

Expert Panel Review of Federal Support to Research and Development

Introduction

As a system, AACTI member institutions offer a Pan-Alberta reach, have earned social capital with all the emerging and mature industries in Alberta, and enable inter-regional connectivity that bridges urban and rural environments. The applied research and innovation file presents a new dimension to the established publicly funded research community that is centered on near market pull and push opportunities. This dimension emphasizes a focus on near to medium term solutions for industry and the efficient application of knowledge and evidence based practices into workplace settings. The impacts are seen in prototypes, successful pilots, experimental design projects, and technology integration pursuits, etc. With a collective capacity of 5,800 faculty, 142,000 students, and 168 campuses, AACTI member institutions present a portal that is objective and in touch with industry norms of practice. In addition, this competitive advantage enables faculty to openly identify and offer approaches to help industry overcome the barriers impeding innovation. The practices of the AACTI membership in relation to the flow of IP and other forms of commercial outputs is business friendly and a key differentiator in the academic milieu.

Q1 In addition to the R&D activity defined by the OECD, should government be funding other business activities related to the commercialization of R&D? If so, what and why?

The activities of AACTI Member Institutions with regard to this question largely fall into the applied research and experimental development categories of the OECD definition. However, another activity of AACTI member institutions that supports the commercialization of R&D is:

Entrepreneurship Development – this includes business incubation, prototype development and testing, production scale-up, and early stage market evaluations. Examples that describe the nature of this capacity include:

1. Entrepreneur in Residence Activities (e.g. NAIT and Mount Royal University)
2. Prototype Development Centres – (e.g. NAIT, SAIT Polytechnic, and Red Deer College)
3. Start-up Business Incubators to encourage integrated applied research support for companies (e.g. Olds College, NAIT)
4. Innovation Store Fronts aligned with Regional Economic Development Organizations – pathfind commercialization resources (e.g. Grande Prairie Regional College – Centre For Research & Innovation, Red Deer College - Central Alberta Regional Innovation Network and Central Alberta Rural Manufacturers Association, Lakeland College – Mentor SMEs to advance / develop renewable energy opportunities)

The challenge for SME clients working with AACTI member institutions is that they require access to consistent, multi-year programming to advance their commercialization and productivity pursuits into sustainable businesses.

Q2 Does Figure 2, the model of business innovation presented above, capture the key structural factors and inputs to innovation? If not, what is missing?

Our AACTI member institutions are positioned to provide three of the four areas of support outlined in Figure 2. The three areas are:

- Ideas and Knowledge;
- Talented, Educated, Entrepreneurial People;
- Networks, Collaborations and Linkages.

Our system has been strengthened through support from Federal programs and complimentary Provincial program. There is an opportunity to significantly strengthen the impacts on SME's through increasing the availability of funding to support successful collaborations between industry and AACTI member institutions.

Q4 Regarding ideas and knowledge, do you believe it is important for Canadian firms to perform their own R&D and, if so, what do you believe are the key factors that have been limiting business R&D activity in Canada?

Yes, it is important for Canadian Firms to do their own R&D. However, SMEs generally do not have the internal capacity to conduct their own R&D with the necessary rigor. This often results in a trial and error approach that inefficiently uses resources and has limited success. AACTI member institutions have experience working with SMEs and their advisors and are able to access faculty across AACTI member institutions to address their needs in a comprehensive manner. The AACTI member institutions general engage an interdisciplinary approach in designing their applied research priorities to ensure they fit with SME's by recruiting faculty from various schools and disciplines as appropriate. With a consistent funding model AACTI member institutions will be able to move from providing adhoc solutions to being consistent service providers that support Canadian firms R&D programs. The applied research and innovation (AR&I) enterprises and programs that have emerged within AACTI member institutions offer important innovation access points for SMEs. Our institutions need multi-year operational funding that both aligns faculty expertise with these dedicated industry-focused resources in our institutions to support industry innovation pursuits.

Q5 Regarding networks, collaborations and linkages, what are the main impediments to successful business-university or business-college partnerships? Does the postsecondary education system have the right capacity, approaches, and policies for effective partnerships with business?

AACTI member institutions have earned social capital in the communities in which they belong. Historically these relational ties with industry are largely linked to graduating HQSPs and the desire of industry to support career development programs. These relational ties are now presenting opportunities to engage in dialogues on applied research service offerings tailored to help companies solve their technical challenges and build new products and services. Collaborative ventures and industry networking events are routinely championed by AACTI member institutions. This is typically done in the context of improving the AACTI members offering. The shift to serving a client's needs, on their terms, and within their timelines requires a flexibility that means changes to policies, the development of administrative structures, and new approaches to client focused AR&I in our institutions. This has resulted in significant investments by our member institutions, particularly in piloting multifaceted workload assignments. With the exception of the undergraduate universities within AACTI, faculty involvement is being achieved

through short term investments and one time project funding. There needs to be a systemic change in our institutions and how innovation services are made sustainable for this to occur. This can largely be enabled both through refining funding rules on existing federal programming and through new funding from government departments charged with the stewardship of innovation. NSERC's CCI program has been a strong move in this direction. Furthermore, there is need to create a sustainable new dimension in the research community that directs more resources further down the commercialization conduit.

