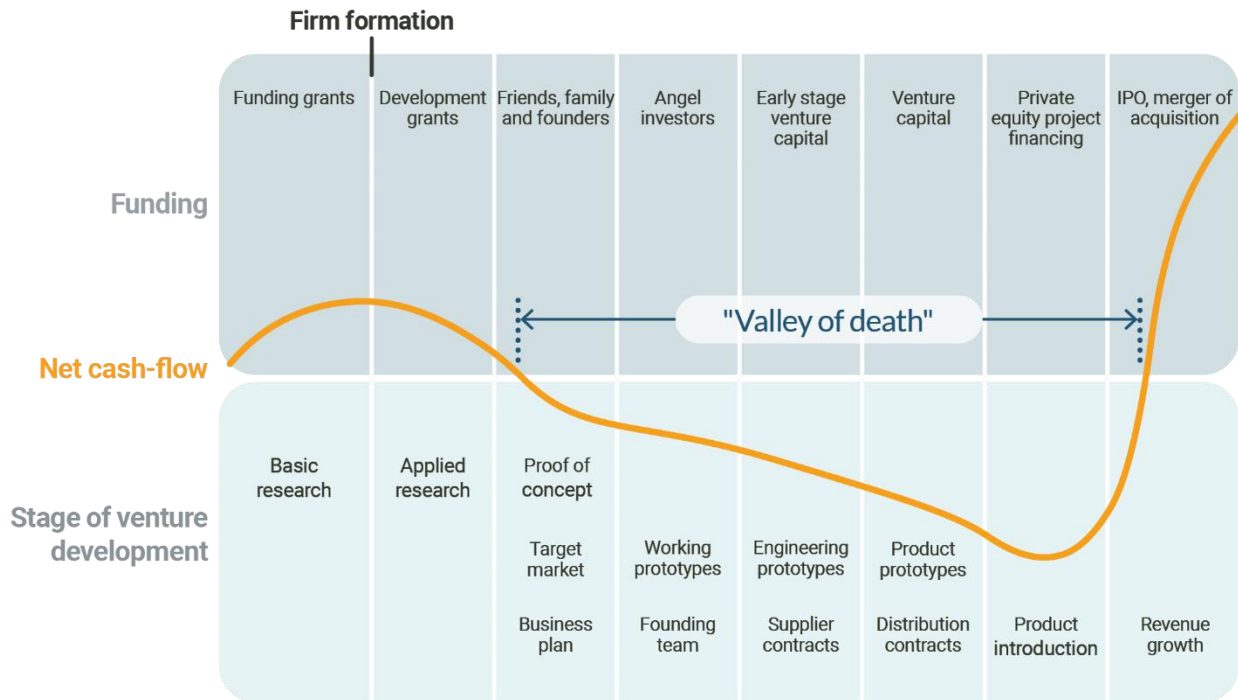
technology- or sector-specific intermediaries. The Research Facilities Navigator, a directory website operated by the Canada Foundation for Innovation (CFI), lists over 775 research facilities covering 28 sectors of application in Canada. (Not all such facilities are innovation intermediaries. As noted at the start of this report, an innovation intermediary is correctly defined by its role in an innovation system, not by its organizational form. If a research facility simply sells its testing services to individual clients, as opposed to genuinely mediating collaborative innovation between other organizations, it would be more accurately described as a technology service provider).

- **Human resource development** services include training in innovation-related skills, and the attraction and recruitment of new talent. The former is a very common service offered by innovation intermediaries, who can make good use of their network connections to bring training experts and learners together. MaRS Discovery District in Toronto, for example, offers 12 self-guided courses to any organization (or individual) willing to pay, ranging from Entrepreneurship 101 to Medtech Reimbursement.<sup>35</sup> Mitacs supports talent acquisition in Canada, by co-funding undergraduate student and postdoc placements in academic-industry R&D projects.<sup>36</sup>
- **Access to finance** includes direct financing by the intermediary itself, or – more commonly – advisory support to access finance from external public or private sources. The single biggest determinant of financing options for innovation projects – which are typically spun out into start-up entities – is the evaluated level of risk. Risk should ideally decrease over time as an innovation project moves forward along the continuum, and uncertainty declines. This changing risk profile typically demands an innovation financing mix that evolves over time (Figure 6). The concurrent challenge for the intermediary is to minimize the erosion of client finances as they move through the ‘valley of death’. As well as accessing new funding sources, innovation intermediaries can support clients to meet project costs and build efficiencies; for example through offering mentorship or training in financial management.

