

**Conseil** de la science  
et de la technologie

A large wireframe profile of a human head facing right, set against a dark background with faint circuit patterns. The title text is overlaid on the right side of the head.

# **ADVISORY REPORT**

## **Intellectual Property Management in University/Business Relations: Promoting Dynamic Strategic Alliances**



*science et technologie au service de la société*

Québec 

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Québec, May 2011

Clément Gignac  
Minister of Economic Development,  
Innovation and Export Trade  
Gouvernement du Québec  
Québec

Minister Gignac:

In compliance with the provisions of Section II, Division IV of the Act respecting the ministère du Développement économique, de l'Innovation et de l'Exportation, I have the honor of submitting to you the Advisory Report prepared by Conseil de la science et de la technologie entitled *Intellectual Property Management in University/Business Relations: Promoting Dynamic Strategic Alliances*.

Sincerely,

Geneviève Tanguay, Ph.D.  
Acting Chair

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We would also like to thank the six sectoral organizations that, at the Council's request, met with their members to collect their opinions and concerns: CRIAQ (Consortium for Research and Innovation in Aerospace in Québec), PROMPT (Partenariats de recherche orientée en microélectronique, photonique et télécommunications), MEDEC (Canada's Medical Technology Companies), Montréal InVivo in the biopharmaceutical industry, FPIInnovations in the forestry industry, and CQRDA (Centre québécois de recherche et de développement de l'aluminium). Many other individuals and organizations were consulted during the process.

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Geneviève Tanguay, Ph.D.  
Acting Chair

Brigitte Van Coillie-Tremblay  
Executive Director

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## SUMMARY

### Introduction

Innovation is the economic engine of today's societies. Under the pressure of more and more intense competition, the pace of innovation has speeded up, and successful businesses and organizations are increasingly adopting open innovation practices.

Intellectual property management lies at the core of innovation strategies, which are increasingly cooperative and tightly linked to the market. These strategies question traditional technology transfer models, both within businesses and between businesses and universities.

In the wake of its situation report on open innovation, the Conseil de la science et de la technologie set up a working committee on intellectual property (IP) management in university/business relations to recommend actions to improve practices. The committee's findings and recommendations set out in this advisory report were the subject of a broad consultation and were validated at an IP forum on February 14, 2011.

### International Situation

The United States led the way with the *Bayh-Dole Act*, passed in 1980, which legitimized and regulated American universities' efforts to commercialize their research results by granting them IP rights over researchers' inventions.

The results are positive but mixed. In reality, technology transfer activities represent only 15 to 20% of total transfers to industry, and the data show that successful transfers are most of all based on a long tradition of cooperation.

Nevertheless, the American example had a strong influence on other OECD countries. Many of them amended their legislative and regulatory provisions in order to grant IP rights to universities and abolish "professor's privilege." Most universities now have commercialization and transfer structures, but they take a wide variety of approaches. For example, some universities in Israel focus on maximizing revenue from commercialization. Others, in Germany, Sweden, and Singapore, aim mainly to spur business development using a holistic approach to their relationship with businesses.

Most countries emphasize strategic partnerships between universities, research centers, and businesses. These partnerships take the form of industry clusters, competitiveness poles (France, Germany, and Sweden), or precompetitive research consortia (e.g., Magnet in Israel).

At the same time, new IP management models have been developed to improve practices and enhance collaboration: express license templates for university staff who wish to start up businesses based on research results, model agreements (e.g., *Lambert Agreements*), IP trading centers, open science and so forth.

IP management support for SMEs is a key component in government policy in many countries as reflected by the numerous IP management guides and tools, databases on commercializable research, and funding programs like the innovation voucher program.

One thing is certain—emerging countries are becoming organized, particularly those in Asia. China, Japan, and South Korea recently launched national IP strategies to help their businesses boost their competitiveness on international markets.

More than ever before, all countries are banking on IP and entrepreneurship training as a key success factor for their IP strategies. The increasingly complex environment requires entrepreneurs to enhance their knowledge and diversify their skills and expertise.

### **In Canada and Québec**

Canada has passed no laws or regulations with respect to IP policies at universities. Consequently, IP policies and practices vary widely among institutions.

This has not prevented most universities from setting up technology transfer offices and research commercializing units whose vitality is comparable, proportionally speaking, to American universities. However, although the results are comparable for disclosed inventions, they are significantly poorer in the case of patents and commercialization revenue. What's more, these activities are far from being companies' preferred method of knowledge transfer.

The innovation challenge in Canada is to maximize economic spinoffs from university research in a context where the private sector's innovation performance is poor and cooperation between universities and businesses is very average. A consensus is forming on the need to strengthen university/private sector cooperation and develop a Canadian IP strategy, which would enable SMEs to better compete in the knowledge economy.

Québec, for its part, stands out for its R&D investments (GERD): 2.63% of GDP in 2007 compared to the OECD average of 2.28%. However, the R&D performance of its universities is much stronger than that of industry. The ratio of industrial research to university research is half the average of the top performing OECD countries.

For this reason Québec has had mixed results despite the scale of the development and knowledge transfer mechanisms put in place in the province.

As mentioned in the 2010–2013 Québec Research and Innovation Strategy, there is a big gap between the province's research resources and its capacity for innovation and wealth creation. Two of the main problems involve the private sector's poor capacity to receive knowledge and technology—barely 50% of industrial R&D jobs are filled by university graduates—and a worrisome level of entrepreneurship.

### Main Problems and Irritants

- There is still a tendency to confuse the terms “invention” and “innovation.” This is reflected in poor impact indicators, which tend to be limited to invention-related indicators rather than to cover real economic spinoffs.
- Private sector innovation strategies vary according to the sector and the size of business involved. SMEs and tech startup companies experience the most difficulties.
- University culture, based on broad dissemination and sharing of knowledge, often conflicts with business culture, which tries to protect intellectual property and preserve its competitive advantage through industrial secrecy. University research is generally conducted far upstream of the market and is not necessarily focused on private sector needs.
- Despite the existence of university commercialization structures, such as university industry liaison offices (UILO) and research commercialization corporations, there is still too big a gap between decision-making processes (which are often very centralized and rigid) and companies’ time to market, which can be very short in some industries. The distance to markets also explains the persistence of certain, sometimes unrealistic, expectations about the value of inventions.
- The complexity of IP management in collaborative university/private sector projects is intensified by its international dimension. Variations in IP frameworks and practices from country to country are an additional challenge for international multi-partner collaborative projects.

### Eight Key Success Factors

The working committee identified eight key success factors:

- A solid and responsible commitment on the part of major industrial and university partners, without which no changes to innovation, cooperation, or IP management strategies can be successfully brought about. Partnerships must also be established at the highest level.
- A **general** enhancement of entrepreneurial and innovation management (including IP) skills. An increasingly complex environment requires greater knowledge and increasingly diversified skills and expertise on the part of university and company staff and decision makers, as well as from organizations whose mission is to assist them. However, the proportion of Québec students and workers trained in IP, innovation, and entrepreneurship at CEGEP and university (both undergraduate and graduate levels) is roughly below 5%.
- Dialogue, trust, and a long-term relationship between the university and the company
- Speed and flexibility
- Collaborative rather than individual work, right from the beginning of the process
- Reduction of technological and legal risks through clearer IP rights and sufficient maturation of the technology
- In-depth understanding of the company’s needs, the external environment, and the market by the various actors
- Consideration of SMEs’ needs and available support strategies designed for them

### RECOMMENDATIONS

The Council's general recommendation is **to promote collaborative work and alliance building** in the province. In order to address this challenge, three key actions are proposed:

- An alliance for action comprising universities, businesses, and research centers
- Collaborative training initiatives in innovation and entrepreneurship
- Support and IP management strategies for SMEs

#### **An Alliance of Major Decision Makers to Address IP Management Challenges and Facilitate Collaborative Projects**

Based on conclusive experiences in various countries:

The Council strongly recommends to key decision makers that an **ALLIANCE FOR ACTION** among universities, businesses, and research centers be created to resolve problems related to IP management and facilitate collaboration.

To obtain concrete action and tangible results:

The Council recommends as follows:

- The alliance should **commit to action and the resolution of very concrete problems**, and make it possible to add real value to existing regional or industry partnership initiatives (consortia, clusters).
- The alliance should **focus on the success factors selected during the forum**:
  - Committed leaders (10 to 12) in public and industrial research
  - From a variety of sectors and sizes of company
  - Clear support from major university associations, public research centers, and business associations
  - Highly streamlined administration
  - A limited number of action targets with clear timelines, milestones, deliverables, and short-term results
  - The promotion and dissemination of results on a provincial (sharing, appropriation), national, and international (brand image) scale
  - Ties to similar international organizations
  - An inspiring name closely associated with the new brand image

The Council recommends **seven priority work targets** selected by participants of the February 14 forum:

- Much quicker procedures and shorter deadlines for intellectual property negotiation: set a maximum time period and release the results
- Standardized procedures in all institutions for awarding quick licenses in order to simplify negotiations
- Harmonization of practices, rules, and clauses and dissemination of those that have been standardized
- Creation of a common website on which all available technologies and expertise are classified by field
- Improved relations between SMEs and both universities and large companies, including increased support and preferred IP access for the region's SMEs
- Promotion of collaborative projects between researchers and industry, particularly SMEs, through increased sabbatical leaves in industry like in the United States, and student internships in companies
- Support for joint innovation and entrepreneurial training initiatives

### **Greater Emphasis on Innovation (Including IP Management) and Entrepreneurial Training**

Despite a number of laudable initiatives in Québec, innovation and entrepreneurial training is the weak link in our innovation system, and best practices are too rare.

Considering the importance of this issue, the Council sets the following two major action priorities:

- In the short term, the entrepreneurial strategy announced by the minister is an opportunity to act quickly and to bank on sectoral and regional concertation initiatives to strengthen and adapt training programs to the various actors' needs.
- In the medium term, the introduction of compulsory training at the various university levels.

To encourage joint action on providing more generalized training that is better adapted to specific clienteles and based on best practices around the world,

The Council recommends that:

- As part of its entrepreneurial strategy, **the Ministère du Développement économique, de l'Innovation et de l'Exportation (MDEIE) should help set up several pilot projects** or programs adapted to fields or needs that are considered important or to clienteles who are less well served. These initiatives should
  - promote multi-organization and multi-sector synergies;
  - draw on a wide variety of complementary university and industrial expertise (including mentoring);
  - enhance support for young entrepreneurs;
  - target an industry cluster or consortium or a regional innovation pole, like the mobilizing projects launched under the 2010–2013 Québec Research and Innovation Strategy or the recent Genome Canada initiative promoting entrepreneurship;
  - receive public and private sector funding (significant leverage effect), with companies contributing through the active participation of their qualified staff;
- **Recognize exemplary innovation and entrepreneurial training practices** through annual awards from MDEIE and Ministère de l'Éducation, du Loisir et du Sport (MELS). The selection criteria for such awards should include adaptation and partnership; and
- Task these government ministries with setting up **a portal listing the best available training opportunities.**

In order to promote course content and teaching methods adapted to various actors' needs:

The Council recommends the following:

- Course content, teaching methods and schedules **that target all actors concerned** (large companies, SMEs, full-time students, managers, employees, ongoing training)
- **Teaching approaches** that incorporate the features **considered essential** by intellectual property forum participants:
  - Theoretical and practical training: concepts illustrated by practical, real-life projects
  - Training staff from both the university and industry, as well as a mix of participants
  - Introductory interactive workshops followed by modular content to provide progressive, personalized training
  - Mentoring and support: very important for SMEs and young entrepreneurs
  - Business internships for students
  - Online and distance courses, etc. to meet the needs of actors in remote regions; use of social networks as practice communities
  - Teaching approaches and content inspired by the best courses from around the world, including world-class experts as guest lecturers
  - Support for integrating various disciplines: health sciences, natural sciences and engineering, humanities and social sciences
  - Incentives promoting dialogue, sharing, and feedback

To introduce compulsory training in the universities at all three academic levels:

The Council recommends the following:

- MELS and university decision makers should encourage and facilitate the inclusion of at **least one credit** in innovation and entrepreneurial training **in all undergraduate programs in Québec**.
- A minimum of three credits in innovation and entrepreneurial training should be required in master's and Ph.D. programs.

### Strategies to Help SMEs Manage Their Intellectual Property

Because SME awareness is a prerequisite for the benefits of sound IP management:

The Council recommends that, on a needs basis and with the support of specialized resources, MDEIE and the main business associations

- Organize **awareness tours** targeting businesses where they are
- Organize **noon webinars** in collaboration with local stakeholders

So that the support provided is more proactive, informed, and networked:

The Council recommends that

- The government **offer incentives to ensure better networking** between intermediation bodies. The Council has already made this recommendation several times and it is a clear expectation of the community (Colloque Valorisation 2010). Networking initiatives do exist, but they remain partial and insufficiently promoted.
- First-line intermediation bodies **invest in expanding their knowledge** with a view to facilitating their dialogue with specialists and their more active participation in the dissemination of IP management tools
- MDEIE adjust the mandate of industrial research consortia so that they play **a greater support role for SMEs** in their IP management and in the dynamics of collaboration with both universities and large businesses

To ensure better access to tools and expertise:

The Council recommends that

- **MDEIE** evaluate existing IP management tools, identify those that are most relevant, and **enhance its site with the selected tools and guides**. This could also be an occasion to partner with other organizations to make available online tools like Intellectual Property Explorer<sup>1</sup>, which is jointly offered to businesses by Australia, Hong Kong, and Singapore to help SMEs identify and protect their IP assets.
- Intermediation organizations (including college centers for the transfer of technology [CCTTs]) be encouraged **to disseminate** information to their SME clients on **the management tools that best meet their needs**
- **Universities make it much easier to access information on technologies** that could be commercialized and research projects that might be of interest to industry. This is something many universities are already doing (see Section 5.8).
- Expertise recherche Québec be more involved

To ensure fast and easy access to funding for first-time IP management experiences:

The Council recommends that

- **MDEIE** assess the value of implementing “**innovation vouchers**” inspired by international success stories and aimed at SMEs with a view to helping them take the first steps in an IP approach. This assessment must take into account existing measures such as R&D tax credits and the technology intensification program.

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<sup>1</sup> [<http://intellectualpropertyexplorer.com/>]



## INTRODUCTION

### **Open Innovation: A Global Trend in the Pursuit of Prosperity**

Innovation is the economic engine of today's societies. Under the pressure of more and more intense competition, the pace of innovation has speeded up, and successful businesses and organizations are increasingly adopting open innovation practices. Both developed and emerging countries are implementing increasingly complex policies to strengthen their innovation systems. These policies now go well beyond mere R&D support and include the quality of the business environment, the role of government contracts, the strengthening of cooperation between actors, and the development of entrepreneurship.

### **Intellectual property management is central to innovation strategies...**

Many countries have changed their legislative and regulatory framework for intellectual property (IP) to create appropriate incentives not only to create and protect rights, but also to disseminate them. Certain countries, including Japan, Finland, and more recently China, have adopted ambitious national intellectual property strategies to strengthen the competitiveness of their businesses in world markets and their long-term growth. A real revolution is occurring, not only in business strategies but also in new missions and in the means employed by universities to increase the value of their research results.

### **...which are increasingly collaborative and closely linked to the market...**

Because innovation cycles are becoming shorter and the market more demanding, fast access to the best knowledge, the reduction of transaction costs, smooth information flow, the pooling of efforts, and preferred partnerships with customers, suppliers, and knowledge producers have become crucial success factors. Businesses' R&D and innovation strategies are becoming increasingly linked to the market. Even in the biopharmaceutical sector, where it generally takes a long time to go to the market, there is strong pressure for businesses to establish closer ties between their research programs and their commercial objectives.<sup>2</sup>

### **...while questioning the traditional models of technology transfer and IP management**

This new reality calls into question the traditional linear models of technology transfer and the management of intellectual property (IP) from universities and public research centers. Indeed, if the transfer process—in the sense of a formal transfer from a laboratory to an engineering department, and then a marketing division—is disappearing, it is becoming even harder to promote the transfer of technologies from entities outside businesses. This is especially true for universities, whose incentive structures are poorly adapted to commercial objectives.<sup>3</sup>

Intellectual property management must therefore go down new paths.

<sup>2</sup> Council of Canadian Academies, *Innovation and Business Strategy: Why Canada Falls Short*, Report from the Expert Panel on Business Innovation, August 2009.

<sup>3</sup> Council of Canadian Academies, *op. cit.*

### A Challenge and an Opportunity for Québec

As was recently noted in the 2010–2013 Québec Research and Innovation Strategy,<sup>4</sup> Québec already boasts a number of assets. It is a Canadian and international leader in overall R&D efforts and has significantly improved its industrial R&D performance. It has implemented efficient transfer, commercialization, and partnership tools over the last 10 years and thus begun to embrace open innovation. However, the results are late in coming with regard to its capacity for innovation and commercialization, as well as in terms of increased productivity and wealth, where Québec is seriously behind.

In its situation report on open innovation,<sup>5</sup> Conseil de la science et de la technologie highlights the many benefits that businesses enjoy when they adopt practices based on openness and cooperation. The Council also mentions risks, in particular the complexity of agreements and intellectual property negotiations and the imbalance of power between contract givers and small businesses. It identified 12 key challenges for Québec, including that of intellectual property management in collaboration between universities, research centers, and business. This concern has been the subject of numerous debates and experiences—both here and abroad—that will likely lead to better practices in Québec.

*By intellectual property management, we mean all the practices an organization adopts to identify and protect its intangible assets and create profits or acquire operating rights. Among other things, this includes establishing an IP strategy that covers protection methods, IP awareness and training, IP audits, determination of IP book values, canvassing of resource people for the concession and assignment of IP, in-depth knowledge of the state of the art and the dominant players in IP, followup on the validity of the IP and the payment of royalties, optimal management of knowledge and know-how, and relations with IP specialists.*

*Inspired by [mivado.com/french/details/gestionPI.htm](http://mivado.com/french/details/gestionPI.htm) (in French only)*

### A Working Committee on Intellectual Property Management in University/Business Relations

In February 2010 the Council set up a working committee on intellectual property management in university/business relations made up of 20 experts and practitioners from various sectors and communities. The Committee's findings were validated by six sectoral working groups (life sciences, information and communication technologies, health technologies, aluminum, aerospace, forest products). The courses of action proposed by the Committee were also discussed during a forum attended by around a hundred partners on February 14, 2011, at the NRC Industrial Materials Institute in Boucherville.

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<sup>4</sup> Ministère du Développement économique, de l'innovation et de l'Exportation, *Mobilize, Innovate, Prosper: The 2010–2013 Québec Research and Innovation Strategy*, June 2010.

<sup>5</sup> Conseil de la science et de la technologie, *Open Innovation: Issues and Challenges for Québec*, 2009 Situation Report.

This report is based on the abovementioned work and on the analysis of international, Canadian, and Québec experiences in the area of IP.<sup>6</sup> It also takes into account two studies conducted by École de technologie supérieure sponsored by the Council.

In their diagnosis the Committee members particularly focused on business/university relations because they are convinced that the proposed success factors and courses of actions are also largely aimed at research centers and that these centers are part of the solution.<sup>7</sup>

Lastly, this report deals only with economic aspects of intellectual property management in a collaborative context. It does not cover the equally important societal and ethical dimensions of this issue, which will be dealt with in a future document by Commission de l'éthique de la science et de la technologie.

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6 Conseil de la science et de la technologie, "La gestion de la propriété intellectuelle dans les relations entre l'université et l'entreprise," *Revue des expériences au Québec, au Canada et à l'international*, Québec City, 2011. (Scheduled to be posted online in June 2011).

7 In this brief, when we mention university/business relations, the word "university" generally covers public research centers.





# Chapter 1

## A Fast Changing International Situation

### 1.1 THE UNITED STATES PAVED THE WAY WITH THE *BAYH-DOLE ACT*...

In 1980 the United States passed the *Bayh-Dole Act*, which legitimized and regulated universities' efforts to commercialize their research results.