Q7 Regarding talent, is Canada producing sufficient numbers of graduates with the right skills to drive business innovation and productivity growth? If not, what changes are needed? Where demand for advanced skills is low, what are the reasons and what changes, if any, are needed?

Increasingly industry is seeking graduates with career foundation skills coupled with critical thinking abilities. Investments that encourage more capstone project offerings, and other inquiry based courses, in AACTI member institutions are important. These real world extensions of classroom theories in both technical and undergraduate courses can include: testing new products, early stage market evaluations, and evaluating and demonstrating technology and new practice integrations in industry settings. AACTI member institutions are familiar with the norms of practice and positioned to offer objective perspectives that can support this sort of innovation. A number of institutions are experimenting with funding pools to support student innovation experiences in their programs of study. Federal programs to further support student-based applied research would be a sound investment. SME and community innovation demands for faculty mentored student innovation projects are far outstripping our ability to engage students in these activities within their current programming.

Q9 With which federal programs supporting business or commercially oriented R&D in Canada do you have direct experience and knowledge? In your view:
a. Which of these programs are working, and why?
b. Which programs are not working, and why not?

Canadian Foundation for Innovation (CFI) – In the late 90's CFI supported investments at Olds College (Olds College School of Innovation), and Lethbridge College (Aquaculture Centre for Excellence). This capital funding was important as it helped move these centers of industry focused AR&I interests forward and supported a business case for dedicated human resources. The biggest challenge of the CFI program was the requirement to secure a leveraged investment from provincial funds and/or industry collaborators. Establishing synergies with provincial priorities and a commitment by the provincial government to match approved CFI projects would achieve more success with regard to support for industry.

Western Economic Diversification (WED) - This federal funding was instrumental in the expansion of the AR&I portfolio of some AACTI member institutions. Starting with the pilot investments made in 2003-2004, WED then moved to strategic applied research and innovation program investments that supported capital infrastructure (e.g. Nor Quest College - Centre for Excellence in Print Media and Red Deer College - Centre for Innovation and Advanced Manufacturing). WED's focus on supporting SME expansion has been a good fit with the AR&I working space and near market focus of AACTI member institutions.

NSERC –CCI – This capacity building investment has been very effective in our member institutions. The original \$2.3M investment per project, contributed over a multi-year period

provided sufficient time to align human capital, build administrative processes, and facilitate meaningful industry relationships. Recent program enhancements that both support different levels of engagement and offer a scalable approach in the development of AR&I capacity is an insightful addition.

NRC-IRAP – Current programming has been very beneficial for AACTI members and complementary to the existing programming within our system. Most of the SMEs supported through AACTI member institutions are also supported by IRAP and both organizations leverage each other in their support. However, IRAP’s ability to support these collaborations is often impacted by the fact that funding is set annually and the available funds are fully committed early in IRAP’s fiscal year.

New Program Considerations

Applied Research and Innovation Leaders – AACTI member institutions have identified and strategically invested into their applied research areas of strength. Faculty are being released, students are being engaged and applied research collaborative work with companies is occurring. Some of our institutions have developed Applied Research Chair or Leader positions to anchor those programs. These dedicated individuals are industry focused and lead the research programming within their respective institutions. They also lead in building high value, strategic relationships with companies, as well as ensuring the applied research programming is delivering short to medium term impacts through the translation of knowledge into solutions for real world problems and the development of products and services. These Chairs exist due to the substantial investment by industry and the dollars should be matched at the federal level 1:1.

Innovation/Entrepreneurship Internships - harnessing and mentoring recent graduates from various technical and undergraduate career development programs would accelerate our global competitiveness and next generation economy.

Faculty Problem Solving Network – With the exception of the undergraduate universities, AACTI’s college and technical institute members’ faculty have full time instructional workloads. There needs to be a funding stimulus that strategically and meaningfully builds cultural capital focused on helping industry with their AR&I needs. This stimulus needs to build redundancy in career program offerings that enables SMEs, and community-based innovation advisors, access to faculty competencies. Creating more and stronger linkages with NRC-IRAP’s ITAs would be beneficial.

International Industry Expert Residences on Campus – Tap into AACTI members relational ties with industry and exploit their community-based visibility to entice international secondments from industry based in our institutions that would facilitate productivity enhancements in targeted sectors and mentor next generation economy opportunities.