Although it is outside the scope of this report to detail the pros and cons of the many different forms of finance for innovation ventures, it is important to note that good innovation intermediaries keep an eye on the wider innovation environment. They are cognizant of the wider implications of innovation financing preferences; particularly the longer-term development of the local innovation ecosystem, in which they themselves have a stake. Some forms of finance, such as loans or guarantees from public regional institutions, arguably have the potential to foster stronger embeddedness within the local ecosystem than, for example, foreign-owned venture capital equity funding. This ability to exercise a broader awareness of how modes of practice affect the local or regional innovation system, as well as being an active stakeholder in the wellbeing of the system, sets innovation intermediaries apart from other financial advisory service providers.



Figure 6: Evolving finance sources over the lifespan of an innovation project ('venture')



Source: adapted from Stefani et al., 2020<sup>37</sup>

- Commercialization** services support to-market planning and operationalization, primarily for clients in the mid-to-late stages of the innovation continuum. As a new product, technology or service nears the end of the experimentation stage, a refined and realistic business model becomes essential, including for social innovations. Indeed, proponents of a design thinking approach to R&D management advocate for elements of the business model (such as customer insight) to be strongly incorporated into the innovation process from the very start of the continuum, to maximize the chances that the innovation addresses a genuine 'job-to-be-done'.<sup>38</sup> A business model is also an essential tool for securing financing and investment. For example, Foresight Canada, a cleantech accelerator, offers business model validation through its 'Launch' training program. Innovation intermediaries that offer commercialization services can also help clients with operational planning, such as supply chain development and negotiating contractual agreements.

Successful intermediaries design their services to be demand-driven and tailored to real innovation challenges (Box 4).

#### **Box 4: Success factors in innovation intermediary services**

Research examining successful technology institutes indicates that the key to providing a suite of value-adding services is to be complementary to the industrial specializations of innovation ecosystems, focusing more on demand pull rather than discovery push.<sup>39</sup> It is likely that this lesson applies to all types of innovation intermediaries (not just technology institutes), because successful services are usually designed on the foundation of real client needs, helping them to overcome specific barriers in the innovation process.

In contrast, innovation intermediaries which fail to connect with the needs of their would-be clients risk becoming irrelevant. The ongoing challenge for innovation intermediaries is to balance these client-oriented service offers with the need to anticipate market and technology trends, and so to remain proactive to changing innovation demands in the longer term (see 'Strategic capability' below).

In terms of how intermediaries can best facilitate academic-industry collaboration, research has focused on overcoming obstacles to successful partnership. Good project management has been advocated for as an effective means of overcoming the 'cultural divide', with universal best practice norms such as clear objective setting, good communication and robust monitoring.<sup>40</sup>

This brief exploration of innovation intermediary services highlights three trends.

Firstly, service areas often overlap. For example, there is obvious complementarity between access to finance services and training services, or between foresight services and commercialization services. This reflects the fact that successful innovation requires a well-integrated combination of complex 'working parts', but it also incentivizes innovation intermediaries to build and offer integrated packages of bundled services to clients.

Secondly, innovation intermediaries do not need to provide services by employing (expensive) payrolled in-house experts. In true intermediary fashion, they can use their profile and visibility to contract thematic experts to offer structured services to clients, such as by contracting CEOs to offer business masterclasses. This agile operating model allows intermediaries to avoid high fixed costs, and to provide a valuable service to small businesses and individual innovators.