The objectives of the **Bayh-Dole Act** were as follows:

- 1) Grant not-for-profit research bodies co-funded by the federal government IP rights for their inventions and allow them to submit a patent application without prior permission from the federal agency that funded them
- 2) Enable these bodies to transfer their technologies to SMEs in the U.S. by means of exclusive paying preferred licenses

The U.S. government targeted three objectives in passing this law:

- Encourage U.S. universities to create commercializable IP by allowing them to earn revenue from it
- Make publicly-owned technology more attractive to U.S. firms
- Keep IP, value creation, and jobs in the U.S.

[[http://www.eurosfair.pr.fr/.../Implications\\_du\\_Bayh\\_Dole\\_Act\\_2\\_Michel\\_Neu\\_CEA.pdf](http://www.eurosfair.pr.fr/.../Implications_du_Bayh_Dole_Act_2_Michel_Neu_CEA.pdf)]

Thirty years after it was passed, analysts still recognize the positive effects of this act, which considerably simplified and harmonized the process of managing IP rights in universities. They have some reserves about its impact, however, both on universities' commercialization activities and economic development in general.

### ...but technology transfer activities represent only 10 to 15% of total transfers to industry

Universities' technology transfer activities today amount to a maximum of 10 to 15% of all transfer activities (7% at MIT).<sup>8</sup> They rank far behind other mechanisms such as publications, conferences, consulting work, consortia, and the hiring of students. They are highly concentrated in the life sciences industry.

The *USC Stevens Institute for Innovation* earned \$7 million in license revenues in 2008 compared to \$500 million in research contracts, i.e., 70 times as much. Stanford, a leading technology transfer university, earned seven times more income from research contracts paid by companies than from license revenues. Both these universities are known for the steps they have taken to facilitate license negotiations.

[[Crossborderbiotech.ca/..Vwhytechnology-transfer-offices-should-focus-on-sponsored-research-and-ignore-royalties-in-praise-of-uncs-...](http://Crossborderbiotech.ca/..Vwhytechnology-transfer-offices-should-focus-on-sponsored-research-and-ignore-royalties-in-praise-of-uncs-...)]

According to AUTM<sup>9</sup> data for 2007, commercialization revenue represented a relatively low percentage of universities' research expenditures: 7.20% at Stanford, 5.06% at MIT, and 6.58% at the University of Washington (the average for all U.S. universities being 4.77%). Out of the 8,000 inventions disclosed at Stanford University over the past 40 years, 4,000 were protected by patents and only 70 generated revenue of over \$1 million individually. For most U.S. universities, the cost of technology transfer is greater than the revenue it generates. These figures reliably reflect the state of university commercialization activities.

<sup>8</sup> National Research Council, *Managing University Intellectual Property in the Public Interest*, National Academies Press, 2010.

<sup>9</sup> Association of University Technology Managers.

The *Bayh-Dole Act* is only one of the factors that led universities to patent more inventions in the 1980s and 1990s. The spectacular advances in biomedical research in the 1970s and certain changes in the legal processing of patents also played an important role.<sup>10</sup>

A more recent phenomenon is the strong growth in IP grey markets, i.e., technology transfer that bypasses the formal services of a transfer office. The proportion of university research commercialized through informal networks of university researchers and industrial developers is estimated at approximately 30%.<sup>11</sup>

However, the National Research Council report cited in the references does not recommend giving researchers the responsibility of commercializing their inventions themselves, but that university entrepreneurship be encouraged, particularly via quick, relatively inexpensive licenses.

### **Transfer success depends mainly on a long tradition of cooperation**

Knowledge and technology transfer success in the United States is mainly due to a long tradition of local cooperation between business and universities that dates back to the 19th century. These relationships have intensified since the 1970s with the creation of numerous joint research centers funded by the National Science Foundation and the companies themselves.

Federal procurement contracts, particularly in the defense field, have played an important role in collaboration between universities, businesses, and government research centers.

## **1.2 MAJOR TRENDS AROUND THE WORLD**

### **Influence of the *Bayh-Dole Act***

The *Bayh-Dole Act* has considerably influenced the decisions of a number of OECD countries, which saw it as the road to success after the disappointing performance of public research in terms of commercial spinoffs. The European Commission strongly supported this direction.<sup>12</sup> Certain countries amended their legislation on the ownership of IP rights, abolishing “professor’s privilege”<sup>13</sup> and granting rights to the universities (such as Finland in 2008). Japan even passed its own version of the *Bayh-Dole Act* in 1998 and has since undertaken a major reform of its intellectual property system. Sweden is one of the rare countries to have resisted this trend and to have preserved professor’s privilege.

### **Maximizing Commercialization Revenue: The Example of Israel...**

Most universities now have technology transfer offices or incubators, with variable levels of resources and results. The most extreme example is undoubtedly that of Israel. All its universities have had technology transfer corporations for years,<sup>14</sup> which in many cases are private companies. These corporations are an essential source of innovation, particularly in the biomedical and agricultural fields.

10 Mowery et al., “The growth of patenting and licensing by US universities: an assessment of the effects of the *Bayh-Dole Act of 1980*,” *Research Policy*, Vol. 30, 2001, pp. 99–119.

11 Melba KURMAN, *Blogging Innovation*, November 28, 2010. [[www.business-strategy-innovation.com/.../melba-kurman/](http://www.business-strategy-innovation.com/.../melba-kurman/)]

12 European Commission, *Améliorer le transfert des connaissances entre les organismes de recherche et les entreprises à travers l'Europe: vers l'innovation ouverte*, Brussels, April 4, 2007.

13 See Glossary for definition.

14 Agence pour la diffusion de la l'information technologique, *Le transfert de connaissances, Quelques pratiques novatrices dans le monde*, September 2008.

**Technion Research & Development Corporation**

Technion, the technology transfer office of the Technion Institute, has played a central role in Israel's high tech sector: 70% of high tech firm founders and directors are Technion Institute graduates. Of 180 Israeli companies listed on the NASDAQ, 80% are managed by former Technion students.

The technology transfer office prefers creating spinoff companies rather than granting licenses because the royalties are considered to be too low.

Professors are responsible for laboratory budgets and researcher salaries. They must obtain their own funding, usually from companies. All doctoral students are financed by university laboratories or companies. They conduct their final projects in the companies on topical research subjects. There are no business internships.

Professors are very familiar with the companies' needs because they do consulting work for them, visit them regularly, and are well-connected to an extensive network through Technion graduates.

Technion also set up the Entrepreneurship and Innovation Centre to enhance the Institute's entrepreneurial culture and provide invaluable help to students, professors, and staff wishing to undertake entrepreneurial and innovation activities.

The low level of government funding to universities puts pressure on these institutions and their corporations to increase their commercialization revenue. According to some, this situation leads to strong selective pressure in favor of the most profitable technologies, to the detriment of a broader industrial development vision.

**...or spurring business development: the examples of Singapore and Waterloo, Ontario**

The Singapore government does not feel the need for an IP commercialization policy for publically-funded research because the philosophy of its universities is to have the most positive influence possible on society and make their research results available to the country's businesses.<sup>15</sup>

For example at the University of Singapore, the indicators used to measure the performance of university technology transfer offices are based on a holistic approach and focus on the offices' impact on business, the economy, and society as well as on the number of new businesses and licenses created.

The University of Waterloo also owes its success to a holistic approach that is both cooperative and entrepreneurial.<sup>16</sup> This approach has enabled it to play an important role in the creation of ICT clusters and in the region's industrial development. The university has laid the foundations for an economic and legal model for university/business relations that enables founders of spinoff companies to keep the property rights over inventions they developed during their university career. This model has been particularly effective in recruiting researchers with an entrepreneurial drive, stimulating entrepreneurship, and promoting economic development in the region. However, companies consider that the key success factor remains the university's cooperative approach as well as the outstanding pool of highly qualified personnel. As Mike Lazaridis, CEO of Research in Motion (RIM), recently said:

*"The best tech transfer is a pair of shoes."*

<sup>15</sup> FORFAS, *Review of Supports for Exploitation of Intellectual Property from Higher Education Research*, April 2010.

<sup>16</sup> Council of Canadian Academies, *Innovation and Business Strategy: Why Canada Falls Short*, Expert Panel on Business Innovation, Ottawa, August 2009.

## **1.3 WIDESPREAD EMPHASIS ON UNIVERSITY/INDUSTRY STRATEGIC PARTNERSHIPS**

### **Industry Cluster Strategies**

Many OECD countries promote the creation of industry clusters or strategic activity poles that bring together not only companies, public research centers, and universities, but also stakeholders in the realm of finance and business support. France has just entered the second phase of its cluster program. Germany launched its Leading Edge Cluster Competition in 2007 as part of its high tech strategy: the quality of cooperative ties is one of the selection criteria.

Technology clusters are extremely effective in disseminating new models for managing IP and transferring technology from universities to industry.

The Stockholm-Uppsala Bioregion, created in May 2007, is one of the world's most advanced clusters in the biotechnology field. It is a unique concentration of universities, hospitals, and pharmaceutical, health sciences, biotechnology, and health technology companies. The European Commission ranked the region number one on the European Regional Innovation Scoreboard in 2007.

#### **Keys to the Stockholm-Uppsala Bioregion's Success**

Success factors mentioned include the world-class and innovative research environment; close ties with industry, the academic community and the public health system; encouragement for scientific invention and entrepreneurship; and strong synergies between research and venture capital. The Karolinska Institutet, one of the biggest medical schools in Europe, plays a leading role in maintaining this environment. Karolinska Institutet Innovations, which acts as intermediary between industry and the university, has set up very flexible license models that reflect the risk/value ratio and stagger payments by tying them to specific steps in the project.

Of the 33 venture capital companies in Sweden, 27 are located in the Stockholm-Uppsala region.

[[www.suls.se/](http://www.suls.se/) -]

### **Precompetitive Research Consortia**

Spurred by major European collaboration programs, a number of countries have recently set up precompetitive research consortia of universities, businesses, and government laboratories. Their research projects are designed to meet industry needs five or ten years in the future and to develop the next generation of cutting-edge technologies.

This type of consortium offers the advantage of reconciling the different time constraints of companies and universities and of developing trust and opportunities for discussion. They are excellent training and recruiting grounds for highly qualified industry staff.

In 2008–2009, Finland established six strategic research, technology, and innovation centers in forestry, ICT industries and services, metallurgy and mechanics, energy and the environment, ecological innovation, and health and well-being. The centers also serve as gateways to international cooperation.

Denmark took the same approach, creating strategic innovation and research platforms in thematic areas such as energy and food production.

These consortia face new IP management challenges. For example, the MAGNET program in Israel takes a rather unique approach. IP rights belong to the technology's developer, but each member of the consortium receives a free use license to develop its own products.

#### **MAGNET Program in Israel**

The MAGNET program, established in 1993, awards nonreimbursable grants to precompetitive research consortia. These three- to five-year grants cover 66% of R&D expenses.

MAGNET's main activities fall under four subprograms:

1. *Consortium*: Teams of industry and university researchers work together to develop innovative technologies likely to become next generation products. Approved projects undergo priority-setting on an annual basis.
2. *Association*: Members of a specific industry come together in an "association of users" to take advantage of latest know-how to implement and integrate their own R&D work.
3. *Magneton*: This subprogram covers bilateral cooperation between a research center and a company and is aimed at facilitating technology transfer to increase the feasibility and use in the company of a technological application developed in the laboratory.
4. *Nofar*: This basic and applied university research program aims to get companies interested in basic research so they will invest in R&D.

[<http://magnet.consortia.org.il/>]

## **1.4 NEW IP MANAGEMENT MODELS**

### **North Carolina's Express License Model**

In North Carolina, home to the third largest health sciences cluster in the U.S., the University of North Carolina recently launched a low-cost license model to spur university entrepreneurship.

**Carolina Express License**

To help its staff set up their own companies, the University of North Carolina put a number of innovative practices in place to facilitate the commercialization of university research. For example, new standardized license agreements offer payment terms that are better adapted to startup technology companies. A guide on the subject is available on their website. The main clauses are as follows:

- The license is exclusive, valid worldwide, and applies to all sectors. The university, however, conserves the use rights for teaching and research.
- In lieu of an upfront license fees, the company must pay the university 0.75% of the company's fair market value at the time of a liquidation event.
- Royalties amount to 1% of net sales for an approved product based on clinical trials and 2% of net sales for any other products.
- Sublicense costs are equal to 10% of sublicense revenues and 20% of sublicensing royalty revenue.
- Annual maintenance fees are paid as of the third year (\$15,000 and \$5,000) and reach their maximum level as of the sixth year (\$30,000 and \$10,000). They are three times as high for clinically approved products as for other products.

[[otd.unc.edu/documents/CarolinaExpressLicenseUserGuide.pdf](http://otd.unc.edu/documents/CarolinaExpressLicenseUserGuide.pdf)]

According to promoters, the more easily obtained licenses, the more companies, and the greater the number of opportunities for success and spinoffs for all. Trying to maximize revenue from a specific license is bad long-term planning.<sup>17</sup>

**England's Lambert Agreements**

Growth in the creation of new collaboration models has led to many initiatives to create a favorable regulatory environment and appropriate support tools for IP management. The best known are the Lambert Agreements, developed in England in 2003. These are guidelines for facilitating rights negotiations between public research bodies and companies. The working group chaired by Richard Lambert developed five bilateral agreement models, from nonexclusive licenses to contracts. In October 2008, four more models were developed for consortia.

These model agreements come with a toolbox prepared by a group of technology transfer, government, and industry partners and launched in 2008.

The Lambert Agreements inspired recent work by the European Union on this issue.<sup>18</sup> However, none of the models provide for joint IP ownership, which is not very popular in Europe despite the growth of open innovation.

**IP Exchange Centers**

As intellectual property grows in importance as a creator of value, it becomes a product that can be traded—a phenomenon that gave birth to the IP derivative market. This practice has led to new trading platforms, such as IP auctions (e.g., ICAP Ocean Tomo<sup>18</sup>). These platforms bring buyers and sellers together and provide access to the intellectual asset and intermediary (technology watch firms) markets.

<sup>17</sup> Joseph M. de Simone and Lesa Mitchell, *Facilitating the Commercialization of University Innovation: the Carolina Express License Agreement*, Ewing Marion Kauffman Foundation, April 2010.

<sup>18</sup> European Commission, *Améliorer le transfert de connaissances entre les organismes de recherche et les entreprises à travers l'Europe : vers l'innovation ouverte*, Bruxelles, April 4, 2007.

The OECD recently studied the issue<sup>20</sup> of collaboration mechanisms like IP exchange centers, patent communities, model/framework agreements, IP auctions, and other types of innovation partnerships that have attracted interest internationally.

## **Open Science**

The open science model is derived from the expression “open source,” applied mainly to software, which involves that programmers around the world can work together to develop software on an informal, decentralized basis. With open innovation, open source concepts and practices are gradually spreading into the biotechnology, environmental, and agricultural domains. The model does not eliminate IP rights, but instead is based on the idea that the proliferation of IP rights has created bottlenecks that slow access to research work and protected inventions.<sup>21</sup> Open innovation significantly reduces transaction costs and speeds up innovation. The many examples of open science include the Structural Genomics Consortium and the Berkeley Wireless Research Center.

## **1.5 NUMEROUS INITIATIVES TO SUPPORT SMES IN THEIR IP MANAGEMENT**

The difficulty SMEs have keeping pace with new practices is a concern for many governments around the world, as reflected in the number of SME support initiatives. These are aimed at educating, equipping, and funding SMEs, and simplifying the paperwork. The need is great, and conventional means and organizations for supporting SMEs are not always efficient or equipped with the necessary expertise.

At the initiative of governments and intellectual property offices, guides and interactive tools are starting to proliferate on the Web:

- A practical IP management guide published in France<sup>22</sup>
- The CREST decision-making guide on collaboration<sup>23</sup>
- SME support tools developed as part of a project on best practices for stronger enforcement of intellectual property rights in industry and SMEs in the European Union<sup>24</sup>
- The IP Advantage Database, an analytic approach based on case studies<sup>25</sup>.

Innovation vouchers/checks for SMEs are very popular in Europe. The vouchers are designed to provide access to specialized services and to minimize paperwork. Various types of innovation vouchers have been created in the Netherlands, Belgium, Denmark, Switzerland, Italy, and Slovenia since 2008. The success of this program in the Netherlands is due mainly to the voucher’s low cost and digital format.

<sup>19</sup> [icapoceantomo.com].

<sup>20</sup> *Enhancing Innovation*: OECD workshop on collaborative mechanisms for intellectual property management, Paris, May 2009.

<sup>21</sup> Jean-Nicolas Delage, “IP Issues in open innovation and collaboration,” *IP Value 2010, Building and Enforcing Intellectual Property Value, An International Guide for the Board Room*, Globe White Page, Intellectual Asset Management Magazine.

<sup>22</sup> [http://www.industrie.gouv.fr/enjeux/guide-pmepme-pensez-pi.pdf].

<sup>23</sup> [http://www.ec.europa.eu/invest-in-research/pdf/download\_en/kina20796enc.pdf].

<sup>24</sup> [http://www.innovaccess.eu/home.html].

<sup>25</sup> [http://www.wipo.int/ipadvantage/en/].

**Innovation Vouchers in the Netherlands**

The innovation voucher program in the Netherlands, aimed at encouraging interaction between SMEs and the public research community, was set up as a pilot project in 2004 and 2005. As the program proved very effective in encouraging such collaboration—out of ten vouchers granted, eight were for projects that otherwise would not have existed—it is now permanent. Two types of vouchers are offered: €2,500 vouchers to encourage SMEs to approach research institutions for the first time, and €7,500 vouchers, paid partially by the companies, to help SMEs submit more complex research questions. Up to ten companies can collectively submit a question. Other countries, including Great Britain, have set up their own programs based on this initiative.

[[www.senternovem.nl/...innovation/innovation\\_vouchers.asp](http://www.senternovem.nl/...innovation/innovation_vouchers.asp)]

Emerging countries are also organizing, particularly in Asia. South Korea has significantly changed its policy on intellectual property to help it make the shift from a traditional to an innovation economy. It puts as much emphasis on the use and protection of intellectual property as on R&D activities. The Korean Intellectual Property Office (KIPO) provides tangible support to SME training and awareness initiatives to help them create, use, and protect their intellectual property.

China is playing an ever greater role on the international IP market. In November 2010 it launched its national intellectual property strategy that provides for special funds to subsidize foreign patent requests by public research bodies and SMEs.

As for South Africa, it just adopted a three-step initiative that includes the creation of a new technology and innovation agency (TIA), a national intellectual property management office, and a number of competence centers.

**1.6 BANKING ON TRAINING ON IP AND ENTREPRENEURSHIP**

The success of any innovation strategy primarily depends on the various actors' expertise. So it is not surprising that developing this expertise is a priority objective in most countries. A more and more complex environment requires entrepreneurs to have greater knowledge and increasingly diversified skills.

The main trend in both Europe and the United States is to establish innovation management schools devoted solely to this issue, such as the Innovation Management School in North Carolina.<sup>26</sup> This trend has led to a proliferation of university programs in innovation management.

Austria and the United Kingdom are the most advanced countries in terms of technology transfer training. In the United Kingdom, three transfer organizations (AURIL, PRAXIS, and UNICO) are working to set up a technology transfer institute to establish a qualification and accreditation system in this field.

The independent agency IP Australia has developed a training series on intellectual property and innovation through Innovation and Business Skills Australia, one of ten Industry Skills Councils established in the country in 2004. A special feature of this training program is that it was developed in collaboration with industry.<sup>27</sup>

<sup>26</sup> [<http://cims.ncsu.edu/ims/about.htm>].

<sup>27</sup> This training series received the 2010 *Australian Marketing Institute Award for Marketing Excellence*.

Industry participation in this type of training is strongly recommended by the European Commission, which in October 2010 announced its intention to support the development of “knowledge alliances” between the educational community and business, with a view to developing new programs to fill in the shortcomings in innovation skills.