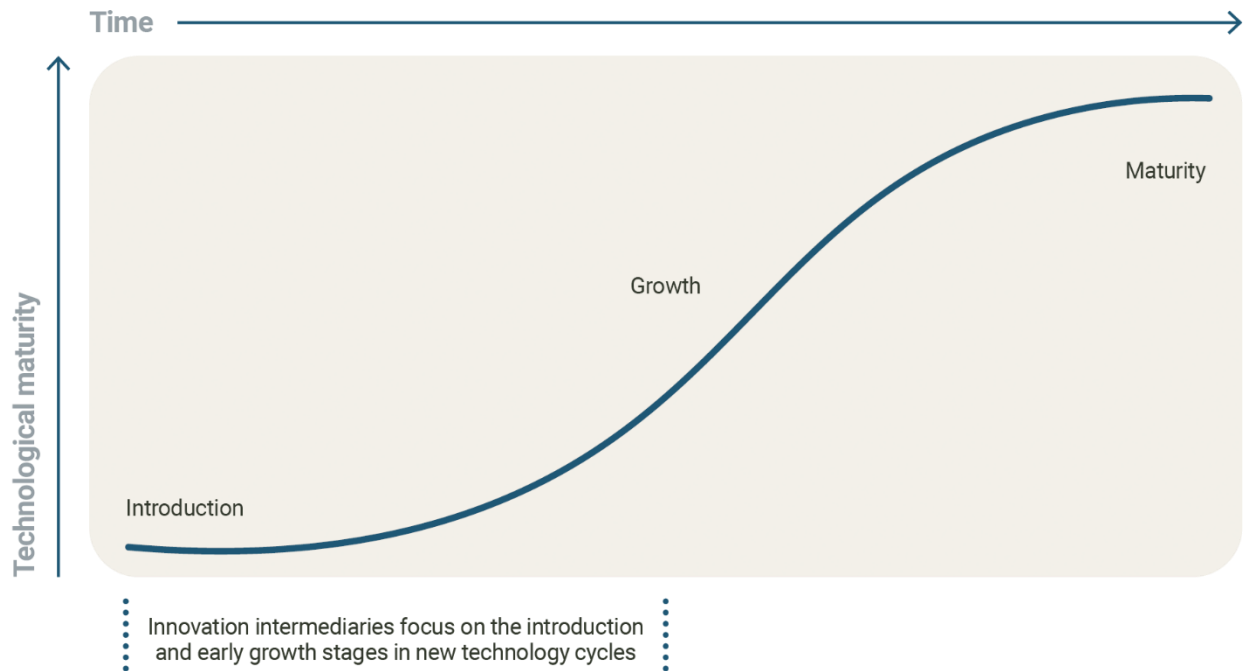
Thirdly, innovation intermediaries are not impassive 'empty vessels' in service provision. As explained above in the context of access to finance services, they capture and retain some of the value generated through service provision and knowledge intermediation, and both shape and are shaped by regional innovation ecosystem trends. This reflects their unique strategic capability.

Unlike linkages and services, which are about day-to-day or month-to-month (short- or medium-term) activities, strategic capability is about the long-term, cumulative influence that intermediaries have over the innovation trajectories of their networked ecosystems.<sup>41</sup> As noted above, successful innovation intermediaries tend to be complementary to the industrial specializations of their innovation systems. But at the same time, they can act to steer the ‘direction of travel’ in innovation. Innovation intermediaries can act in two main ways to shape the longer-term strategic innovation performance of their networks; by *engaging with emerging technologies*, and by *acting as long-term strategic assets* in their innovation ecosystems.

**Innovation intermediaries can act in two main ways to shape the longer-term strategic innovation performance of their networks; by engaging with emerging technologies, and by acting as long-term strategic assets in their innovation ecosystems**

In terms of *engaging with emerging technologies*: innovation intermediaries usually aim to operate over years or decades, and so are incentivized to take a long-term market perspective. As noted in Box 3, long-term success means proactively responding to actual or anticipated market changes in order to remain industrially relevant. But innovation intermediaries also have a vested interest in promoting awareness of emerging technologies that could create new growth-led opportunities for client universities, firms, or individuals. On the classic technology s-curve, innovation intermediaries need to be ready to exploit opportunities at the introduction and early growth stages (Figure 7).

**Figure 7: The intermediary focus on early technology maturity**



Source: author

Some innovation intermediaries are tasked with supporting innovation or industrial policy priorities. Mitacs, for example, is a national, private not-for-profit organization with a mandate to support

innovation in Canada. Within this scope for action, it issues dedicated thematic calls supporting strategic industry development goals in Canada, such as its Autumn 2021 call for project applications in artificial intelligence, biomanufacturing, cleantech, and quantum science.<sup>42</sup>

**Box 5: Does academic-industry R&D have a measurable impact on Canadian business innovation?**

There is an ongoing conversation about the collective effectiveness of academic-industry R&D in terms of its real impact on Canadian business innovation. Canada has a well-documented challenge: persistent low business innovation expenditure. As this report has made clear, invention does not necessarily lead to innovation (Box 1). The good news is that Canada certainly does not lack in terms of university-industry R&D cooperation:

“The share of industry-funded R&D in Canadian universities hovered around eight percent over the past couple of decades. That may not sound like a lot, but it has been consistently higher than the equivalent figure for American universities, which has fluctuated at around five percent in the same period. And no proponent of stronger university-industry partnerships in Canada is claiming that there is a similar problem in the United States.”

*Sá, 2019<sup>43</sup>*

At the same time, the Council of Canadian Academies notes that, “the trend towards increased collaboration and partnerships between industry and higher education institutions combined with flat business expenditures on R&D in the higher education sector remains a puzzling anomaly.”<sup>44</sup>

Despite a lack of clear statistical evidence that academic-industry collaboration enhances business innovation at the aggregate (national) level, many individual academic-industry partnerships do deliver genuine value-creating innovation. For example, Mitacs longitudinal surveys indicate that after two to three years of further work to commercialize collaborative research results, 23% of Accelerate/Elevate projects reached the “technology proven through successful deployment” stage.<sup>45</sup> A Canadian Licensing Activity Survey found that licensing activity by Canadian universities increased by 16% from 2015-2020, with small companies accounting for 42% of licensees.<sup>46</sup>

The takeaway is that enhancing Canadian business innovation is a complex challenge and that although academic-industry collaboration is not a magic bullet, it is an important part of the overall solution.

In terms of *acting as long-term strategic assets*, innovation intermediaries are reservoirs of knowledge and experience, built up over time and through repeated interactions with many clients and many different innovation projects. As trusted and open institutions which support innovation, “the retention and reintroduction of knowledge into future technology cycles ensures long-term benefit to regional innovation actors.”<sup>47</sup> This can be seen, for example, by working with the same sets of clients on successive R&D projects over several years, supporting a portfolio approach to innovation, supporting local embeddedness (particularly in start-ups), and encouraging positive local spillovers.

## Conclusions

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Successful innovation intermediaries bring innovation actors together, tailor their services to the real needs of their clients, and act to foster the broader and long-term wellbeing of their innovation ecosystems. This synopsis of leading current knowledge on innovation intermediaries has highlighted that all innovation intermediaries share a set of core functions, but also that rolling them out to best effect demands careful planning. Previous research into successful intermediaries reveals a number of universal best practice principles:

- In building *linkages* for collaborative innovation, successful intermediaries use their network centrality to identify promising potential for partnerships, distill incentives for collaboration where they are needed, and communicate them with credibility and trust to create and strengthen connections.
- In delivering *services*, successful innovation intermediaries must be cognizant of the real innovation needs of their clients, tailoring their services accordingly, whilst also creating added value through complementary and overlapping offers. As illustrated by selected Canadian examples, different intermediaries do different things. Whereas some, such as TTOs, facilitate discovery push, others such as business accelerators tend to focus more on demand pull and commercialization. A keen awareness of the intended role of each intermediary is invaluable as a foundation upon which to build and deliver appropriate services.
- In delivering *strategic capability*, innovation intermediaries should recognize their unique position in innovation ecosystems, and leverage their influence for the long-term prosperity of their client firms. This requires careful balancing of day-to-day service activities with far-sighted awareness of emerging trends and opportunities. Some are also tasked with supporting strategic public policy goals.

In the context of academic-industry collaboration in Canada, innovation intermediaries have a significant ongoing role to play in supporting innovation. But as this report has made clear, invention does not necessarily lead to innovation. It is important that this distinction is used to underpin intermediary approaches to supporting Canadian academic-industry R&D.