With regard to **Ip4inno**, funded by the European Commission as part of its 6th Scientific Research and Technology Development Framework Program, its partners will pool their resources to conduct a joint analysis of SME needs with respect to intellectual property training. A set of training modules will be created, tested, and made available to all registered IP trainers in Europe.

[ [www.ip4inno.eu/](http://www.ip4inno.eu/)]

In 2010, Denmark launched a new entrepreneurship education and training strategy covering management, entrepreneurship, and interdisciplinary cooperation. The objective is to boost students’ business knowledge and entrepreneurial spirit by enhancing their ability to think in innovative ways, detect opportunities, and turn ideas into marketable products.

### **In Conclusion: Long-Term Cooperation is the Key to Success Around the World**

The most successful examples of technology transfer and IP management between universities and business have occurred in countries like Germany, the United States, and Sweden, which for many years have had mechanisms in place to promote cooperation among universities, business, and government laboratories. This “partnership culture” is solidly based on best practices and cuts across the entire range of innovation activities of all actors in the system. Technology transfer, in its strictest sense, is not particularly profitable for universities, which increasingly tend to take a holistic approach aimed at maximizing global spinoffs from their transfer activities. In fact it is not technology transfer that initially attracts business, but access to research excellence and student expertise.

Changes in work methods in industry clusters, consortia, and knowledge networks promote creative IP management mechanisms that are better adapted to the needs of the various partners and to the increasing pace of innovation.





#### 2.1 NO LEGISLATIVE OR REGULATORY FRAMEWORK FOR INTELLECTUAL PROPERTY AT UNIVERSITIES

With the exception of the National Research Council Canada's institutes, there is no legislative or regulatory framework for IP policies and practices at universities, which leads to significant variations and a proliferation of rules. This lack of standardized IP policies has been denounced many times, particularly by the Fortier report in 1999,<sup>28</sup> which saw in it a threat to collaborative research and consortium creation. Moreover, in 1997 a performance report of the Networks of Centres of Excellence, the three federal funds' flagship university/business collaboration program, pointed to significant tensions related to IP problems.<sup>29</sup>

The Fortier report called for a strategic IP management framework in universities, inspired by the *Bayh-Dole Act*—a recommendation that remained a dead letter. Only Québec launched its Action Plan for Managing Intellectual Property in Universities and Institutions of the Health and Social Network<sup>30</sup> in 2002, in accordance with the Québec Policy on Science and Innovation.<sup>31</sup> Although it didn't achieve the standardization objectives, the plan had a positive effect on the establishment of more formal IP policies in universities and health network institutions.

In reality, federal agencies' intellectual property policy—NSERC's in particular—have the greatest influence on intellectual property management in university/business collaborations given the size of their funding. This policy was recently relaxed as part of the agency's partnering shift in 2009, particularly with regard to IP access: today it allows full or partial assignment of intellectual property rights to businesses.

#### 2.2 TECHNOLOGY TRANSFER ACTIVITIES AT CANADIAN UNIVERSITIES: MANY INVENTIONS DISCLOSED, BUT LITTLE REVENUE

Most Canadian universities have technology transfer offices. British Columbia and Alberta have longstanding technology transfer commitments. The federal Indirect Costs Program and the three research councils' Intellectual Property Mobilization (IPM) Program were of great help to the smallest universities and eastern provinces.

Even lacking a legal framework, they implemented research commercialization activities whose vitality compares easily with those of American universities, relatively speaking.<sup>32</sup>

28 Advisory Council on Science and Technology, *Report of the Expert Panel on the Commercialization of University Research, Public Investments in University Research: Reaping the Benefits*, May 4, 1999.

29 Marc Couture, Marcel Dubé, and Pierrick Malissard (2010), *Propriété intellectuelle et université. Entre la privatisation et la libre circulation des savoirs*. Québec, Canada, Presses de l'Université du Québec.

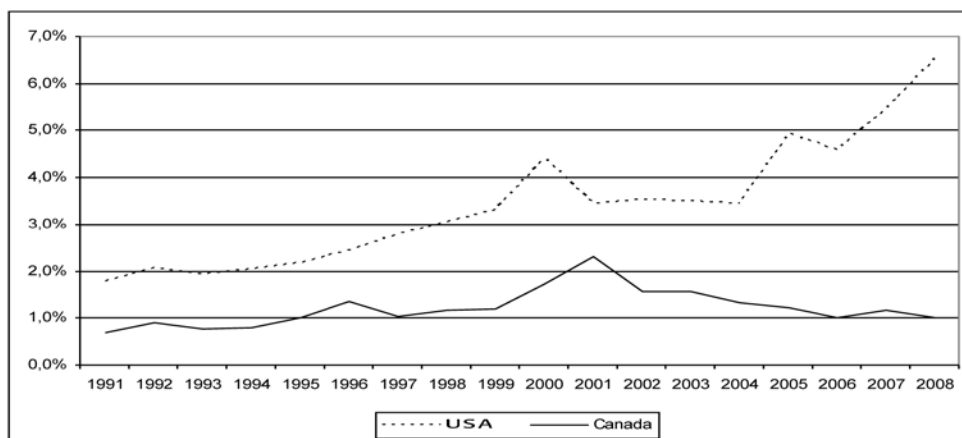
30 Ministère de la Recherche, de la Science et de la Technologie, *Action Plan, Managing intellectual property in universities and institutions of the health and social service network where research activities are conducted*, Québec, 2002.

31 Ministère de la Recherche, de la Science et de la Technologie, *Québec Policy on Science and Innovation – Knowledge to Change the World*, Government of Québec, 2001, 169 pp.

32 Marc Couture, *op. cit.*

According to AUTM data on inventions disclosed, Canadian universities perform as well as American universities (410 disclosures per billion dollars invested in research). But many fewer patents are issued and revenues are markedly lower: from 2004 to 2008, commercialization revenues represented 1.14% of university research expenditures compared to 5% in the United States.

**Figure 1 – IP commercialization revenues in American and Canadian universities as a percentage of R&D expenditures, 1991–2008**



Source: Council compilation based on AUTM survey data

Revenues hardly cover the transfer organization's operating costs: in 2008, these revenues were \$53.2 million for \$51.1 million in operating costs.

Conversely, there is a marked increase in contracts, which represented nearly \$2 billion in 2008, or around 40 times total commercialization revenues.

Given this, some technology transfer offices are rebelling against evaluations of their activities that only take traditional commercialization indicators into account.<sup>33</sup> These metrics are thought to be much too restrictive and to reflect an outdated linear model.

The most meaningful example is the transfer office of the University of British Columbia, the largest in Canada. It developed a framework for evaluating the effects of its transfer activities comprising five indicators: academic impact, societal advantages, economic spinoffs, financial effects, and political impact (the university's local, national, and international profile). The University of Waterloo, on the other hand, selected effects on the business community as its only performance indicator.

## 2.3 MAIN INNOVATION ISSUES IN CANADA:

### Maximizing the effects of academic research...

Since the early 2000s, the Canadian government has clearly demonstrated its expectations with regard to the economic spinoffs of academic research, transformation of results into commercializable innovations, and contribution of research to improving Canadian businesses' productivity and competitiveness. This is in fact one of the key messages of the latest Canadian Science and Technology

<sup>33</sup> Tania M. Bubela and Timothy Caulfield, Role and reality: technology transfer at Canadian universities, *Trends in Biotechnology*, Vol. 28, Issue 9, 2010.

Strategy,<sup>34</sup> launched in 2007. According to the OECD's recent report,<sup>35</sup> the scientific system is in effect one of Canada's main strengths that is nevertheless lagging in industrial research compared to the OECD average.

This strategy is backed by a large increase in research funds, but with targeted investments in four sectors: health and life sciences, natural resources and energy, information and communication technologies, and environmental technologies. New collaborative mechanisms were set up to support these major sectors, with greater private sector involvement required. This is how twenty-two centers of excellence in commercialization and research were created, including three in Québec, and four networks of centers of excellence directed by businesses.

The federal government also launched an extensive program of short industrial research and development internships designed for Canadian university graduate students (Industrial Research and Development Internship [IRDI] program).

The Industrial Research and Development Internship (IRDI) program is a federal internship program for research in industrial settings designed for graduate students and postdoctoral fellows that forges ties between businesses, non-profit organizations, the public sector, and universities in a number of research fields. The IRDI is implemented through Accelerate Canada, a program that enables interns to research a problem that poses a challenge to the partner. In Québec, this program is jointly offered with FQRNT.

[[www.nce-rce.gc.ca/.../IRDI.../Index\\_eng.asp](http://www.nce-rce.gc.ca/.../IRDI.../Index_eng.asp)]

[[http://www.sciences.uqam.ca/pdf/MITACS\\_AccelerationQuebec.pdf](http://www.sciences.uqam.ca/pdf/MITACS_AccelerationQuebec.pdf)]

Lastly the federal government has increased its support for the National Research Council Industrial Research Assistance Program (NRC-IRAP), which plays a decisive role with SMEs. A number of studies have also emphasized that the IRAP plays a larger role than venture capital in the success of Canadian spin-off companies.<sup>36</sup>

### **...in an environment of weak private sector performance in innovation...**

For many years, the Conference Board of Canada has given Canada a "D" for its innovation performance. In its most recent ranking, Canada came in 13th for innovation worldwide and 6th within the G-8.<sup>37</sup>

Two recent reports—the Science, Technology and Innovation Council's *State of the Nation 2008*<sup>38</sup> (May 2009) and especially the Council of Canadian Academies' *Innovation and Business Strategy: Why Canada Falls Short*, (April 2009)<sup>39</sup>—analyzed the scope and causes of the Canada's lag in innovation and set out opportunities for action.

The Council of Canadian Academies attributes the low success rate of technology transfer mechanisms that come from universities to the difficulty in tying them to businesses' commercial objectives, while the formal transfer process is in the process of disappearing even within businesses.

The best solution would be based in large part on transferring highly qualified persons to businesses. These individuals would be able to adapt advanced techniques from around the world based on market needs and would create a tendency to pull technology from universities and laboratories.

34 Industry Canada, *Mobilizing Science and Technology to Canada's Advantage*, 2007.

35 OECD, *OECD Science, Technology and Industry Outlook 2010*.

36 Jorge Niosi, *Success Factors in Canadian Academic Spin-Offs*, *Journal of Technology Transfer*, 2006, p. 31, 451–457.

37 *How Canada Performs 2009: A Report Card on Canada*. [<http://www.conferenceboard.ca/documents.aspx?did=3526>]

38 [[http://www.stic-csti.ca/eic/site/stic-csti.nsf/eng/h\\_00011.html](http://www.stic-csti.ca/eic/site/stic-csti.nsf/eng/h_00011.html)]

39 Council of Canadian Academies, *Innovation and Business Strategy: Why Canada Falls Short*, Expert Panel on Business Innovation report, August 2009.

## The Situation in Canada

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The *Coalition for Action on Innovation in Canada*, which brings together various business, university, and government decision makers, repeats the Council of Canadian Academies' diagnosis and worries about the private sector's lack of vibrancy and its difficulty in profiting from the wealth of its university system.<sup>40</sup> Ten actions are proposed to correct the situation, including one that aims to strengthen ties between universities and businesses.

The discrepancy between the strength of the university research system and the private sector lag in innovation is also one of the main challenges Québec faces today.

### **...and a very average level of business/university collaboration**

According to a recent comparative study,<sup>41</sup> Canada is far from being an international leader in university/business collaborations, although it has progressed significantly in recent years.

The author recommends reviewing the role and effectiveness of intermediation bodies, maintaining funding for programs that foster university/business collaboration, as well as centralizing program management by making an independent entity responsible for them. He also suggests initiating a province-wide discussion between businesses, universities, and provincial governments about ways to improve the IP negotiation process in university/business research partnerships.

### **A growing consensus on the need for Canada to adopt a true, SME-friendly IP strategy**

During the Intellectual Property Workshop on March 31 and April 1, 2011, in Ottawa, at the Canadian International Council's initiative, participants agreed overall about the need for a true, SME-friendly national strategy. Specifically, it was envisaged there that Canada should seek to adopt international intellectual property management standards that help SMEs compete in the knowledge economy—for example, by creating funds that help SMEs file patents and, like Korea, defend them against patent trolls.<sup>42</sup>

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<sup>40</sup> *Coalition for Action on Innovation in Canada report*, October 2010. [[http://www.actiononinnovation.ca/en/media/ENG\\_Plan.pdf](http://www.actiononinnovation.ca/en/media/ENG_Plan.pdf)]

<sup>41</sup> Ian Currie, *Government Policies to Encourage University-Business Research Collaboration in Canada: Lessons from the US, the UK and Australia*, Center for the Study of Living Standards, CSLS Research Report 2011-02, February 2011.

<sup>42</sup> Patent troll means any business that acquires patents or property rights with the sole aim of selling licenses and protecting its patents without carrying out research or manufacturing any products. Such businesses profit from the excessive fees demanded by law firms to develop their patents. [[http://www.legalbiznext.com/.../Patent\\_Troll\\_un\\_nouveau\\_metier.pdf](http://www.legalbiznext.com/.../Patent_Troll_un_nouveau_metier.pdf)]

### 3.1 QUÉBEC IS AN R&D LEADER IN CANADA...

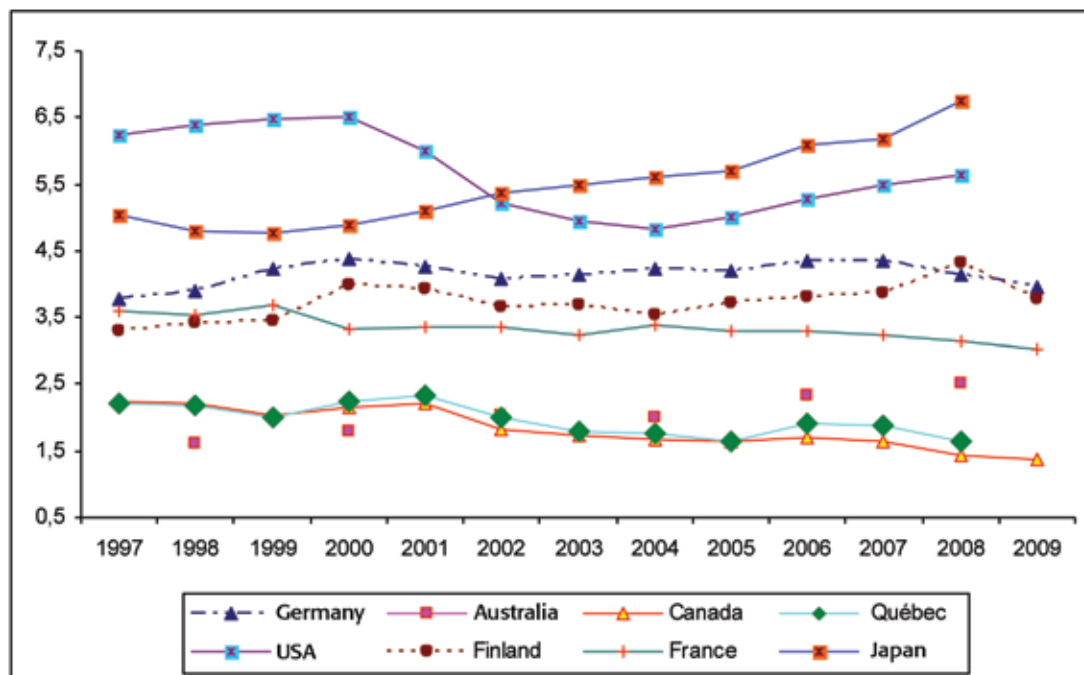
In 2007 Québec's total R&D expenditures (GERD) represented 2.63% of its GDP, a percentage higher than Ontario's (2.32%) and the Canadian average (1.91%). It is also higher than both the OECD average (2.28%) and the G-7 average (2.53%).

Québec maintains its leadership position in Canada for its industrial research effort (BERD), which was 1.67% in 2007, compared to 1.29% in Ontario and 0.99% on average in Canada. Internationally, its performance is equivalent to the OECD average, but remains lower than that of economies recognized for their innovation performance, such as the United States (2.01%), Japan (2.69%), Finland (2.77%), and Sweden (2.78%).

#### ...but its university R&D performance is much better than its industrial R&D performance

The two-to-one ratio between industrial research expenditures (BERD) and university research expenditures (HERD) in Québec also raises certain questions in comparison to what is observed in the highest performing OECD countries whose ratio is higher than four to one (Figure 2).

**Figure 2 – BERD/HERD ratio, Québec and some countries, 1997–2009**



Source: Compilation based on ISQ data, updated January 7, 2011

One initial hypothesis, still to be verified, is that Québec's two-to-one ratio reflects the characteristics of countries like Canada (as a whole) and Australia that are very competitive in scientific research and are striving to catch up in industrial research. This situation creates particular transfer problems between the two sectors. Another hypothesis raised to explain the gap in the ratios seen between the various OECD countries is linked not only to the inherent difficulties in accurately estimating this data but also to which items are included in the calculation of BERD and HERD.

One cannot fail to notice that, although industrial research has made considerable progress over the past 15 years owing to one of the most favorable tax environments on the planet, it remains very concentrated in a few sectors and large businesses, and particularly in subsidiaries of foreign multinational companies.<sup>43</sup>

#### **A High Concentration of Industrial R&D Expenditures**

- The top 50 R&D companies—out of a total of 8,680—account for fully 55% of BERD expenditures (65% for the top 100).
- Over 40% of BERD was concentrated in three sectors: aerospace, pharmaceutical, and ICT.
- Multinational companies that represent 3% of businesses in Québec account for over one-third of industrial R&D expenditures on average (37.3% in 2007). There again, a concentration in the largest companies can be seen since the top 100 multinational companies were responsible for 36.4% of R&D expenditures.

[[http://www.stat.gouv.qc.ca/savoir/indicateurs/rd/dird/rdi/\\_dep\\_concentration\\_total.htm](http://www.stat.gouv.qc.ca/savoir/indicateurs/rd/dird/rdi/_dep_concentration_total.htm)]

## **3.2 QUÉBEC MADE A SIGNIFICANT SHIFT TOWARD COMMERCIALIZATION AND TRANSFER...**

Québec made shift toward commercialisation ten years ago: in the wake of the Action Plan for Managing Intellectual Property in Universities and Institutions of the Health and Social Network,<sup>44</sup> four university commercialization corporations<sup>45</sup> were created. These entities are distinct from the business and university liaison offices (BLEU), which have a specific commercialization mandate.

The first Québec Research and Innovation Strategy<sup>46</sup> solidified these corporations' mandate and resources and set up technology maturation programs and technological business startup funds. It also provided for the startup of an industrial consortium program, building on the example of Consortium for Research and Innovation in Aerospace in Québec (CRIAQ), created in 2001.<sup>47</sup>

### **...but results remain mixed: disappointing Canadian results in technology transfer from 2003 to 2008**

If we take Québec's share of total research funding in Canada as a benchmark, or 26.4%, we see that Québec's performance in technology transfer remains mediocre for this period.<sup>48</sup>

- Québec's performance is weaker than Ontario's and the western provinces' for disclosed inventions (20% of the total<sup>49</sup>) and spin-off companies created (16% of the total).

<sup>43</sup> Institut de la statistique du Québec, *Compendium d'indicateurs de l'activité scientifique et technologique au Québec*, 2010 edition.

<sup>44</sup> *Op.cit.*

<sup>45</sup> Gestion Univalor (2001), Gestion Valeo (2000), MSBi Valorisation Inc. (2001), and Société de valorisation des applications de la recherche - SOVAR (2000).

<sup>46</sup> Ministère du Développement économique, de l'Innovation et de l'Exportation, *An Innovative, Prosperous Québec, Québec Research and Innovation Strategy*, December 2006.

<sup>47</sup> Six industrial consortia are currently supported by MDEIE.

<sup>48</sup> Statistics Canada, *Survey of Intellectual Property Commercialization in the Higher Education Sector*, 2003–2008.

<sup>49</sup> Conseil de la science et de la technologie, *La gestion de la propriété intellectuelle dans les relations entre l'université et l'entreprise, Revue des expériences au Québec, au Canada et à l'international*, Québec, 2011.