## References

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- <sup>1</sup> Howells, Jeremy (2006) Intermediation and the Role of Intermediaries in Innovation, *Research Policy*, 35, 715-728
- <sup>2</sup> Howells, *op. cit.*
- <sup>3</sup> Dutta, S. and Folta, T. (2016) A comparison of the effect of angels and venture capitalists on innovation and value creation, *Journal of Business Venturing*, 31 (1), 39-54
- <sup>4</sup> Tracxn (2022) Accelerators & Incubators in Canada. Updated 31 December 2021. Accessed 14 March 2022. Available at: [Accelerators & Incubators in Canada | Tracxn](#)
- <sup>5</sup> The Logic (2021) With dozens of startup incubators and limited funding, B.C. regional development agency seeks expert advice. Published 8 October 2021. Accessed 28 March 2022. Available at: <https://thelogic.co/news/with-dozens-of-startup-incubators-and-limited-funding-b-c-regional-development-agency-seeks-expert-advice/>
- <sup>6</sup> Government of Canada (2022) Innovation Superclusters Initiative. Updated 14 March 2022. Accessed 18 March 2022. Available at: [Home - Innovation Superclusters Initiative \(ic.gc.ca\)](#)
- <sup>7</sup> Government of Canada (2022) About the NRC Industrial Research Assistance Program. Updated 23 July 2019. Accessed 22 March 2022. Available at: <https://nrc.canada.ca/en/support-technology-innovation/about-nrc-industrial-research-assistance-program>
- <sup>8</sup> Government of Canada (2022) BAI Performance measurement framework – 2018. Updated 7 February 2018. Accessed 14 March 2022. Available at: [BAI Performance measurement framework - 2018 - SME research and statistics](#)
- <sup>9</sup> *Ibid.*, p141
- <sup>10</sup> Fudurich, J., Suchanek, L. and Pichette, L. (2021) Adoption of Digital Technologies: Insights from a Global Survey Initiative, Staff Discussion Paper, Bank of Canada, April 12 2021
- <sup>11</sup> Council of Canadian Academies (2018) Competing in a Global Innovation Economy: The Current State of R&D in Canada. Ottawa, ON, Expert Panel on the State of Science and Technology and Industrial Research and Development in Canada, Council of Canadian Academies, xx-xxii
- <sup>12</sup> Breznitz, D. (2021) *Innovation in Real Places; Strategies for Prosperity in an Unforgiving World*, Oxford University Press, New York, p3-4
- <sup>13</sup> Bramwell, A., Hepburn, N. and Wolfe, D.A. (2012) *Growing Innovation Ecosystems: University-Industry Knowledge Transfer and Regional Economic Development in Canada*, Munk School of Global Affairs, University of Toronto, p55
- <sup>14</sup> *Ibid.*
- <sup>15</sup> Beausoleil, V., Bouchard, M. and Hilton, C.A. (2021) New federal budget needs to deliver on government's social finance and innovation commitments, *CBC News Opinion*. Published 13 April 2021. Accessed 21 March 2022. Available at: [New federal budget needs to deliver on government's social finance and innovation commitments | CBC News](#)
- <sup>16</sup> Evanschitzky, H., Eisend, M., Calantone, R.J. and Jiang, Y. (2012) Success Factors of Product Innovation: An Updated Meta-Analysis, *Journal of Product Innovation Management*, 29, 21-37
- <sup>17</sup> Markham, S.K., Ward, S.J., Aiman-Smith, L. and Kingon, A.I. (2010) The Valley of Death as Context for Role Theory in Product Innovation, *Journal of Product Innovation Management*, 27 (3), 402-417
- <sup>18</sup> Miller (2014) The Strathclyde Technology and Innovation Centre (TIC) in Scotland's innovation system, *Regional Studies*, *Regional Science*, 1 (1), 145-151
- <sup>19</sup> Chesbrough, H.W. (2003) *Open innovation: the new imperative for creating and profiting from technology*, Boston, MA, Harvard Business School Press
- <sup>20</sup> Zomer, A. and Benneworth, P. (2011) The Rise of the University's Third Mission. In: Enders, J., de Boer, H.F. and Westerheijden D.F. (Eds.), *Reform of Higher Education in Europe*, SensePublishers
- <sup>21</sup> University of British Columbia, University-Industry Liaison Office (2022) UILO stats + success stories. Accessed 18 March 2022. Available at: [UILO Stats + Success Stories | uilo.ubc.ca](#)
- <sup>22</sup> Polytechnics Canada (undated) *Polytechnic Applied Research; Building a Stronger Canada*, p4
- <sup>23</sup> Winch, G.M. and Courtney, R. (2007) The Organization of Innovation Brokers: An International Review, *Technology Analysis & Strategic Management*, 19, p.757
- <sup>24</sup> Breznitz, *op. cit.*, p3-4

- 
- <sup>25</sup> Polzin, F., von Flotow, P. and Klerkx, L. (2016) Addressing barriers to eco-innovation: exploring the finance mobilisation functions of institutional innovation intermediaries, *Technological Forecasting & Social Change*, 103, 34–46
- <sup>26</sup> Perkmann, M., Tartari, V., McKelvey, M., Autio, E., Broström, A., D'Este, P., Fini, R., Geuna, A., Grimaldi, R., Hughes, A., Krabel, S., Kitson, M., Llerena, P., Lissoni, F., Salter, A. and Sobrero, M. (2013) Academic engagement and commercialisation: A review of the literature on university–industry relations, *Research Policy*, 42 (2), 423–442
- <sup>27</sup> Cohen, W.M., Nelson, R.R., Walsh, J.P. (2002) Links and impacts: the influence of public research on industrial R&D, *Management Science*, 48, 1–23
- <sup>28</sup> University of Waterloo (2022) Intellectual Property. Accessed 5 April 2022. Available at: <https://uwaterloo.ca/research/waterloo-commercialization-office-watco/intellectual-property>
- <sup>29</sup> Atta-Owusu, K., Fitjar, R.D. and Rodríguez-Pose, A. (2021) What drives university–industry collaboration? Research excellence or firm collaboration strategy? *Technological Forecasting & Social Change*, 173, p3
- <sup>30</sup> Maietta, O.W. (2015) Determinants of university–firm R&D collaboration and its impact on innovation: A perspective from a low-tech industry, *Research Policy*, 44 (7), 1341–1359
- <sup>31</sup> Fontana, R., Geuna, A. and Factors affecting university–industry R&D projects: The importance of searching, screening and signalling, *Research Policy*, 35, 309–323
- <sup>32</sup> Agogué, M., Berthet, E., Fredberg, T., Le Masson, P., Segrestin, B., Stoetzel, M., Wiener, M. and Yström, A. (2017) Explicating the role of innovation intermediaries in the “unknown”: a contingency approach, *Journal of Strategy and Management*, 10 (1), 19–39
- <sup>33</sup> Government of Canada (2022) NRC IRAP advisory services. Updated 19 March 2019. Accessed 24 March 2022. Available at: [NRC IRAP advisory services - National Research Council Canada](#)
- <sup>34</sup> Universities Canada (2017) Considerations for a national intellectual property strategy in Canada; Universities Canada’s submission to the Department of Innovation, Science and Economic Development’s consultation on Canada’s new IP strategy, p4
- <sup>35</sup> MaRS Discovery District (2022) MaRS Startup Toolkit. Accessed 24 March 2022. Available at: [Startup Toolkit | MaRS Discovery District \(marsdd.com\)](#)
- <sup>36</sup> Mitacs (2022) About Mitacs. Accessed 21 March 2022. Available at: [About Mitacs | Mitacs](#)
- <sup>37</sup> Stefani, U., Schiavone, F., Laperche, B. and Burger-Helmchen, T. (2020) New tools and practices for financing novelty: a research agenda, *European Journal of Innovation Management*, 23 (2), 314–328
- <sup>38</sup> Furr, N, and Dyer, J. (2014) *The Innovator's Method: Bringing the Lean Start-up into Your Organization*, Harvard Business Review Press, Boston, MA
- <sup>39</sup> Rush, H., Hobday, M., Bessant, J., Arnold, E., and Murray, R. (1996). *Technology institutes: Strategies for best practice*, International Thomson Business Press, Bury St Edmunds
- <sup>40</sup> Barnes, T., Pashby, I. and Gibbons, A. (2002) Effective University – Industry Interaction: A Multi-Case Evaluation of Collaborative R&D Projects, *European Management Journal*, 20, 272–285
- <sup>41</sup> Miller, *op. cit.*
- <sup>42</sup> Mitacs (2022) Elevate. Accessed 27 March 2022. Available at: [Elevate | Mitacs](#)
- <sup>43</sup> Sá, C. (2019) Canada doesn’t lack in terms of university–industry collaboration, *University Affairs*, 12 September 2019
- <sup>44</sup> Council of Canadian Academies, *op. cit.*, p23
- <sup>45</sup> Mitacs (2021) *Mitacs in Review – Innovative Solutions and Path to Commercialization (2016-17 to 2020-21)*
- <sup>46</sup> AUTM (2020) *AUTM 2020 Canadian Licensing Activity Survey*
- <sup>47</sup> Miller, *op. cit.*, p149

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