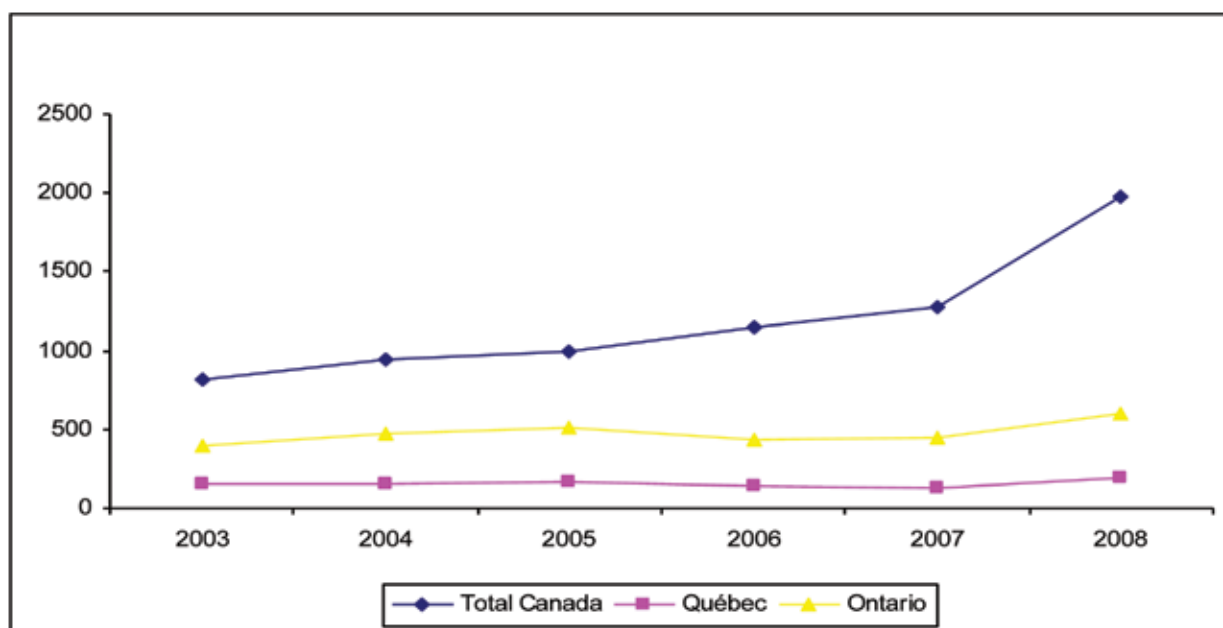
- It is equivalent for the number of patents held (27%).
- It is distinctly higher for commercialization revenues (37%). However 80% of these revenues still originate from technology developed in the late 1980s at Université de Sherbrooke (licensing).

Although commercialization corporations could not have much impact during this period and especially at the beginning, their results have substantially improved in recent years. However, like elsewhere, they are facing the leveling off of commercialization revenues and the need to adapt their approach.<sup>50</sup>

### 3.3 CONTRACT REVENUES ARE TEN TIMES HIGHER THAN COMMERCIALIZATION REVENUES BUT ARE GROWING LESS QUICKLY THAN ELSEWHERE IN CANADA

In 2008 research contracts reached nearly \$200 million, or nearly ten times total commercialization revenues. However these contracts are growing less quickly in Québec than elsewhere in Canada and in 2008 only represented 10% of the total.

**Figure 3 – Change in research contracts from 2003 to 2008, Québec, Ontario, Canada (in millions of \$)**



Source: Statistics Canada, *Survey of Intellectual Property Commercialization in the Higher Education Sector, 2003–2008*

50 Ministère du Développement économique, de l'Innovation et de l'Exportation, *Rapport d'évaluation du programme de soutien à la valorisation et au transfert*, February 22, 2010.

### 3.4 COLLABORATIVE RESEARCH: PERFORMANCE HIGHER THAN THE CANADIAN AVERAGE IN THE NSERC PARTNERSHIP PROGRAMS

In 2008, 9.1% of Québec university research expenditures were funded by business, a percentage that has remained stable for the past ten years and that is slightly higher than the Canadian average (8.2%).

The overall share of NSERC investments in Québec has been hovering around 25% of the total for several years. This percentage is much larger for both cooperative R&D projects (34% of the total in 2008–2009) and industrial chairs (36% of the total). And these percentages are growing.

### 3.5 TRANSFER OF SKILLS: STILL SOME WAY TO GO

As has already been mentioned a number of times, the most powerful transfer mechanism between businesses and universities is based first and foremost on students. Yet,

- In 2008, barely 50% of industrial R&D positions were held by university graduates: only 10% with a master's degree and 8% with a doctorate. This put Québec in seventh place among the Canadian provinces.<sup>51</sup>
- From 2002 to 2006, the percentage of university graduates in the active population increased more slowly than the OECD average.<sup>52</sup> In 2007 it was 20.7%, compared to 26% in Ontario.

The gap between Québec and Ontario is due to the fact that most Québec industrial sectors are less intensive in highly skilled labor than their Ontario counterparts.

### 3.6 A PERSISTENT RECEPTOR CAPACITY PROBLEM IN CERTAIN INDUSTRIAL SECTORS AND SMES...

The relative dearth of highly skilled labor in certain industrial sectors as well as in non-technological SMEs exacerbates their difficulties interacting with universities. It contributes to keeping the two worlds relatively isolated. Initiatives such as the FQRNT-NSERC Industrial Innovation Scholarships or industrial internships (Accelerate Québec) are a way of building bridges that should be increased.

This situation is aggravated by the fact that applied research institutes that frequently work with SMEs, such as CRIQ, the NRC institutes, INO, and the CCTTs, are much less tied to universities than certain European institutes like Tekes in Finland<sup>53</sup> or the Fraunhofer Institutes in Germany. In both cases, these organizations strongly encourage collaboration between universities, businesses, polytechnic schools, and public research institutes, and the networking that occurs among these various actors is a key objective. Student and researcher mobility between the various organizations becomes extremely easy as a result. The Fraunhofer Institutes are recognized incubators for doctoral candidates interested in industrial careers.

51 Statistics Canada, catalog no. 88-001-X.

52 Jean-Pierre Robitaille, *La relève en sciences et en technologies au Québec: un état des lieux*, prepared for Association francophone pour le savoir (ACFAS), Observatoire des sciences et des technologies (OST), March 2010.

53 Conseil de la science et de la technologie, *Pour un financement performant de l'innovation dans les entreprises*, May 2010.

### ...and Québec entrepreneurship that is falling behind

Québec entrepreneurship, and particularly higher learning entrepreneurship, is lagging compared to other provinces in terms of business creation and survival rate, even though it is sometimes difficult to agree on the breadth of the deficit.

For example, the number of new businesses as compared to the total number of businesses in Québec fell from a rate of 14.6% in 1991 to 11.2% in 2006.<sup>54</sup> In comparison, the rate of business creations in Ontario increased from 13.9% in 1991 to 15.1% in 2006.

As for the business survival rate in Québec and Canada, it is already slightly lower than the OECD average. Moreover Québec recently showed a drop in this area compared to Canada.

Young Quebecers are appreciably more active than their older counterparts in business pre-startup and startup activities, unlike in Ontario and the West. Accelerated demographic aging of the population therefore works against entrepreneurial activity in Québec, even though the young people are highly capable.<sup>55</sup>

## 3.7 A SIGNIFICANT GAP BETWEEN RESEARCH STRENGTHS AND THE ABILITY TO INNOVATE AND CREATE WEALTH

This is the observation of the 2010–2013 Québec Research and Innovation Strategy,<sup>55</sup> which is concerned about Québec's lag in productivity and wealth per capita. It calls for general mobilization in favor of innovation and the future prosperity of Québec.

The intellectual property working committee has oriented its work and proposals to better meet this challenge, which implies urgent action by the various partners.

54 [http://66.254.39.139/Fondation/Rapp%20GEM%20jeunesse%202005.pdf]

55 Ministère du Développement économique, de l'Innovation et de l'Exportation, *Mobilize. Innovate. Prosper., the 2010–2013 Québec Research and Innovation Strategy*, June 2010.





## Main Problems and Irritants

Apart from the lack of reception capacity in industry, the Working Committee noted and confirmed a number of problems and irritants during the sectoral consultations and the Forum. There is general agreement about the following aspects.

### 4.1 ONGOING CONFUSION BETWEEN INVENTION AND INNOVATION...

An invention is primarily the outcome of a scientific process of knowledge development and does not necessarily lead to innovation. Innovation involves a company creating value in a market with a new product, process, or organizational change and drawing benefit from it.

#### Invention and Innovation: What's the difference

| Invention                                                   | Innovation                                                                     |
|-------------------------------------------------------------|--------------------------------------------------------------------------------|
| A new to the world discovery/creation                       | A product, service, or process that creates net new value for customers        |
| Driven primarily by inventor curiosity or research interest | Driven primarily by desire to add customer value                               |
| Merit defined by uniqueness                                 | Merit defined by profitable deployment                                         |
| Based primarily on scientific skills                        | Based on a broad set of strategic, marketing, operational and technical skills |

Source: Roger Martin, Institute for Competitiveness & Prosperity, University of Toronto

#### ...which is reflected in poor impact indicators

This confusion has led to the development of poor impact indicators.

- Too often, only invention-related indicators are used: invention disclosures, patents, spin-off companies, and licenses rather than trying to measure the real economic impacts as the University of British Columbia has attempted to do.
- The scale of other transfer methods—contracts, collaboration, infrastructure sharing, training, consulting, and above all, students—is underestimated.
- The necessary investment in development and commercialization to generate economic spinoffs from an invention is also underestimated.

Very little information is available on other innovation activities and their impact on business and the economy in general.

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## 4.2 BUSINESS INNOVATION STRATEGIES THAT VARY BY SECTOR...

Sectoral consultations the Council conducted in preparing this report indicated that innovation strategies vary considerably among the various industrial sectors.

The innovation process in the **health sciences industry** is very long term and relatively linear. Time lines are long and substantial precommercialization investment is required. Innovation unfolds in a very strict regulatory environment, both from an ethical and procedural standpoint, and is very expensive. Exclusive rights are essential for making the required development and commercialization investment profitable.

In the **aerospace industry**, innovations are almost always incremental, and the likelihood of a real breakthrough is low. The industry is characterized by small quantities, relatively long-term profitability, and long lead times: about ten years is required before a product is certified. Because the industry is made up of large companies that face intense international competition, IP ownership and market exclusivity are essential to their competitive advantage. Subcontractors play an important role in this industry, including original equipment manufacturers (OEMs) and a large number of SMEs.

The **ICT industry** is very heterogeneous and faces special innovation challenges because of its short innovation cycles, weak domestic markets, and fragmented, globalized value chains. The industry comprises a myriad of small companies (few multinationals or large customers) that find it difficult to pay the astronomical costs of monitoring and defending patents.

The **forestry industry** is experiencing serious difficulties because of major changes in demand that require profound transformations. Its strategy up until now has been conservative rather than innovative: cutting R&D expenses, concentrating on know-how and processes, and practicing industrial secrecy. Its main challenge is not only to rebuild its receptor capacity but also to develop a much more open and flexible innovation culture.

Lastly, the **service sector** is playing an increasingly important role in the economy, with its own innovation and IP protection strategies. Formal protection (patents, licenses, etc.) is less prominent in this industry, which prefers semi-formal or informal methods (secrecy, restricted access to information, movement of labor, defensive publication, etc.).

### ...and company size

Problems facing companies vary considerably depending on whether they are large multinationals, tech startups, growing medium-sized businesses, or SMEs.

Multinationals are very familiar with global markets and manage a large portfolio of patents and alliances, both with other companies and with public and university research centers around the world. When dealing with universities, they generally use a very centralized IP management model, the *Master Research Agreement*, which has become the standard for most large companies.

Most SMEs face quite a different reality. They often lack an innovation strategy and have poor knowledge of available IP management tools and very little or no experience in negotiating with universities. They rarely have the skills, financial resources, or support required to develop more ambitious strategies. IP management is a black box for many SMEs. Not only do they fail to understand how IP protection can benefit them, they indicated that their main problems were red tape, delays, and inefficiency.

An SME's maturity can make a difference, particularly its level of R&D investment. But even innovative SMEs that have been in business for a long time experience difficulties in their relations with big business—due to the imbalance in negotiating strength—and with universities. They often become discouraged by the length of negotiations and have the feeling that they are the only one taking risks.

The situation is also difficult for startups, particularly due to the critical lack of funds in the prestartup and startup phases, partly resulting from the rather general intransigence of Canadian venture capital firms, which generally require businesses to have intellectual property before providing them with capital.

### 4.3 UNIVERSITY CULTURE AND MISSION

Universities are primarily teaching and research institutions. Not all universities include transfer in their missions.

Scientific culture seeks mainly to broadly disseminate and share knowledge via international research networks, an essential condition for knowledge advancement. For example, genomic research has benefited tremendously from open science. Business culture, on the other hand, is all about protecting intellectual property and preserving, through industrial secrecy, the competitive advantage it gains from research.

Historically, universities have strongly resisted any commercialization of their research, based on the preconceived idea that commercialization is carried out to the detriment of basic research. Yet experience shows that one does not preclude the other.<sup>56</sup>

Despite the shift toward commercialization that started in Québec in the early 2000s, there are major differences in the mission, means, and responsibilities of the various university transfer offices. As a result, policies and practices vary considerably from one university to another, and this lack of harmonization tarnishes the image of universities as possible partners. A new process has to be started every time the university partner changes.

University research is generally conducted far upstream of the market and focuses relatively little on the needs of companies, even over the long term. Québec also lacks a long-standing tradition of collaboration with business, such as exists in the United States or parts of Europe (Germany and Scandinavia) and Asia (Japan, Singapore). The two worlds have developed in parallel, and attempts to bring them closer have been relatively recent. Engineering and management schools are the exception, as well as universities in the regions, which do much more applied research in partnership with business.

This is also reflected in the highly varied levels of recognition for researcher transfer activities, as well as in researchers' general ignorance of IP issues/management.

<sup>56</sup> [www.nserc-crsng.gc.ca/.../dgigp-psigp\_fra.asp]

#### 4.4 UILOS AND UNIVERSITY RESEARCH DEVELOPMENT CORPORATIONS: CERTAIN RIGIDITIES AND UNREALISTIC EXPECTATIONS PERSIST

University/industry liaison offices (UILOs or BLEU in Québec) are often overloaded and sometimes lack knowledge about the business community and commercialization. Institutional decision-making processes are often too centralized and rigid, which sometimes leads to a defensive rather than open attitude on the part of UILOs in their dealings with business.

There is still too big a gap between the length of negotiations and time to market, which is very short in some industries. To be noted though that, in CRIAQ's experience, long negotiations are not solely the universities' fault.

Distance from market realities also explains the persistence of sometimes unrealistic expectations about the value of an invention. Companies must combine a number of sources of knowledge in order to innovate, so transfer offices' insistence on substantial royalties for a single technology is a source of friction that can slow down or block technology transfer.

The originally intended distinction between the structures and responsibilities of UILOs/BLEU and those of research commercialization corporations have had a positive effect on university technology transfer. However, this separation too often means that relations with business are segmented rather than synergistic and that a holistic approach to transfer and collaboration is lacking.

A positive change is occurring, however. Research commercialization corporations are more likely to try to develop partnerships and maximize the economic spinoffs of their investments instead of concentrating on license revenues, even though the latter is still a key success indicator, particularly for university sponsors.<sup>57</sup>

#### 4.5 INTERNATIONAL IP MANAGEMENT AROUND THE WORLD

The complexity of IP management in university/industry projects is increased by its international dimension. As we have illustrated above, IP management frameworks and practices vary from country to country. This is an added challenge for international, multi-partner projects.

Some countries have amended their laws and regulations governing IP rights in order to make them more consistent with international law and companies' ability to use and exploit intellectual assets. IP is currently at the core of a number of political programs, especially in Europe.

As an example, due to the high cost of submitting a patent application and seeking and purchasing foreign IP, the European Community is considering creating a single patent for all of its member countries.

International agreements are pushing most of the countries to set up harmonized IP protection systems by 2013.<sup>58</sup> International intellectual property negotiations, part of the Uruguay Round of trade talks, stipulate that all countries who are members of the World Trade Organization (currently 151) must implement the Agreement on Trade-Related Aspects of Intellectual Property Rights (TRIPS) by that deadline.

<sup>57</sup> Ministère du Développement économique, de l'Innovation et de l'Exportation, *Rapport d'évaluation*, op. cit.

<sup>58</sup> [[http://www.oseo.fr/a\\_la\\_une/propriete\\_industrielle/grandes\\_tendances/vers\\_des\\_systemes-harmonises\\_a\\_l\\_international](http://www.oseo.fr/a_la_une/propriete_industrielle/grandes_tendances/vers_des_systemes-harmonises_a_l_international)]

Some of the Québec businesses consulted for this report indicated that they have an easier time working with foreign universities (in France, Switzerland, Sweden, and Singapore) than those at home, mainly because ties and transactions are more informal and quicker.

In contrast, most multinational companies seeking top expertise from around the world have centralized and standardized their memoranda of understanding (MOU) with universities. Since they sell or sign contracts in a number of countries with varying standards, they tend to use standardized clauses.





## **Eight Key Success Factors**

Intellectual property management is, and will remain, complex for all the above-mentioned reasons. According to an MIT study<sup>59</sup>, companies should take the following key steps to ensure successful collaboration with universities:

1. Define the project's strategic context an important part of the selection process.
2. Select boundary-spanning project managers who have in-depth knowledge of the industry's technology needs and who know how to network and make connections between the research and opportunities for product applications.
3. Share with the university team the vision of how the collaboration can help the company.
4. Invest in long-term, stable relationships.
5. Establish strong communication linkage with the university team.
6. Involve as many company staff members as possible in the research projects.
7. Support the project inside the company until the research can be exploited.

Many problems and irritants can be eliminated by taking international experience and best practices in the field into account. Following the consultations, the Working Committee was able to identify eight key success factors—some of which overlap with those identified in the MIT study—for ensuring effective IP management in a dynamic of collaboration between universities and business.

### **5.1 A SOLID COMMITMENT FROM MAJOR PARTNERS**

In a number of countries as well as in Europe, major industrial and university partners play a key role in promoting collaborative projects and developing tools.

#### **Europe Develops Partnership Guidelines**

Responsible Partnering is a code of conduct to which businesses and public research institutions voluntarily adhere. The rules were established by experienced members of four European associations representing industry needs (EIRMA), R&D organizations (EARTO), universities (EUA), and transfer bodies (ProTon Europe).

The code comprises ten key guidelines on partnerships, including the following:

- *View innovation as a trans-disciplinary activity.*
- *Achieve effective intellectual property.*
- *Provide the right professional skills.*
- *Treat collaboration strategically.*

The initiative both encourages a change in culture and provides practical tools for doing so.

[<http://www.responsible-partnering.org/>].

59 Julio A. Pertuzé, Edward S. Calder, Edward M. Greitzer, and William A. Lucas, "Best practices for Industry-University Collaboration," *MIT Sloan Review*, Summer 2010, Vol. 51, No. 4.

Another oft-cited example is SAN DIEGO CONNECT,<sup>60</sup> an organization that was set up 25 years ago by the City of San Diego, the University of California/San Diego, and the private sector to commercialize research results through training, mentoring, and funding. This experience inspired ADRIQ, which seeks to promote better technological partnership practices via QUÉBEC CONNECT.

University authorities' clear commitment to transfer and collaboration is another key success factor. It affects the amount of resources granted to transfer offices, as well as their mission, flexibility, and the way they are evaluated. We can take as examples some single-faculty universities in Québec and the University of Waterloo. University authorities are responsible for making the paradigm shift from a technology transfer mission designed to maximize commercialization revenues to a more holistic mission based on transfer spinoffs, including recognition for researchers' transfer activities in the career advancement process.

Companies cannot successfully change their innovation, collaboration, and IP management strategies without a firm and explicit commitment from senior management. Innovation management training, recruitment of highly qualified staff, and interaction with universities and public research centers depends on support from top management. Top level support played an important role in Hydro-Québec's move toward open innovation, for example.<sup>61</sup>

## **5.2 GENERAL ENHANCEMENT OF ENTREPRENEURIAL AND INNOVATION MANAGEMENT (INCLUDING IP) SKILLS**

The main measure needed to support business growth and success in Canada involves a general enhancement of entrepreneurial, innovation, and commercialization expertise. A number of leading economists in Québec have made statements to this effect.<sup>62</sup>

There are many reasons for using general, high quality training to spearhead significant progress in innovation and entrepreneurship:

- Lack of training is the weak link in our innovation system: other problems cannot be effectively dealt with until this weakness is corrected.
- We have a tendency in Québec to emphasize awareness raising, sometimes to the detriment of more in-depth training on cutting edge concepts and good practices. Raising awareness is good, but training has much more of an impact.
- IP, innovation, and export marketing management have become very complex: depending on hearsay or trial and error is out of date.
- Existing training initiatives by both educational institutions and the private sector are laudable. They have been developed and fine-tuned over time, leading to full innovation management training programs.<sup>63</sup>

<sup>60</sup> [www.connect.org/about/].

<sup>61</sup> Presentation by Charles Gagnon, commercialization manager at IREQ at the International Forum on Intellectual Property (FORPIQ), Montréal, February 3, 2011.

<sup>62</sup> H. Douglas Barber and Jeffrey Crelistent, *Understanding the Disappearance of Early-Stage and Start-up R&D Performing Firms*, Impact Group, with the collaboration of the National Angel Capital Organization, September 2009.

<sup>63</sup> The Council has drawn up a short, non-exhaustive but detailed list of sample training programs in innovation and entrepreneurship available in Québec. (See Appendix 4)

A number of challenges remain, however:

- Currently available innovation and entrepreneurship training in Québec is often the result of initiatives by individuals or single organizations, whereas the international trend is toward “knowledge alliances.”
- These courses are generally optional rather than compulsory, and best practices are still too rare. Consequently, the percentage of students and workers trained in IP, innovation, and entrepreneurship at CEGEPs and at the undergraduate and graduate levels at university remains roughly below 5%. There is tremendous potential for increasing the number of people with innovation training.
- A number of organizations in Québec provide innovation or entrepreneurial training, but it is relatively scarce and can vary from professional development for graduates in the form of a one-hour awareness workshop to a full master’s program in innovation management. In between these two extremes lie optional intellectual property, innovation management, or entrepreneurship courses for the most part.
- Training may or may not lead to a diploma. Sometimes a certificate will be awarded as part of a general training program.
- There is no process to standardize this training, nor any overall monitoring of its quality or content.
- There is a tenacious myth that innovation and entrepreneurship are innate. However, studies at Université du Québec à Trois-Rivières’s Research Institute for SMEs<sup>64</sup> showed that this myth is obsolete. To the contrary, training spurs interest and reduces the fear of starting a business.
- The needs of certain types of clientele (SMEs for example) are not currently met.

The generalized need for training concerns all actors involved in innovation:

- Researchers interested in collaboration and technology transfer projects with industry
- High school, CEGEP, and undergraduate and graduate students, regardless of their career plans
- Company staff, including employees, supervisors, and managers; special emphasis should be put on SMEs
- Those working in transfer or commercialization offices and intermediation bodies
- Financing bodies, particularly in the venture capital field
- Future entrepreneurs, especially those wishing to set up a science and technology enterprise
- Senior public and private sector management.

<sup>64</sup> Pierre-André Julien and Louise Cadieux, *La mesure de l'entrepreneuriat*, Rapport d'études, Institut de la statistique du Québec, science, technologie et innovation, 2010.

### 5.3 DIALOGUE, TRUST, AND LONG-TERM RELATIONSHIPS

*It is trust and stability—not only the individual research contract or excellent facilities—that provide primary conditions for establishing programs that meet partner needs. Good outcomes are the result of demonstrated commitment (Responsible Partnering).*

Everyone agrees that stable relationships and frequent dialogue establish trust, which in turn greatly facilitates partnership relationships. *It is the trust established between the two worlds that creates the project, rather than the project establishing trust.*<sup>65</sup> This explains why countries with a long-standing tradition of creating partnerships and very fluid relationships between public research and industry (like the United States, Germany, and Singapore) are more successful in transfer and innovation.

Whereas when on unfamiliar ground, we become fearful and try to protect ourselves, generally through legal provisions or by refusing to act.

Long term, mature relationships with selected partners make it possible to reconcile partners' different time constraints. For example, postponing setting the value of the transferred technology until it can be most accurately determined.

The best solution is often a prior agreement between the parties on the general outline of the project, as well as a clear understanding of each party's role and contribution, with the legal experts intervening later in the negotiation process.

The same success factors emerged from a Québec study on four companies that opted for an open innovation strategy: trust, communication, complementary objectives and activities, and sharing of business risk. It is an ongoing learning process.<sup>66</sup>

Mechanisms such as precompetitive research consortia promote this type of long-term partnership and provide an exchange forum for public research, large companies, and SMEs and provide opportunities to improve practices and enter into other agreements. They also are perfect structures for training and recruiting graduate students.

### 5.4 SPEED, ADAPTABILITY, AND FLEXIBILITY

Speedy negotiations are essential for companies, especially those that work in industries where product lifecycles are short (ICT and health technologies, for example). They require a more nimble approach.

Just as important are adaptability and an open attitude of universities to the different situations experienced by SMEs: these characteristics are part of the École de technologie supérieure motto, which translates as *Openness, Flexibility, Ability to Listen*. The most adaptable organizations are often those with decentralized decision-making and an adapted risk management policy that allows front line players to have a proactive and creative rather than defensive attitude.

Since many SME entrepreneurs have little experience with IP negotiations, tools and information to guide them through the process can be very useful. Model agreements, standard provisions, and success stories should therefore be circulated much more systematically. Model agreements like the Lambert Agreements<sup>67</sup> and accompanying tool box are extremely useful and should be more readily available. However, it is widely considered that this type of model agreement is appropriate only if adapted to each specific situation. Flexibility is key, especially as often the details are the hardest to resolve.

<sup>65</sup> Jean-Maurice Plourde, CEO of Centre québécois de valorisation de la biomasse.

<sup>66</sup> Isabelle Deschamps, Maria Macedo, and Manon Hélie, *Modèles de réussite des collaborations université-entreprise au Québec dans un contexte d'innovation ouverte*, École de technologie supérieure, Montréal, January 2011.

<sup>67</sup> [<http://www.ipa.gov.uk/whyuse/research.htm>]

Simplifying the process also requires harmonization or even standardization whenever possible. For example, it would be helpful if all clinical research centers used the same model agreement for life sciences.

## 5.5 COLLABORATIVE RATHER THAN INDIVIDUAL WORK

Increasingly complex innovation systems, the proliferation of actors involved, and especially open global innovation have also had an impact on current partnership modes. New ways of working together are gradually emerging.

### Québec Seeks Solutions

*Québec Seeks Solutions* is an initiative of the Québec City area's research centers, supported by Québec International and the region's universities via the Innovation Council. On December 14, 2010, nine businesses shared ten complex problems in different industrial sectors with participants of varying backgrounds, creating an original open innovation and problem solving experience. The event drew on participants' knowledge, expertise, and creativity to enhance understanding of the problems, provide companies with possible solutions, propose new technical ideas, and create new business opportunities and relationships. It should be noted that no IP problems were raised; the discussions and suggestions concerned issues upstream of the intellectual property phase.

[<http://www.quebec-solutions.com/>]

A number of organizations now incorporate IP management into the overall innovation management process. Thus countering the traditional isolation of legal services offices, common in big companies, that hampers open innovation.

It is well known that involving a number of departments (sales, production, marketing, legal, etc.) right from the outset speeds up and optimizes the innovation process. A more integrated approach can also lead to structural changes to better reflect the need for synergy. This has been the approach of Institut de recherche d'Hydro-Québec (IREQ) which, after adopting an open innovation approach, moved its legal department in charge of IP agreements within the research commercialization unit. This allowed for greater decentralization and integration of related complex duties and made for speedier, more flexible negotiations.

A holistic approach to relations with business and the establishment of multiple synergies between transfer actors generate many more important medium- and long-term spinoffs, both for the company and the university. It is important to share services (as Gestion Valeo and Ascenion do, for example), negotiating teams, and technology bundles (e.g., FlintBox), thus creating a critical mass of licenses. This approach is more promising than research that simply seeks to maximize license revenues.

**Ascenion in Germany**

Ascenion is the exclusive partner of 17 health sciences institutes and a medical school. This German organization coordinates technology transfer for the national genome research network. It commercializes some 700 technologies, including a large array of research products.

What Ascenion does:

- Advises research institutions on all IP issues, including value creation and management
- Identifies and patents inventions with strong commercial potential and promising materials and know-how
- Helps research institutes find industrial partners
- Negotiates licenses and collaboration agreements
- Helps startups achieve greater independence

[<http://www.ascenion.de/index.php?id=201&L=1>]

## 5.6 REDUCTION OF LEGAL AND TECHNOLOGICAL RISKS

Technology transfer is facilitated by putting considerable effort into "decontaminating" the technology, that is cleaning intellectual property rights, which often requires more energy and work than the commercial negotiations themselves. This includes clarifying the ownership and origin of the technology and identifying risks associated with its exploitation.

Recognizing the work of students or other parties who have made a secondary contribution but who later claim property rights is often a problem. The ability of companies and universities to agree on the nature of the university's responsibilities, the guarantee provisions, and the issue of insurance must also be reinforced.

Companies, for their part, must ensure they have the "freedom to operate" the technology without infringing on third party intellectual property rights in the various national or international territories where they plan to operate.

Investing in maturing an invention goes a long way toward reducing its technological risks. Just because an invention is promising does not mean that it will pan out once developed or that its exploitation involves no risk. The long and costly maturation process (including technology showcases) is necessary to minimize the technological risks.

## 5.7 IN-DEPTH UNDERSTANDING OF THE COMPANY'S NEEDS, THE EXTERNAL ENVIRONMENT, AND THE MARKET

Cooperative work mechanisms (precompetitive research consortia and networks of centers of excellence focused on industry needs) are other effective means of focusing part of medium- and long-term public research on the needs of business. A number of sectoral research centers, like Institut de recherche sur l'électricité du Québec (IREQ) and Institut national d'optique (INO), are much closer to the market than universities. Such centers could serve as bridges to bring university research closer to the realities and needs of the market.

Knowledge of and detailed intelligence on the market have become a key to successful R&D and innovation projects. Consequently, market specialists should be included in applied research teams right from the start. Regular contact should also be maintained with customers, as Curt Carlsson of Stanford Research Institute International recommends in his book, *Innovation: The Five Disciplines for Creating What Customers Want*.<sup>68</sup> This approach has transformed the way R&D projects are handled at the Canadian forestry research consortium, FPIInnovations.

All innovation projects should be based on an in-depth knowledge of the state of the art and the dominant IP players, which is made easier thanks to the Web applications Innography and Invention Machine GoldFire.<sup>69</sup>

**Innography** offers an online Web application for conducting a business analysis of IP assets, enabling all companies (regardless of their size or industry) to optimize their IP investments. Correlations between patent, trademark, and litigation information and other strategic business data instantaneously generate a variety of views and graphical summaries. The application also reduces search time by a factor of ten and related legal fees by 25%. This makes it possible to put a variety of products on the market more quickly, to obtain a preemption and a second opinion on dispute-related claims, and remain vigilant about other aspects of IP management.

[<http://www.innography.com/>]

## 5.8 SME SUPPORT STRATEGIES

Many countries directly target SMEs in their innovation policies and strategies. A number of them, primarily those with a long tradition of university/business collaboration, have set up a number of effective mechanisms for supporting SMEs.

The main components of a successful SME support strategy are as follows:

- Training incentives and measures to facilitate recruitment and hiring of highly qualified staff and bridging mechanisms like industrial internships for students and industrial research scholarships
- Quick and easy access to support, mentoring, and networking

### **The Essential Role of Tekes in Finland**

Finnish national agency TEKES pays special attention to SMEs. Apart from providing funding, it organizes technology clinics aimed at facilitating technology transfer from universities to SMEs. The agency also works to intensify networking between large companies, SMEs, and the public research community and supports SMEs seeking new ideas.

[[www.tekes.fi/eng/](http://www.tekes.fi/eng/)]

<sup>68</sup> [<http://www.sri.com/about/innovation-book.html>]

<sup>69</sup> GoldFire software can be used to find new markets or technology, design new projects or improvements, enhance existing technologies and products, correct defects in existing products, and streamline processes. [[www.goldfire.com/](http://www.goldfire.com/)].

### Support for the Entire Process

A good example of support for businesses is the Steinbeis centers in Germany. All their activities are based on private sessions where experts from the center discuss the SME's objectives and problems, as well as necessary changes with managers and others parties involved. Center staff then proposes a series of adjustments together with concrete and practical means of bringing them about. Their advice focuses on new technologies related to products and services as well as management and marketing. The IRAP program plays a similar role in Canada.

*Advisory Report, Pour un financement performant de l'innovation dans les entreprises, op. cit.*

- Fiscal and financial incentives promoting innovation (vouchers, tax credits, etc.). In terms of funding, innovation vouchers have also proven to be an effective way to encourage more SMEs to take their first steps in the area of knowledge transfer and to commit to technological innovation.

### Technology Checks

Belgium (Wallonia) has created technology checks, a 75 % subsidy that can be granted within three working days to any SME in Wallonia that wishes to use the services of a research center.

*OECD Science, Technology, and Industry Outlook 2010, January 2011*

- Easier access to university research technology and expertise. Businesses and venture capital companies regularly request a list of university research results that could be commercialized. Universities in eastern Québec already do this in part via RUTTEQ,<sup>70</sup> and the universities of Glasgow and British Columbia via the FlintBox platform.<sup>71</sup> FlintBox, in cooperation with WestLink Innovation Network Ltd., has published 1,600 projects and given rise to 5,400 license transactions since its launch.
- Encouragement for creation of knowledge-based enterprises  
This is the specific objective of rapid licensing systems like Carolina Express License and the mechanism put in place by the Fraunhofer institutes.

### Fraunhofer Venture Group in Germany

The Fraunhofer Venture Group was created in 1999 to help researchers at the Fraunhofer institutes set up companies and to protect the interests of all parties involved in the "research, industry, investor" interface. Very early on in the business creation process, Fraunhofer puts entrepreneurs in contact with the institutes likely to reinforce the future company's technological capital. An in-depth examination of industrial property rights held by the Fraunhofer that are relevant to the project is conducted, even extending beyond the Fraunhofer institutes in order to validate and strengthen the company's position.

*[<http://theseus-programm.de/en-us/theseus-sme-2009/vc-initiative/fraunhofer-venture-gruppe/default.aspx>]*

<sup>70</sup> [[www.rutteq.ca/](http://www.rutteq.ca/)]. These institutions have combined their efforts to develop a portfolio of innovations with strong commercial value, implement optimal commercialization strategies, and raise the university community's awareness of the commercial potential of its innovations.

<sup>71</sup> [[www.uilo.ubc.ca/licensing/flintbox.html](http://www.uilo.ubc.ca/licensing/flintbox.html)]



The overview of major world trends regarding the main challenges facing Québec as well as the success factors identified by the Working Committee made it possible to determine the main courses of action on which the Council based its recommendations. It also took into account the wealth of contributions and consensus that emerged at *Forum sur la gestion de la propriété intellectuelle* on February 14, 2011, at the National Research Council of Canada's Industrial Materials Institute.

## **1. General Recommendation: Promote Cooperative Work and Alliance Building in the Province**

All the consulted stakeholders agree: **IP management is most instrumental for its contribution to innovation and prosperity in Québec.**

Accordingly, intellectual property management in university/business relations must be regarded as one of the components of an innovation approach that is interactive, collaborative, and as fluid as possible, rather than as an isolated invention commercialization activity.

More than ever before, this new approach must be based on the demand of businesses and their knowledge of the market, and aim for a better dynamic between supply (push) and demand (pull). The approach based on science and technology (science and technology push) has shown its limitations around the world, especially when it is not part of a collaborative approach. Greater emphasis on university research conducted according to market needs and trends is likely to improve university "performance" and create more economic wealth.

Under such circumstances, isolated initiatives and lack of dialogue are a major source of inefficiency. The establishment of alliances and cooperative frameworks between all major actors is the key to success: not only universities, research centers, and businesses, but also interface organizations, financial actors, and government agencies—CRIAQ is a good example of what can be done.

Québec has an opportunity to add two strings to its bow so that it can compete with the best nationally and internationally in innovation and IP management: 1) To excellence, Québec must add collaboration. 2) It must promote entrepreneurship. Entrepreneurship and innovation are closely linked: entrepreneurship without innovation or innovation without entrepreneurship will not allow us to increase our collective wealth.

**Excellence + Collaboration + Entrepreneurship → Innovation → Prosperity**

## RECOMMENDATIONS

To meet this challenge, three main courses of action were identified:

- An alliance for action comprising universities, businesses, and research centers
- Cooperative training initiatives in innovation and entrepreneurial
- Support and IP management strategies for SMEs

## 2. An Alliance of Major Decision Makers to Address IP Management Challenges and Facilitate Collaborative Projects

In most countries, forums to promote collaboration and better IP management practices have been established for quite some time, on the initiative of partners, namely major universities, and business leaders.

Such an initiative, which is critical for Québec, was supported by all participants at the intellectual property forum.

The Council strongly recommends to key decision makers that an **ALLIANCE FOR ACTION** among universities, businesses, and research centers be created to resolve problems related to IP management and facilitate collaboration.

### 2.1 Strive for Concrete Action and Tangible Results

The Council recommends as follows:

- The alliance should **commit to action and the resolution of very concrete problems** and make it possible to add real value to existing regional or industry partnership initiatives (consortia, clusters).
- The alliance should **focus on the success factors selected during the forum**:
  - Committed leaders (10 to 12) in public and industrial research
  - From a variety of sectors and sizes of company
  - Clear support from major university associations, public research centers, and business associations
  - Highly streamlined administration
  - A limited number of action targets with clear timelines, milestones, deliverables, and short-term results
  - Promotion and dissemination of results on a provincial (sharing, appropriation), national, and international (brand image) scale
  - Ties to similar international organizations
  - An inspiring name closely associated with the new brand image

## 2.2 Priority Work Targets

The Council recommends **seven priority work targets** selected by participants of the February 14 forum:

- Much quicker procedures and shorter deadlines for intellectual property negotiation: set a maximum time period and release the results
- Establishment of procedures in all institutions for awarding quick licenses in order to simplify negotiations
- Harmonization of practices, rules, and clauses and dissemination of those that have been standardized
- Creation of a common website on which all available technologies and expertise are classified by field
- Improved relations between SMEs and both universities and large companies, including increased support and preferred IP access for the region's SMEs
- Promotion of collaborative projects between researchers and industry, particularly SMEs, through increased sabbatical leaves in industry like in the United States, and student internships in companies
- Support for joint innovation and entrepreneurial training initiatives

## 3. Greater Emphasis on Innovation (Including IP Management) and Entrepreneurial Training

Despite a number of laudable initiatives in Québec, innovation and entrepreneurial training is the weak link in our innovation system, and best practices are too rare. Many of Québec's economic leaders have recently made statements in this regard.

The scope of the challenges faced requires action that is swift, more concerted, and better adapted to the different needs of actors in the innovation system, with a view to enhancing existing initiatives and expanding the range of services offered.

Considering the importance of this issue, the Council sets the following two major action priorities:

- In the short term, the entrepreneurial strategy announced by the Minister is an opportunity to act quickly and draw on sectoral and regional concertation initiatives to strengthen and adapt training programs to the various actors' needs.
- In the medium term, compulsory training at the various university levels should be introduced.

### 3.1 Encourage Joint Action on Providing More Generalized Training That Is Better Adapted to Specific Clienteles and Based on Best Practices Around the World

The Council recommends the following:

- As part of its entrepreneurial strategy, the **Ministère du Développement économique, de l'Innovation et de l'Exportation (MDEIE)** should help set up several pilot projects or programs adapted to fields or needs that are considered important or to clientele who are less well served. These initiatives should
  - promote multi-organization and multi-sector synergies;
  - draw on a wide variety of complementary university and industrial expertise (including mentoring);
  - enhance support for young entrepreneurs;
  - target an industry cluster or consortium or a regional innovation pole, like the mobilizing projects launched under the 2010–2013 Québec Research and Innovation Strategy or the recent Genome Canada initiative promoting entrepreneurship;
  - receive public and private sector funding (significant leverage effect), with companies contributing through the active participation of their qualified staff;
- **recognize exemplary innovation and entrepreneurial training practices through annual awards** from MDEIE and the Ministère de l'Éducation, du Loisir et du Sport (MELS): the selection criteria for such awards should include adaptation and partnership;
- task these government ministries with setting up a **portal listing the best available training opportunities**.

### 3.2 Promote Course Content and Teaching Methods Adapted to Various Actors' Needs

The Council recommends the following:

- Course content, teaching methods and schedules that target **all actors concerned** (large companies, SMEs, full-time students, managers, employees, ongoing training)
- **Teaching approaches** that incorporate various **features considered essential** by intellectual property forum participants:
  - Theoretical and practical training: concepts illustrated by practical, real-life projects
  - Training staff from both the university milieu and industry, as well as a mix of participants
  - Introductory interactive workshops followed by modular content to provide progressive, personalized training
  - Mentoring and support: very important for SMEs and young entrepreneurs
  - Business internships for students
  - Online and distance courses, etc. to meet the needs of actors in remote regions; use of social networks as practice communities
  - Teaching approaches and content inspired by the best courses from around the world, including world-class experts as guest lecturers
  - Support for integrating various disciplines: health sciences, natural sciences and engineering, humanities and social sciences
  - Incentives promoting dialogue, sharing, and feedback

### 3.3 Compulsory Training in Universities at All Three Academic Levels

The Council is fully aware of the importance of time devoted to the scientific quality of training and the difficulty in integrating new modules in already overloaded university programs. However, it is also convinced that the change of culture Québec needs will not happen without opening to basic training in entrepreneurship and innovation, not only in engineering but also in many programs in both the pure and natural sciences as well as the social and human sciences.

As long as training in innovation, intrapreneurship, and entrepreneurship remains “optional” and limited to around 5% of students, it is unrealistic to expect a culture change across Québec. The generalization of training will also have the dual benefit of overcoming prejudices and promoting constructive and efficient dialogue.

To introduce compulsory training in the universities at all three academic levels,

The Council recommends the following:

- MELS and university decision makers should encourage and facilitate the inclusion of at least **one credit in innovation and entrepreneurial training in all undergraduate programs in Québec.**
- **A minimum of three credits in innovation and entrepreneurial training** should be required in master's and Ph.D. programs.

The integration of compulsory innovation and entrepreneurship training in basic university education must, of course, be progressive and flexible in accordance with the interests and career plans of each individual. It will be greatly facilitated by adopting the abovementioned pedagogical approaches, which are based on the sharing of concrete experiences and the integration of expertise and disciplines.

## 4. Strategies to Help SMEs Manage Their Intellectual Property

With regard to IP management, the needs of SMEs vary according to their degree of maturity and the intensity of their technological innovation. Three main types of PME can be considered: technology startup SMEs, innovative technology SMEs that have reached maturity, and moderately or somewhat less innovative SMEs.

Businesses in the first two SME categories are reasonably aware of the importance of intellectual property and its management, which is certainly not the case for the third, which accounts for 97.9% of Québec businesses. However, all businesses need to be informed on the various ways to protect their IP, whether through formal, semiformal, or informal management tools. In addition, all SMEs need other types of support such as training, access to tools and coaching, and financial assistance.

### 4.1 A Prerequisite: SME Awareness on the Benefits of Sound IP Management

According to the Forum participants, the first step is to demystify IP among SMEs so that they understand the extent to which sound IP management is profitable and how it can help them improve their commercial performance. This step is a prerequisite for the success of more extensive training.

The use of case studies and testimonials can open new perspectives and promote greater awareness of all possible protection strategies.

## RECOMMENDATIONS

These awareness efforts must target SMEs where they are:

- In the intermediation bodies that SMEs approach for assistance
- In the agenda of industry clusters, sectoral associations, chambers of commerce, and regional innovation clusters
- In the media that SMEs consult.

Because SME awareness is a prerequisite for them to recognize the benefits of sound IP management:

The Council recommends that, on a needs basis and with the support of specialized resources, MDEIE and the main business associations

- Organize **awareness tours** where businesses are
- Organize **noon webinars** in collaboration with local stakeholders

### 4.2 More Proactive, Informed, and Networked Support

SMEs repeat that the assistance most useful to them is support from competent resources who have knowledge of innovation and IP management.

Québec boasts a broad network of intermediation bodies. However, as a study by ETS<sup>72</sup> highlights, many intermediaries are not concerned with IP management or consider that it is not part of their role. Some perceive themselves as relay runners: they provide basic advice and refer SMEs to experts who are generally specialists in IP protection, but not IP management or strategy, which does not necessarily resolve the problem. Moreover, with the exception of IRAP, few intermediaries are prepared to deal with the entire innovation process and instead intervene at different stages.

So that a more proactive, informed, and networked support be provided:

The Council recommends that

- The **government offer incentives to ensure better networking** between intermediation bodies. The Council has already made this recommendation several times and it is a clear expectation of the community (Colloque Valorisation 2010). Networking initiatives do exist, but they remain partial and insufficiently encouraged
- First-line intermediation bodies **invest in expanding their knowledge** with a view to facilitating their dialogue with specialists and their more active participation in the dissemination of IP management tools

Consortia are the preferred mechanisms for university/business partnerships where SMEs can take a more active role and benefit from more tools, training, advice, and support.

The Council recommends that

- MDEIE adjust the mandate of **industrial research consortia** so that they play a **greater support role for SMEs** in their IP management and in the dynamics of collaboration with both universities and large businesses

<sup>72</sup> Isabelle Deschamps, Maria Macedo, Manon Hélie, *Accompagner les PME dans leurs collaborations universitaires: rôle des intermédiaires et outils de gestion de la propriété intellectuelle*, Montreal, January 2011.

### 4.3 Better Access to Tools and Expertise

There is a wide range of tools and guides, both online and offline, to help businesses manage their intellectual property and adopt strategies in this regard.<sup>73</sup> However, these tools are scattered, not well known, and rarely used.

Accessing university technologies and expertise continues to be a difficult if not impossible mission for SMEs that have not already formed collaborative relationships with laboratories.

To ensure better access to tools and expertise:

The Council recommends that

- **MDEIE** evaluate existing IP management tools, identify those that are most relevant, and **enhance its site with the selected tools and guides**. This could also be an occasion to partner with other organizations to make available online tools like Intellectual Property Explorer,<sup>74</sup> which is jointly offered to businesses by Australia, Hong Kong, and Singapore to help SMEs identify and protect their IP assets.
- Intermediation organizations (including college centers for the transfer of technology [CCTTs]) be encouraged **to disseminate** information to their SME clients on **the management tools that best meet their needs**
- **Universities** make it much **easier to access information on technologies** that could be commercialized and research projects that might be of interest to industry. Many universities are already doing so (see Section 5.8).
- Expertise recherche Québec be more involved

### 4.4 Fast and Easy Access to Funding for First-Time IP Management Experiences

Some PME have never dealt with public research or taken steps to protect intellectual property. The Forum participants highlighted the need for these businesses to benefit from financial incentives that let them “break the ice” for a first-time experience.

To ensure fast and easy access to funding for first-time IP management experiences:

The Council recommends that

- MDEIE assess the value of implementing “**innovation vouchers**” inspired by international success stories and aimed at SMEs with a view to helping them take the first steps in an IP approach. This assessment must take into account existing measures such as R&D tax credits and the technology intensification program.

Moreover, the federal and provincial governments are currently in the process of reviewing R&D programs and government assistance. The Council proposes that in this review process the government **consider covering the cost of filing patents in the R&D tax credits granted to businesses**.

This measure can be an additional incentive for Québec businesses to acquire patents.

<sup>73</sup> The factsheet prepared to support Workshop 3 of the Forum contains various examples of tools. Appendix 3.3.

<sup>74</sup> [<http://intellectualpropertyexplorer.com/>]





## Appendix 1 Glossary of Key Terms

In collaboration with  
Jean-Nicolas Delage, attorney with  
Fasken Martineau DuMoulin, LLP,  
patent and trademark agent

This glossary aims to clarify the main terms related to intellectual property management in collaborations between public research and businesses.

### INTELLECTUAL PROPERTY (IP) MANAGEMENT

**“Intellectual property”** (IP), very broadly, means the legal rights that result from intellectual activity in the industrial, scientific, literary, and artistic fields. IP rights, in their various forms (patents, trademarks, copyrights, industrial designs, integrated circuit topographies, or plant breeders’ rights) reward this intellectual activity.

By **intellectual property management**, we mean all the practices an organization adopts to identify and protect its intangible assets and create profits or acquire operating rights. Among other things, this includes establishing an IP strategy that covers protection methods, IP awareness and training, IP audits, determination of IP book values, canvassing of resource people for the concession and assignment of IP, in-depth knowledge of the state of the art and the dominant players in IP, followup on the validity of the IP and the payment of royalties, optimal management of knowledge and know-how, and relations with IP specialists.<sup>75</sup>

**IP protection methods** distribute mainly as follows.<sup>76</sup>

- Intellectual property rights (protection under law)
  - Copyright
  - Patent
  - Industrial design
  - Trademark
  - Integrated circuit topographies
  - Plant breeders’ rights
- Contracts
  - Non-competition
  - Confidentiality
  - Nonsolicitation
  - Ownership of employee inventions
  - Property and exploitation agreements, including partnership projects
- Other protection methods
  - Industrial secrecy secret
  - Confidentiality
  - Defensive publication (decision to make an invention public instead of patenting it)

<sup>75</sup> Inspired by [\[mivado.com/french/details/gestionPI.htm\]](http://mivado.com/french/details/gestionPI.htm).

<sup>76</sup> Based on Selina Paallysaho and Jari Kuusisto, *Intellectual Property Protection in Service Sector*.

- Loyalty building among personnel
- Restricted access to information
- Database and network protection
- Division of duties
- Customer relationship management
- Efficient sharing of information
- Documentation of processes and results
- Fast innovation cycle
- Complex product design
- Technical production

### INVENTION AND INNOVATION

**“Invention”** means any new and useful art, process, machine, manufacture or composition of matter, or any new and useful improvement in any art, process, machine, manufacture or composition of matter.<sup>77</sup>

According to the OECD, **“innovation”** is the implementation of a new or significantly improved product (good or service), or process, a new marketing method, or a new organizational method in business practices, workplace organization, or external relations. It is distinguished from an invention or a discovery in that it falls within the scope of an application perspective.

The **difference between an innovation and an invention** lies in the implementation—innovation occurs when a new element begins to be used, and not at the moment of conception.<sup>78</sup>

**“Open innovation”** is the increased use, upstream, of information and knowledge sources coming from outside the enterprise as well as, downstream, the increase of commercialization channels of its intangible assets for the purpose to accelerate innovation.<sup>79</sup> These new practices, which result in more interaction between players, make intellectual property management significantly more complex in cases where property becomes jointly owned.

### OTHER TERMS

A **“patent”** is a government document giving an inventor the right to exclude others from making, using, or selling his or her invention.<sup>80</sup>

The expression **“commercialization of university research”** is often used as a synonym of **“technology transfer”** and refers to the commercial exploitation of all creative forms protected by intellectual property rights as well as of the expertise of university researchers (their knowledge and skills) resulting from research carried out in all fields.<sup>81</sup>

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77 [http://lois-laws.justice.gc.ca/eng/acts/]

78 Conseil de la science et de la technologie, *La valorisation de la recherche universitaire, Clarification conceptuelle*, Québec City, 2005.

79 CST, *OPEN INNOVATION: ISSUES AND CHALLENGES FOR QUÉBEC, 2009 SITUATION REPORT*, First Quarter, 2010.

80 Canadian Intellectual Property Office, Glossary. ([http://www.opic.ic.gc.ca/eic/site/cipointernet-internetopic.nsf/eng/h\\_wr00861.html](http://www.opic.ic.gc.ca/eic/site/cipointernet-internetopic.nsf/eng/h_wr00861.html))

81 Conseil de la science et de la technologie, *IBID.*

In ordinary usage in Québec, the term “**research consortium**” refers to two different realities: a sectoral industrial research association (see definition further down) and a sectoral organization that has a research facility and personnel assigned to research. The latter organization conducts precompetitive scientific research and experimental development work that must meet the scientific and technological interests of member businesses. The results obtained must be accessible to all members who might use and develop them according to the unique needs of each party. Two examples are FP Innovation in the forestry sector and COREM in the mining sector.<sup>82</sup>

“**Freedom to operate**” is the ability of a business to develop, produce, and sell products without infringing the intellectual property rights of others, in all the jurisdictions where it expects to operate.<sup>83</sup>

A “**license**” is a legal agreement by which an intellectual property owner allows another party to take actions that would otherwise be illegal.<sup>84</sup> This agreement is concluded with a client for the use of IP in exchange for the payment of royalties or other benefits (e.g., an interest in the business).<sup>85</sup> A license does not constitute a change in ownership of the copyright.

An “**intellectual property license**” (for a patent, trademark, design, or model) is considered **exclusive** when the holder of the industrial property right grants the license to a natural or legal person, to the exclusion of all others, including the holder of right.<sup>86</sup>

A “**nonexclusive license**” is a form of license which grants a natural or legal person something other than an exclusive entitlement. The effect is that multiple parties can use the same license at the same time for the same thing, and in the same geographic region.<sup>87</sup>

“**Professor’s privilege**” refers to cases where researchers who work in colleges and universities automatically own the IP right to inventions and copyright works that they produce. Decisions about whether to patent research results, how to commercialize intellectual property, and even to whom to license ideas and inventions lie with the individual researcher. This distinguishes them from researchers or other employees working in public laboratories or the private sector, where any invention produced in the workplace automatically belongs to the employer.<sup>88</sup> This term is used mainly in Europe.

“**Collaborative research**” is a multifinalized approach to scientific investigation that involves close cooperation between individuals working in research and action and, possibly, between managers and beneficiaries.<sup>89</sup>

“**Contract research**” is research conducted by a university or research organization on behalf of a third party (e.g. industry, government), where the results and IP belong to the third party. Normally, the full cost of work, including management fees, is covered by the third party.

82 Inspired by [www.mdeie.gouv.qc.ca/...consortium-de-recherche.../criteres-dadmissibilite/](http://www.mdeie.gouv.qc.ca/...consortium-de-recherche.../criteres-dadmissibilite/).

83 [[www.patentlens.net/daisy/.../2768.html](http://www.patentlens.net/daisy/.../2768.html)]

84 Inspired by Office de la Propriété intellectuelle du Canada, Glossaire [www.ic.gc.ca/eic/site/...internetopicnsf/fra/wr00837.html](http://www.ic.gc.ca/eic/site/...internetopicnsf/fra/wr00837.html).

85 Conseil de la science et de la technologie, *op.cit.*

86 [[www.chaillot.fr/.../licence-exclusive-150.html](http://www.chaillot.fr/.../licence-exclusive-150.html)]

87 [[www.lawglossary.net/definition/2185-Non\\_exclusive\\_License](http://www.lawglossary.net/definition/2185-Non_exclusive_License)]

88 [[www2.druid.dk/conferences/viewpaper.php?id=6085&cf=32](http://www2.druid.dk/conferences/viewpaper.php?id=6085&cf=32)] and [[www.managingip.com/Article/1969167/The-profesors-pr/wlege.html](http://www.managingip.com/Article/1969167/The-profesors-pr/wlege.html)]

89 Richard Lefrançois, “La recherche collaborative : essai de définition,” *Nouvelles pratiques sociales*, Vol. 10, No. 1, 1997, pp. 81–95

**“Precompetitive research”** is research conducted by or on behalf of businesses who are in a competitive situation or who have complementary technological expertise. The research consists of basic or applied research and may include part of the development phase. Because the research results are not immediately commercializable at the precompetitive stage, businesses may use them in different ways, depending on their own expertise.<sup>90</sup>

A **“royalty”** is the amount paid to the holder of property rights in exchange for the granting of a license.<sup>91</sup>

A **“sectoral industrial research group”** (commonly known as a “research consortium” in Québec) refers to a nonprofit organization made up of businesses in the same sector or a related sector. Its aim is to carry out activities that

- Are directly linked to technological innovation in Québec
- Involve management activities, including business intelligence
- Involve industry coordination, training, and information

These sectoral groups promote equitable sharing of IP between members participating in carrying out R&D and innovation activities and they maximize access to research results for all members.<sup>92</sup> CRIAQ, in the aerospace sector, and Prompt, in the ICT industry, are two sectoral industrial research groups.

A **“startup”** is a newly created business that is formed around technology or knowledge derived from a parent organization, without the direct participation of this organization’s current or former employees.<sup>93</sup>

A **“spin-off”** (or “spin-out”) is usually a new business 1) created by one or more current or former employees of a parent organization and 2) formed around technology or knowledge derived from this organization. It is often a subsidiary dedicated to a new activity to grow more quickly without the organizational constraints of the parent company.<sup>94</sup>

**“University spin-outs”** are businesses created by university employees or students to exploit one of the university’s technologies.

**“Technology transfer”** is the transfer of the results of research by a university or other enterprise with the objective of commercializing new products or services. It involves the transfer of not only a “product” but also knowledge and skills for its use and application.<sup>95</sup>

<sup>90</sup> [www.formulaire.gouv.qc.ca/.../affiche\_doc.cgi?]

<sup>91</sup> Inspired by the Canadian Intellectual Property Office, Glossary [www.ic.gc.ca/eic/site/...internetopic.nsf/fra/wr00837.html](http://www.ic.gc.ca/eic/site/...internetopic.nsf/fra/wr00837.html).

<sup>92</sup> Inspired by [www.mdeie.gouv.qc.ca/.../programme-de-soutien-a-la-valorisation-et-au-transfert-psvt-soutien-aux-regroupements-sectoriels-de-rech...].

<sup>93</sup> Extract from *Propriété Intellectuelle et universitaire; entre la privatisation et la libre circulation des savoirs*, Pierrick Malissard, p. 93.

<sup>94</sup> [www.agrojob.com/.../definition-spin-off-3788.html]

<sup>95</sup> Conseil de la science et de la technologie, op.cit.

## Program for the Forum of February 14, 2011

### Industrial Materials Institute/National Research Council Canada

Boucherville

#### *Intellectual Property Management in Collaborations Between Businesses, Universities, and Research Centers: New Perspectives and Courses of Action*

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p><b>7:30 a.m.</b> Networking breakfast</p> <p><b>9:00 a.m.</b> Opening remarks by <b>André Bazergui</b>, special advisor to the CEO, Consortium de recherche et d'innovation en aérospatiale au Québec (CRIAQ), co-chair of the Working Committee</p> <p><b>9:05 a.m.</b> Presentation on the main results and invitation for participants to enhance the recommendations during the day by <b>Sylvie Dillard</b>, president of Conseil de la science et de la technologie, co-chair of the Working Committee</p> <p><b>9:30 a.m.</b> Presentation by <b>Jean Rousseau</b>, business unit director, vascular therapies and medical supplies, Covidien Canada, on intellectual property management practices and the innovation process at Covidien international</p> <p><b>10:00 a.m.</b> Break</p> <p><b>10:15 a.m.</b> Start of the first series of <b>three workshops</b> on the courses of action deemed most promising by the Working Committee members</p> | <p><b>12:30 p.m.</b> Lunch in the cafeteria</p> <p><b>1:30 p.m.</b> Start of the <b>second series of workshops</b>; morning workshops are repeated in the afternoon so that everyone can take part in two different workshops during the day</p> <p><b>3:15 p.m.</b> Break</p> <p><b>3:30 p.m.</b> Speech by <b>Clément Gignac</b>, minister of economic development, innovation, and export trade, on the importance of collaboration between businesses, universities, and research centers to speed up innovation</p> <p><b>4:00 p.m.</b> Plenary session chaired by <b>André Bazergui</b>:</p> <ul style="list-style-type: none"> <li>• Report from the workshop chairs</li> <li>• Responses from the decision-makers roundtable composed of four senior management members representing universities, large companies, research centers, and community associations: <b>Denis Brière</b>, rector of Université Laval and chairman of the board of the Conference of Rectors and Principals of Quebec Universities (CREPUQ); <b>François Caza</b>, vice president, engineering, Bombardier, and chairman of the board of CRIAQ; <b>Blaise Champagne</b>, director general, National Research Council Canada (NRC) Industrial Materials Institute; and <b>Jean-Louis Legault</b>, CEO of Association de la recherche industrielle du Québec</li> </ul> |
| <p>The morning workshops are repeated in the afternoon.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | <p><b>5:00 p.m.</b> Closing remarks by Mr. Bazergui and Ms. Dillard</p> <p><b>5:30 p.m.</b> Alcohol-free cocktail</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| <p><b>ATELIER 1: PROMOTE TRAINING IN INNOVATION MANAGEMENT AND ENTREPRENEURSHIP</b></p> <p><b>Chair: Jean Nicolas</b>, emeritus professor at Université de Sherbrooke and visiting professor at École polytechnique, in collaboration with <b>Charles Gagnon</b>, director of technology business development at Hydro-Québec, and <b>Jean-Nicolas Delage</b>, attorney at Fasken Martineau.</p> <p>This workshop aims to determine the best strategies for addressing the general lack of knowledge and skills in innovation management by drawing from recent international experiences. We will examine, among other things, ways to get universities, businesses, and research centers to pool their knowledge and resources to give rise to comprehensive, high-quality training and determine the best pedagogical approaches to meet the needs of different clientele.</p>                                                                                  | <p><b>ATELIER 2: AN ALLIANCE FOR ACTION BETWEEN UNIVERSITIES, BUSINESSES AND RESEARCH CENTERS WITH REGARD TO COLLABORATION AND INTELLECTUAL PROPERTY MANAGEMENT</b></p> <p><b>Chair: Michel Dumoulin</b>, vice president of scientific affairs and partnerships at Fonds de recherche sur la nature et les technologies, in collaboration with <b>Patrick Champagne</b>, vice president of CMC Electronics Inc. and <b>Gilles Savard</b>, director of research at École polytechnique.</p> <p>The real and responsible commitment of partners at the highest level is part of best international practices for improving collaboration and IP management. The objective of this workshop is to determine the characteristics and main agenda of such an alliance so as to make it possible to efficiently deliver on this commitment by decision makers.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | <p><b>ATELIER 3: SUPPORT SMEs IN THE MANAGEMENT OF THE INTELLECTUAL PROPERTY</b></p> <p><b>Chair: Diane Côté</b>, Québec vice president of MEDEC, in collaboration with <b>Florent Chandelier</b>, vice president and chief technology officer at Cadens Imaging, and <b>Jean Belzile</b>, director of research and industry relations at École de technologie supérieure.</p> <p>In Québec, as elsewhere in the world, SMEs are the businesses that have the most difficulty in defining their strategy for innovation and IP management. This workshop aims to determine the best strategies to increase their access to necessary resources and tools, strengthen SME support, and promote their integration in dynamics of collaboration between businesses, universities, and research centers.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |

## Appendix 3.1 Forum Factsheet – Workshop 1



### WORKSHOP 1: PROMOTE TRAINING IN INNOVATION MANAGEMENT AND ENTREPRENEURSHIP

#### Chair

Jean Nicolas, emeritus professor at Université de Sherbrooke and visiting professor at École Polytechnique

#### Collaborators

Innovation: Charles Gagnon, director of technology business development, Hydro-Québec  
Intellectual property (IP): Jean-Nicolas Delage, attorney, Fasken Martineau

#### Issues

Québec faces major challenges in increasing productivity, innovation, and entrepreneurship that require the mobilization and cooperation of all stakeholders.

The dynamics of cooperation are adversely affected by a rather generalized lack of knowledge and skills in innovation in the broad sense of the term (including in IP management).

There is a need to boost the innovation and entrepreneurship capacity of businesses, particularly SMEs, mainly by targeting

- Science-based entrepreneurship: number and lifespan of businesses
- The training and ambition of entrepreneurs
- The lack of personnel qualified in innovation
- The significant lag in continuing education

Generalized lack of training in innovation management and entrepreneurship at universities: persistence of a culture that mainly values basic research ("science push").

- Lack of information and training for research professors who get involved in commercialization activities
- Lack of student skills for business careers
- Need to strengthen the expertise and continuity of expertise in university/industry liaison offices (BLEUs)

Need for support in the adoption of open innovation by public research centers and intermediation bodies

- Focus on meeting market needs rather than science-push type development.
- Role of intermediation bodies and research consortia in supporting SMEs

WORKSHOP 1: PROMOTE TRAINING IN INNOVATION MANAGEMENT AND ENTREPRENEURSHIP

**Training offered is incomplete, insufficient, and scattered, in spite of certain promising initiatives.**

- Many things are being done in Québec, but they are still too unknown and not listed.

**Some examples of training offered in Québec:**

- Direction du développement des entreprises at Ministère du Développement économique, de l'Innovation et de l'Exportation (MDEIE) – Training on the strategic aspects of IP
- École de technologie supérieure (ETS) – Innovation management (microprogram, DESS, master's degree)
- McGill University - Certificate in Entrepreneurship (undergraduate level)
- Université Sherbrooke – Graduate degree in technology transfer
- Zins Beauduchesne and Associates – Online training programs in innovation management

There is little recognition of staff and students trained in innovation management and entrepreneurship.

**Global Trends**

- The creation of schools specialized in the teaching of innovation management is a trend in both Europe and the U.S.

**U.S. - North Carolina State University**

The Innovation Management School (IMS) is the result of a partnership between the Center for Innovation Management Studies at North Carolina State University and the Industrial Research Institute. IMS provides innovation management training to the state's leaders and businesspeople. The school relies on the networks of two partner organizations, one bringing together researchers specializing in innovation and technology management, and the other practitioners and business leaders. <http://cims.ncsu.edu/ims/about.htm>

**Reflection on accreditation in the U.K.**

In the U.K., since 2005, three transfer organizations (AURIL, PRAXIS, and UNICO) have worked jointly to create a technology transfer institute, particularly to set up a real qualification and accreditation system in the field.

- There are many university programs in innovation management.

**A few examples of advanced training in innovation management:**

- Master of Technology and Innovation Management – University of Queensland in Australia
- Ph.D. Program in Management Science and Innovation - University College London in the U.K.
- Master's, doctoral, and postdoctoral program since 1994 - Graduate Institute of Technology and Innovation Management in Taiwan
- Various innovation management programs, including the Master's in Science and Innovation Management – Utrecht University in the Netherlands

- Much emphasis is placed on continuing education.

### **IP Australia, a recognized and original training**

Australia has an independent agency, IP Australia, which has developed a series of training sessions on IP and innovation through Innovation and Business Skills Australia, one of ten Industry Skills Councils created by the country in 2004. This organization's mission consists of designing educational products and services aimed at developing the skills required to ensure the sustainability of an innovation workforce that is flexible and adapted to today's realities. IP and innovation management are the subjects of training programs that stand out for being developed with industry.

In 2010 this training was recognized with the prestigious Australian Marketing Institute Award for Marketing Excellence.

- The development of training programs in collaboration with industry is becoming a major strategic issue.

### **"Knowledge alliances" in Europe**

In October 2010 the European Commission announced support for collaborations between businesses and teaching institutions through the creation of "knowledge alliances" between the education and business communities, with a view to developing new programs likely to address the gaps with regard to innovation skills. These "knowledge alliances" will help universities modernize and move towards interdisciplinarity, entrepreneurship, and closer partnerships with businesses.

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## **Solution: Joint Innovation Training Platforms**

### **Objectives**

Develop training activities and programs in innovation management and entrepreneurship that are comprehensive, innovative, and inspired by the best practices in the world

Mobilize and pool the expertise of all communities (public research, industry, associations, intermediation)

Strive to integrate activities and programs at all university levels and meet the continuing education needs of the various actors

Implement innovative pedagogical approaches that promote the acquisition of skills, group learning, and distance learning

Train specialists in innovation management and entrepreneurship and aim for their accreditation

*Forum*  
Intellectual Property Management in Collaborations  
Between Businesses, Universities, and Research  
Centers: New Perspectives and Courses of Action

### Success Factors

Multi-institutional action: bring together a number of universities and different partners such as businesses (including business networks), research centers, CEGEPs, professional bodies and other types of associations such as consortia  
Provide training based on a sound needs analysis that distinguishes one target clientele from another

Trans-disciplinarity: call on specialists in all aspects of innovation (products, processes, organization, commercialization, intellectual property, ethics)

Practical but also theoretical training that includes mentoring and coaching: we learn best by example

Sectoral specialization: the innovation process is very different depending on the industrial sector

Specific diploma and accreditation process

Innovative pedagogy, distance learning (e-learning), and collaborations

### Target Clienteles

Basic training for students at all three university levels.

Continuing education:

- Members of professional corporations
- University and industry researchers
- Specialists from transfer and intermediation organizations
- SMEs

### Questions

Why promote training?

What clienteles should be targeted?

What essential training or skills should be developed?

What pedagogical approaches should be favored?

What strategies should be prioritized (e.g., pilot projects, joint platforms)?

What organizational approaches should be used so that these training sessions are best supported and recognized?

## Appendix 3.2 Forum Factsheet – Workshop 2



### **WORKSHOP 2: AN ALLIANCE FOR ACTION BETWEEN UNIVERSITIES, BUSINESSES, AND RESEARCH CENTERS WITH REGARD TO COLLABORATION AND INTELLECTUAL PROPERTY MANAGEMENT**

#### **Chair**

**Michel Dumoulin**, vice president of scientific affairs and partnerships at Fonds québécois de la recherche sur la nature et les technologies (FQRNT)

#### **Collaborators**

Innovation:

**Patrick Champagne**, vice president, CMC Electronics Inc.

Universities:

**Gilles Savard**, director of research, École polytechnique

### **Context**

#### **The Situation in Québec**

In 2010 the Québec Research and Innovation Strategy (QRIS) highlighted the need to promote partnerships to speed up innovation (open innovation).

Mobilize around partnerships: The 2010–2013 QRIS

The mobilizing projects announced in the Québec Research and Innovation Strategy testify to the importance the Ministère du Développement économique, de l'Innovation et de l'Exportation (MDEIE) places on building partnerships between large businesses, SMEs, universities, and public research centers.

In total, the QRIS devotes nearly \$230 million over three years to support joint research and mobilizing projects.

The community is ripe for greater cooperation, as many initiatives show (industrial consortia, the “Québec, une région en mode solutions” activity, Colloque Valorisation 2010).

However, among the major partners in Québec, there is no formal and structured commitment to improving practices and fluidity in relations or resolving concrete intellectual property management problems.

In general, universities operate with little cooperation or coordination among themselves and with industry and have little contact with public research centers, with the exception at regional level.

There are persistent problems in relationships with SMEs.

There remain significant disparities between regions.

There are major operational and cultural differences between the various sectors.

WORKSHOP 2: AN ALLIANCE FOR ACTION BETWEEN UNIVERSITIES, BUSINESSES, AND RESEARCH CENTERS WITH REGARD TO COLLABORATION AND INTELLECTUAL PROPERTY MANAGEMENT

## Major Trends in Canada and the World

- The new Coalition for Action on Innovation in Canada brings together universities and industry.

### A University-Business Coalition in Canada

Co-chaired by John P. Manley (president of the Canadian Council of Chief Executives) and Paul Lucas (President and CEO of GlaxoSmithKline), this coalition is made up of chief executives, university representatives, and public agencies of Canada. Following a reflection that began with a report by the Council of Canadian Academies (CCA) in 2009, a national roundtable recommended courses of action to correct current weaknesses in Canada's innovation system.

This university-business coalition aims to go beyond discussion. An action plan for prosperity, published in October 2010, recommends ten measures including a reform of tax support for research and development (R&D), a strengthening of business-academic links, and a review of the intellectual property (IP) regime.

- There are many examples in the world: Denmark, the U.S., Ireland, the U.K., Europe, etc. A few of them are presented hereafter.

### A Tripartite Round Table in the U.S. Since 1984

The Government-University-Industry Research Roundtable (GUIRR) has existed in the U.S. since 1984. It was created to facilitate dialogue between top business leaders and governmental and nongovernmental bodies in the research sector. The reports, published annually, are produced by task forces and approved by the table members at one of three annual meetings. The University-Industry Demonstration partnership (UIDP), one of the ongoing projects, is a university-business forum where participants discuss IP, publications, technology transfer, and other issues of concern.

GUIRR, which is co-chaired by a university representative and an industry representative, is funded by the National Academy of Sciences, the National Academy of Engineering, and the Institute of Medicine.

### The Lambert Report in the U.K.

In December 2003, Richard Lambert (editor of the *Financial Times* and DG of CBI) submitted a seminal report in the U.K. The document, which presented an in-depth study of university-business collaborations in the U.K., includes 33 recommendations regarding in particular the link between university and business R&D, knowledge transfer, and intellectual property.

One of these recommendations directly concerned the issue of partnership, inviting the key actors—university and industry representatives—to work together to produce collaborative research agreement models for discretionary use by both universities and businesses. This led to the creation of the five Lambert Agreements, which put forward an approach and flexible collaborative research agreement models that include terms for intellectual property ownership and exploitation.

### Europe Adopts Partnership Guidelines

Responsible partnering is a code of conduct that businesses and public research institutions voluntarily adhere to. The rules are developed by experienced practitioners from four European associations representing industry needs (EIRMA), R&D organizations (EARTO), universities (EUA), and transfer organizations (ProTon Europe).

The code comprises six main partnership guidelines, including

- View innovation as a trans-disciplinary activity
- Achieve effective intellectual property
- Provide the right professional skills
- Treat collaboration strategically

The initiative is both a call for a change of culture and an offer of practical tools to achieve this change.

WORKSHOP 2: AN ALLIANCE FOR ACTION BETWEEN UNIVERSITIES, BUSINESSES, AND RESEARCH CENTERS WITH REGARD  
TO COLLABORATION AND INTELLECTUAL PROPERTY MANAGEMENT

### Recommendation

Create an alliance for action (task force) on university-business-research center collaborations and intellectual property management.

#### Objectives

- Actively and formally promote collaborations and best IP management practices at the highest levels of decision making
- Mobilize and increase the coherence of actions in the field and the efficiency of the innovation system
- Portray Québec as open to partnerships, both in Canada and internationally—a significant comparative advantage
- Bring about the regions to develop stronger partnerships

#### Governance

- High-level leadership: rotating co-chairs
- Sponsorship committee made up of around twelve partners from the university, industry, and research centers:
- Members of the Conference of Rectors and Principals of Quebec Universities (CREPUQ)
- A number of large businesses and dynamic SMEs
- Large public research centers
- A number of large business associations (Association de la recherche industrielle du Québec [ADRIQ], Fédération des chambres de commerce du Québec [FCCQ], and CCMM).

#### Operations

- Setting of priorities and establishment of a restricted number of target projects with clear expected results
- Projects led by champions and the best-qualified individuals in each of the communities involved
- Pilot projects based on existing sectoral or regional dynamics (respect for the diversity of sectoral issues is key)
- Creation of forums for the sharing, appropriation, and dissemination of the results of each project (as soon as results are available)
- Mobilizing event at the end of three years, in partnership with stakeholders
- Coordination support by MDEIE (an individual assigned for this purpose)
- Accounting, after three years, to Comité stratégique en science et innovation chaired by the minister (official creation of this committee expected in 2011)

### **Strategic Targets Proposed by the Working Committee**

- Reduce negotiation times in IP agreements
- Promote an approach suited to SMEs: access to expertise; reduced response times; fast, inclusive, and affordable licenses; openness and flexibility; integrated operations (one-stop shop); long-term perspectives
- Simplify negotiations and promote internal university entrepreneurship (e.g., the Carolina Express License Agreement approach)
- Adopt efficient partnership research models: teams, strategic market intelligence, management, communications, followup, long-term approach
- Adopt efficient sectoral and regional open innovation models (pilot projects)
- Sponsor training initiatives to support SMEs (workshops 1 and 3)

### **Success Factors**

- Partners' commitment to the minister
- Partners' real commitment to advancing university/business relations and intellectual property management
- Importance of accurately identifying value added vis-à-vis existing cooperative mechanisms
- Definition and drafting of a concrete list of common work targets within a relatively short timeframe (build on success)

### **Questions**

1. Is an alliance for action on university/business/research center collaborations and intellectual property management part of the solution?  
What are your expectations with regard to such an alliance?
2. What are the key targets for this alliance to ensure improvement in IP management? Have the critical success factors been identified?
3. Have the elements critical to proper functioning been identified? How should such an alliance be governed?

## Appendix 3.3 Forum Factsheet - Workshop 3



### WORKSHOP 3: SUPPORT SMEs IN THE MANAGEMENT OF THEIR INTELLECTUAL PROPERTY

#### Chair

**Diane Côté**, Québec vice president of Canada's Medical Technology Companies (MEDEC)

#### Collaborators

SME:

**Florent Chandelier**, vice president and chief technology officer at Cadens Imaging

University:

**Jean Belzile**, director of research and industry relations at École de technologie supérieure

#### 1. Issues

- SMEs are the businesses that have the most difficulty in defining their innovation and intellectual property (IP) management strategies at the international level.
- It is very difficult for them to quickly negotiate IP agreements with universities and large businesses and, consequently, bring their products to market within desired timeframes.
- Their main constraints are the need for quickness, lack of internal expertise, and funding.
- They make little use of formal intellectual property systems, in particular due to the difficulties in defending their rights.
- A key problem is poor reception capacity (qualified personnel, R&D capacity) and, consequently, access to university and research centers expertise and exploiting this expertise.
- Although there is a large range of tools and guides, many of which can be accessed for free on the Web, Québec's SMEs make little use of them.
- The use of innovation and IP management tools among intermediaries is rather mediocre; dissemination of these tools to SMEs is poor.
- The assistance SMEs seek most is coaching. However, there are few SME coaching bodies in Québec for innovation management. Most intermediaries do not consider themselves to be specialists in innovation or IP and prefer to leave the role of analyst, intermediary, and trainer to specialized firms.
- Despite certain initiatives (e.g., Réseau conseil en technologie et en innovation [RCTi]), there is a lack of both networking between federal and provincial actors and an efficient expert referral system.
- There are very few rapidly accessible funding sources for the purchase of specialized services.
- New technology businesses have great difficulty securing funding because of venture capital requirements.

WORKSHOP 3: SUPPORT SMEs IN THE MANAGEMENT OF THEIR INTELLECTUAL PROPERTY

## 2. International Trends

Strategies for supporting SMEs are among the priorities of many countries that have developed services and tools that are useful and considered high quality.

- Agency Dedicated to SME Support and Networking

The National Technology Agency (**Tekes**), Finland's main funding agency for applied research and development, offers businesses funding in the form of subsidies and reduced rate loans that may cover some R&D expenses (salaries, raw materials, equipment, outsourcing, travel, patents). In addition to funding access, Tekes provides advice and networks for cooperation between businesses, research centers, and universities, as well as an international network of technology advisors.

<http://www.tekes.fi/en/community/Strategy/343/Strategy/1280>

- Model Agreements

The Lambert agreements are a toolkit for universities and companies that wish to undertake collaborative research projects. They consist of five model research collaboration agreements and four model consortium agreements.

<http://www.ipo.gov.uk/lambert>

- Guides and Decision Trees

The collaborative decisions guide developed by the Center for Research in Economics and Statistics (**CREST**) contains a series of questions aimed at helping businesses and public research organizations prepare collaboration agreements. The first part of the guide helps the user identify issues to be addressed in collaboration agreements, while the second concerns cross-border aspects.

[http://ec.europa.eu/invest-in-research/pdf/download\\_en/kina20796enc.pdf](http://ec.europa.eu/invest-in-research/pdf/download_en/kina20796enc.pdf)

In France, the Ministère de l'Économie, de l'Industrie et de l'Emploi published a **practical guide to managing intellectual property** for SMEs. The objective is to demystify intellectual property and help SMEs better understand the IP issues involved with regard to business competitiveness. The guide provides a series of tips for each key step in the life of a business and offers numerous examples of best practices in intellectual property strategy.

<http://www.industrie.gouv.fr/enjeux/guide-pmepme-pensez-pi.pdf>

- Tools to Enable IP Decision Making

**Innography** has an online Web application for conducting a business analysis of IP assets, enabling all companies (regardless of their size or industry) to optimize their IP investments. Correlations between patent, trademark, and litigation information and other strategic business data instantaneously generate a variety of views and graphical summaries. The application also reduces search time by a factor of ten and related legal fees by 25%. This makes it possible to put a variety of products on the market more quickly, to obtain a preemption and a second opinion on dispute-related claims, and remain vigilant about other aspects of IP management.

<http://www.innography.com/>

- Case-Study Type Analytical Approach

The **IP Advantage** database provides access to studies on intellectual property and the experiences of inventors, creators, entrepreneurs, and researchers from around the world. The case studies offer insights into how IP works and how it can be successfully exploited.  
<http://www.wipo.int/ipadvantage/en/>

- Some countries offer SMEs innovation cheques to cover the costs of their first knowledge transfer steps

The **innovation voucher** program in the Netherlands, aimed at encouraging interaction between SMEs and the public research community, was set up as a pilot project in 2004 and 2005. As the program proved very effective in encouraging such collaboration—out of ten vouchers granted, eight were for projects that otherwise would not have existed—it is now permanent. Two types of vouchers are offered: €2,500 vouchers to encourage SMEs to approach research institutions for the first time, and €7,500 vouchers, paid partially by the companies, to help SMEs submit more complex research questions. Up to ten companies can collectively submit a question. Other countries, including Great Britain, have set up their own programs based on this initiative.  
[www.senternovem.nl/...innovation/innovation\\_vouchers.asp](http://www.senternovem.nl/...innovation/innovation_vouchers.asp)

- In addition, other measures have been taken to facilitate the creation of knowledge-based businesses.

The **Fraunhofer Venture Group** was created in 1999 to help researchers at the Fraunhofer institutes to set up companies and to protect the interests of all parties involved in the “research, industry, investor” interface. Very early on in the business creation process, Fraunhofer puts entrepreneurs in contact with the institutes likely to reinforce the future company’s technological capital. An in-depth examination of industrial property rights held by the Fraunhofer that are relevant to the project is conducted, even extending beyond the Fraunhofer institutes in order to validate and strengthen the company’s position.  
<http://theseus-programm.de/en-us/theseus-sme-2009/vc-initiative/fraunhofer-venture-gruppe/default.aspx>

### **Carolina Express License**

A set of innovative practices for the commercialization of university research has been developed and implemented by the University of North Carolina. New standardized license agreements and payment terms more compatible with the constraints of a new technology business aim to support and speed up the creation of businesses derived from university intellectual property.  
[otd.unc.edu/documents/CarolinaExpressLicenseSellerGuide.pdf](http://otd.unc.edu/documents/CarolinaExpressLicenseSellerGuide.pdf) Réduire

## **3. Solutions**

### **Objectives**

#### **Access and simplification**

- Make IP training more accessible to SMEs
- Facilitate SME access to necessary resources and tools to better define their strategy for innovation and IP management and their intangible assets
- Make it easier for SMEs to access all expertise available in research centers and universities
- Simplify proceedings in universities and adapt collaboration and IP management mechanisms to the constraints of SMEs

WORKSHOP 3: SUPPORT SMEs IN THE MANAGEMENT OF THEIR INTELLECTUAL PROPERTY

*Forum*  
Intellectual Property Management in Collaborations  
Between Businesses, Universities, and Research  
Centers: New Perspectives and Courses of Action

### Support and integration

- Contribute to skills acquisition in SMEs (e.g., through training, on-the-job internships and scholarships, and the hiring of specialized personnel)
- Strengthen support for SMEs from intermediation organizations: an approach that is more proactive, progressive, better networked, and more balanced (“push-pull”)
- Integrate SMEs more in the dynamics of collaboration between universities, research centers, and businesses

### Funding

- Simplified and rapid funding to access specialized services (e.g., innovation cheques)
- Financial conditions (cost of licenses) favorable to new businesses

### Success Factors

- Proper consideration of the realities of SMEs
- Establishment of long-term relationships
- Maximum use of what exists and is effective
- A network of frontline intermediaries who are well trained and use basic tools
- A research community that is more open and committed to ties with SMEs

### Questions

What can be done to best identify the priority IP management issues of SMEs?

What do they need most?

- Training?
- Tools?
- A portal?
- Coaching?
- Financial assistance?

What organizations are in the best position to help SMEs?

What characteristics should these organizations have to best meet the needs of SMEs?

What can be done to best assist startups

## Appendix 4 Training and Skills Acquisition in Innovation Management, Entrepreneurship, and Intellectual Property

Summary Table of Some Trainings Offered in Québec<sup>96</sup>

| Specialized University Education                                                                                                                                                                                                                                                                                                                                                                                                     | Vocational and Ongoing Education                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>École de technologie supérieure (ETS)</b><br>DESS in innovation management (graduate studies) – 30 cr.                                                                                                                                                                                                                                                                                                                            | <b>École d'entrepreneurship de Beauce</b><br>Private school specializing in training tomorrow's entrepreneurs. All programs, taught by experienced entrepreneurs, are designed to improve the performance of decision makers.                                                                                                                                                                                                                                                                                                        |
| <b>École de technologie supérieure (ETS)</b><br>Master's in engineering, concentration in innovation management (graduate studies) – with dissertation, without dissertation but with a project, or without dissertation but with a technical project.                                                                                                                                                                               | <b>ACCT Canada</b><br>ACCT offers its members a three-year program, the Professional Development Program for Technology Transfer Professionals, as well as an advanced training module. There are also a number of courses on IP, administration, and all technology-transfer related subjects.                                                                                                                                                                                                                                      |
| <b>École de technologie supérieure (ETS)</b><br>Innovation management short program (graduate studies) – 15 cr.                                                                                                                                                                                                                                                                                                                      | <b>HEC Montréal</b><br>One-day, periodic seminar entitled "Innovation Management and New Product Commercialization."                                                                                                                                                                                                                                                                                                                                                                                                                 |
| <b>École de technologie supérieure (ETS)</b><br>Business startup short program (12 credits of practical training related to startup of the proponent's new business and 6 credits of theoretical training based on graduate-level courses covering subjects related to business startup and management).                                                                                                                             | <b>Ministère du Développement économique, de l'Innovation et de l'Exportation (MDEIE)</b><br>Croissance Québec Techno (CQT). Entrepreneur training program in collaboration with BCF, Fondation de l'entrepreneurship, Québec International, and TechnoMontréal. Personalized support services, international contacts book, proven "recipes" in sales, marketing, operations, and leadership. Courses are given by "serial" entrepreneurs from the MIT Entrepreneurship Center. Selection of ten businesses per cohort (each year). |
| <b>École polytechnique de Montréal HEC (programme conjoint)</b><br>Microprogram in engineering and technology entrepreneurship (15 credits). Emphasis is on mastering Québec's entrepreneurial models and their respective advantages. Integration of a technology entrepreneurship initiative, piloting of the project in the Québec business network, use of funding sources, and advice and support for technology entrepreneurs. | <b>MDEIE</b><br>Réseau InnovaXion<br>MDEIE has developed a business network project for participating businesses to further examine innovation process concepts. Learning is done groups, through participation in specialized training and individual coaching in-company.                                                                                                                                                                                                                                                          |

<sup>96</sup> This table, which is detailed but not exhaustive, lists a number of the training options indexed on the Web or suggested by participants at the Intellectual Property Forum (February 2011, Boucherville). It lists only training offered in 2011. Some Canadian training offered at the national level may also be listed.

| Specialized University Education                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | Vocational and Ongoing Education                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p><b>École polytechnique de Montréal</b></p> <p>All bachelor's programs offer a thematic focus, "Technological Innovation" (12 credits), which includes the following compulsory courses:</p> <ul style="list-style-type: none"> <li>– ND4710 R&amp;D and Innovation Management</li> <li>– IND4711 Technological and Industrial Innovation</li> <li>– IND8120 Commercialization of New Products and Services</li> <li>– ND8137 Technology Entrepreneurship</li> </ul>                                        | <p><b>MDEIE – Direction du développement des entreprises</b></p> <p>"Accompagnement d'un projet d'innovation" (Innovation Project Support)</p> <p>This program is aimed at supporting economic development professionals in their support of innovators with a view to further promoting the emergence of projects involving the technological innovation of products.</p> <p>It is comprised of four modules:</p> <ul style="list-style-type: none"> <li>– IP Management</li> <li>– Technical Development and Prototyping</li> <li>– Understanding of the Markets</li> <li>– Business Strategies</li> </ul>                                                        |
| <p><b>École polytechnique de Montréal</b></p> <p>DESS in industrial engineering (graduate studies) – Technology management area of specialization, which includes the following optional courses:</p> <ul style="list-style-type: none"> <li>– ND6110 Technology Strategies</li> <li>– IND6116 Economic Aspects of Technology Strategies</li> <li>– IND8120 Commercialization of New Products and Services</li> <li>– IND6117 Innovation Management</li> <li>– IND8137 Technology Entrepreneurship</li> </ul> | <p><b>MDEIE – Direction du développement des entreprises</b></p> <p>"Les meilleures pratiques d'affaires" (Best Business Practices)</p> <p>The training program on best business practices was established in 2001 to speed up the dissemination of knowledge related to model business practices. It is aimed at business leaders and strategic workers.</p> <p>Training sessions are offered in a variety of fields (administration and management, financial management, marketing, etc.), including</p> <p>Innovation, R&amp;D and information technologies (strategic aspects of IP, ecodesign, innovation in industrial design, and product development).</p> |
| <p><b>Concordia University</b></p> <p>Minor in entrepreneurship (12 credits). Offered only to BComm and BAdmin students and aimed at students currently enrolled at the John Molson School of Business.</p>                                                                                                                                                                                                                                                                                                   | <p><b>Mireille Jean, Speaker</b></p> <p>Lecture series "Innover c'est bien... breveter c'est mieux! Comment faire de l'argent avec des brevets" (Innovating Is Good, Patenting Is Better! How to Make Money with Patents). This series is supported by a book on the subject published by Mireille Jean.</p>                                                                                                                                                                                                                                                                                                                                                        |
| <p><b>Université de Sherbrooke</b></p> <p>Graduate microprogram in entrepreneurship (9 credits). Development of knowledge in diverse fields of business startup and management based on the learning of concepts, principles, and entrepreneurial skills.</p>                                                                                                                                                                                                                                                 | <p><b>Canadian Intellectual Property Office – Intellectual Property Institute of Canada (CIPO-IPIC)</b></p> <p>CIPO and IPIC present IP briefings for SMEs in the private sector and educational institutions. Presentations from the Bank of IP Speakers may take the form of workshops or seminars designed to provide IP information to Canadian businesses, innovators, and entrepreneurs.</p> <p>In addition, three one-hour IP presentations are available upon request. Each presentation covers one or more IP-related rights, the strategic value of these rights, and the resources available to learn more about the subject.</p>                        |
| <p><b>Université de Sherbrooke</b></p> <p>Graduate microprogram on the foundations of technology transfer (15 credits) offered jointly by the faculties of administration, law, and engineering.</p>                                                                                                                                                                                                                                                                                                          | <p><b>Service d'Aide aux Jeunes Entreprises (SAJE)</b></p> <p>The mission of SAJE is to contribute to the business success of new entrepreneurs by offering them consultant services, coaching, and training. It also offers an international summer school for young entrepreneurs (ÉÉIJE). Twelve-week training session entitled "Lancement d'une entreprise" (Launching a Business).</p>                                                                                                                                                                                                                                                                         |

| Specialized University Education                                                                                                                                                                                                                                                                                                                                                                               | Vocational and Ongoing Education                                                                                                                                                                                                                                                                                                    |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Université de Sherbrooke</b><br>Graduate microprogram on skills development (15 credits) reserved for doctoral students.                                                                                                                                                                                                                                                                                    | <b>Université de Montréal (UdeM)</b><br>Innovation management: professional development (duration: 2 days or 14 hours). Tailored to individual businesses.                                                                                                                                                                          |
| <b>Université du Québec à Rimouski (UQAR)</b><br>Certificate in entrepreneurship (30 credits, undergraduate level). Helps students acquire basic management knowledge and develop the skills needed to work in various sectors in the field of administration and, in particular, small and medium organizations.                                                                                              | <b>Université du Québec à Trois-Rivières (UQTR) – Centre universitaire PME</b><br>Training program entitled “Gestion de l’innovation pour chefs d’entreprises” (Innovation Management for Business Leaders) – A number of full- and half-day workshops.                                                                             |
| <b>Université du Québec à Trois-Rivières (UQTR)</b><br>Graduate short program in innovation management in SMEs (15 credits recognized in the MBA program).                                                                                                                                                                                                                                                     | <b>Université Laval</b><br>Development workshop entitled “La propriété intellectuelle, un capital, un actif” (Intellectual Property, a Capital and an Asset) offered by Entrepreneuriat Laval - 3 hours.                                                                                                                            |
| <b>Université Laval</b><br>Entrepreneurship Research Chair<br>Offers <b>14 undergraduate courses</b> and <b>6 graduate courses</b> (SME Strategic Management, Entrepreneurship Processes, New Business Creation and Management, Theoretical Foundations of Entrepreneurship, Small Business Strategic Management and Entrepreneurship, Engineering Entrepreneurship, Self-Employment, Microbusiness, and more) | <b>Université McGill</b><br>“Intellectual Property (Patents, Trade-Marks, and Copyright)” Summer training offered since 1994. Includes introductory and advanced courses. Training recognized by Barreau du Québec.                                                                                                                 |
| <b>Université Laval</b><br>Advanced graduate diploma in business administration—technology entrepreneurship (30 credits). This program aims to give participants the skills needed to create, manage, or advise a technology-oriented business.                                                                                                                                                                | <b>ValoRIST</b><br>ValoRIST is an initiative of Université du Québec established in 2005 and funded by the Intellectual Property Mobilization Program of the three federal grant funds. ValoRIST is a development program that offers its members three activity types: professional development, tool development, and networking. |
| <b>Université Laval</b><br>Graduate program in business administration—entrepreneurship and SME management (12 credits). Continuing education program aimed at future entrepreneurs, business leaders, collaborators, and advisors working with SMEs.                                                                                                                                                          | <b>Zins Beauchesne and Associates</b><br>Online training program in innovation management: 40 ninety-minute training sessions. For businesses and professionals.                                                                                                                                                                    |
| <b>McGill University</b><br>Certificate in Entrepreneurship (30 credits). Offered at the undergraduate level; DCS required.                                                                                                                                                                                                                                                                                    |                                                                                                                                                                                                                                                                                                                                     |

## Appendix 5 Intellectual Property Management

### Members of the Working Committee

#### Co-chairs

André Bazergui, Ph.D., Eng., special advisor to the CEO, CRIAQ  
Consortium de recherche et d'innovation en aérospatiale au Québec (CRIAQ)

Sylvie Dillard, president until March 1, 2011  
Conseil de la science et de la technologie

#### Members

Michèle Beaulieu, Ph.D., MBA, life science technologies agent  
Office of the Vice Rector (Research and International Relations)  
McGill University

Jean Belzile, director  
Department of Research and Industry Relations  
École de technologie supérieure

Patrick Champagne, vice president, cockpits and systems integration  
CMC Electronics Inc.

Florent Chandelier, vice president and chief technology officer  
Cadens Imaging/Dog Micro-systèmes

Diane Côté, vice president  
Canada's Medical Technology Companies (MEDEC)

Jean-Nicolas Delage, attorney  
Fasken Martineau DuMoulin, LLP  
Patent and trademark agent

Charles Despins, president and CEO  
Prompt Inc.

Dominique Drouin, microelectronics researcher  
Université de Sherbrooke

Charles Gagnon, Eng., director  
Direction of technology commercialization  
IREQ, Technology Group, HYDRO-QUÉBEC

Daniel Lamarre, Ph.D., professor, Department of Medicine  
Principal researcher, Immunovirology Laboratory  
Chair, Université de Montréal/Novartis/Canadian Liver Foundation  
Director, IRIC's High-Throughput Screening core facility  
CEO and general manager, IRICoR  
Institute for Research in Immunology and Cancer (IRIC)

Marc Leroux, advisor

Christian Moreau, Ph.D., principal research officer  
IMI – Industrial Materials Institute - NRC

Jean Nicolas, emeritus professor at Université de Sherbrooke and visiting professor  
at École Polytechnique de Montréal

Gilles Savard, director of research  
École Polytechnique de Montréal

Gregory W. Schinn, Ph.D., director of R&D  
Director of intellectual property  
EXFO Electro-Optical Engineering Inc.

## Appendix 5

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### Observers

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Émilie Dionne, policy advisor  
Ministère du Développement économique, de l'Innovation et de l'Exportation (MDEIE)

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Michel Dumoulin, vice president of scientific affairs and partnerships  
Fonds québécois de la recherche sur la nature et les technologies (FQRNT)

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Stéphanie Michaud, senior manager, strategic planning for RPPs  
National Sciences and Engineering Research Council of Canada (NSERC)

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### Conseil de la science et de la technologie

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Geneviève Drolet, foresight and priority-setting advisor for research and innovation  
Conseil de la science et de la technologie, until March 21, 2011

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Pierre Gagnon, research officer  
Ministère du Développement économique, de l'Innovation et de l'Exportation

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Iryna Golovan, international science and technology analyst  
Conseil de la science et de la technologie

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Daniel Lebeau, research officer  
Conseil de la science et de la technologie

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Brigitte Van Coillie-Tremblay, executive director  
Conseil de la science et de la technologie

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## Appendix 6 **Members of Conseil de la science et de la technologie** (List as of March 31, 2011)

### Acting chair (as of March 1, 2011)

Geneviève Tanguay, assistant deputy minister  
Direction générale de la recherche, de l'innovation, de la science et société  
Ministère du Développement économique, de l'Innovation et de l'Exportation

### Members

Denis Beaumont, general manager  
TransBIOTech - CEGEP Lévis-Lauzon

Mary-Ann Bell, senior vice president, Québec and Ontario  
Bell Aliant Regional Communications

Daniel Coderre, executive director  
Institut national de la recherche scientifique (INRS)

Édith Deleury, associate professor, research ethics committee  
Université Laval

Isabelle Deschamps, full professor  
Department of Automated Production Engineering  
Director of innovation management programs  
École de technologie supérieure

Jean-Claude Forest, full professor  
Université Laval Faculty of Medicine  
Research director  
Centre hospitalier universitaire de Québec

Michel Jébrak, professor  
Department of Earth and Atmospheric Sciences  
Université du Québec à Montréal

Pierre Lacroix, president  
Gestion PILAC Inc.

Alain Lavoie, chair of the board  
InnoVactiv Inc.

Perry Niro, president  
Conseil des Entreprises de Services Environnementaux (CESE)

Jean-Maurice Plourde, president and CEO  
Centre québécois de la valorisation des biotechnologies  
Fonds Bio-Innovation

Jacques Simoneau, corporate director

### Observers

Carmen Charette, executive vice president  
Social Sciences and Humanities Research Council of Canada

Francine Laurent, consulting partner  
Secor Group

### Conseil de la science et de la technologie

Brigitte Van Coillie-Tremblay, executive director