Q10 If you have direct experience and knowledge of the SR&ED tax credit, what are your views in relation to the following:

Does the current structure of the SR&ED tax credit encourage incremental investment in R&D?

The SRED program is an excellent program and highly aligned to support current R&D funding into the AACTI system. Significant rigor occurs with existing funding programs for colleges and technical institutes and most of the programs require SME engagement. As such, if an SME is working with an AACTI member institution in relation to a funded applied research program (such

as NSERC CCI-IE or NSERC CCI-ARD), eligibility should be explicit and guaranteed for the company. This already occurs with the NSERC-CRD program and should be extended to all College and Technical Institute Tri-Council funded programming.

Q12 How could the Government of Canada be more innovative and responsive to meet new needs or opportunities, and try alternative service delivery-approaches in its programs?

AACTI member institutions offer a Pan-Alberta reach and visible store fronts for applied research and innovation. Working as a meaningful contributor within the Alberta Innovates landscape, these community-based entities offer a visible portal for federal government research and development funding that is tailored to entice near market pull and push innovation transactions. Also, faculty and staff within the AACTI member institutions routinely attend international conferences, workshops, and events for professional development. There is an untapped opportunity to recruit these faculty and staff to repackage their PD experience and engage in industry opportunity prospecting, scout new technologies, and compile market intelligence in cooperation with industry associations or a designated cluster of companies involved in a value chain. The reach of AACTI member institutions and their community-based linkages offer a data collection infrastructure to support initiatives like this review of federal support to research and development.

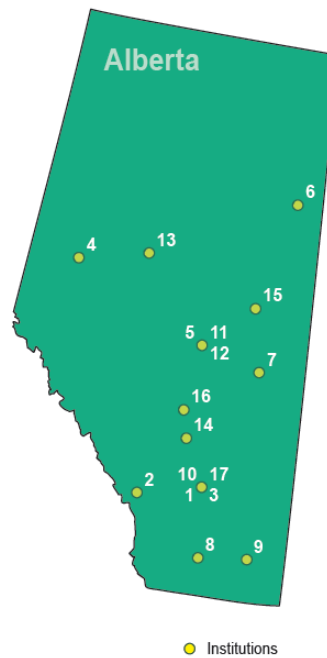
Q14 What lessons and best practices can be taken from provincial business and commercially oriented R&D programs, and how should the two orders of government align their programming?

Alberta's innovation ecosystem is changing and offering new opportunities to impact the service offering of AACTI member institutions to industry. New federal investments should be broad in scope and enable the flexibility for customization at the provincial level. This will ensure synergy between federal and provincial priorities, minimize duplication of efforts, and extend the reach of limited funding resources.

Appendix A – Profile of AACTI Member Institutions

17 Institutions
168 Campuses or Learning Centres
106 Communities

1. Alberta College of Art + Design
2. The Banff Centre
3. Bow Valley College
4. Grande Prairie Regional College
5. Grant MacEwan University
6. Keyano College
7. Lakeland College
8. Lethbridge College
9. Medicine Hat College
10. Mount Royal University
11. NAIT
12. NorQuest College
13. Northern Lakes College
14. Olds College
15. Portage College
16. Red Deer College
17. SAIT Polytechnic



Alberta Education Sectors Represented by AACTI Members

- Comprehensive Community Colleges (11 institutions)
- Polytechnical Institutions (2 institutions)
- Undergraduate Universities (2 institutions)
- Specialized Arts & Culture (2 institutions)

Other Relevant Statistics

- > 142,000 students
- > 250,000 extension student registrations (life—long learning/ employee development)
- > 5,800 faculty, diverse credentials: PhD or Masters, journeymen, technologists, Professionals
- Tri-council Certification (gold standard for administrative processes to manage external innovation funding). As of June 30, 2010, nine institutions hold NSERC Certification and five hold SSHRC Certification.

Examples of Applied Research and Innovation Campus-based Enterprises / Program Capacities

These examples highlight applied research and innovation competency centres/clusters with dedicated resources, including facilities, staff, and equipment. The enterprises and programs are focused on serving industry and community innovation pursuits.

AACTI Member Institution	Program and Enterprise Examples
Alberta College of Art + Design	<ul style="list-style-type: none"> • Creative Environment for Emerging Electronic Culture (CE³C)
Bow Valley College	<ul style="list-style-type: none"> • TOWES “Test of Workplace Essential Skills” Enterprise
Grande Prairie Regional College	<ul style="list-style-type: none"> • Centre for Research & Innovation (CRI) • Biotechnologies Program to Turn Pollutants to Products
Grant MacEwan University	<ul style="list-style-type: none"> • International Nursing Preparatory Interventions • Community Development Impact Studies
Keyano College	<ul style="list-style-type: none"> • Wildlife Management
Lakeland College	<ul style="list-style-type: none"> • Renewable Energy Technologies
Lethbridge College	<ul style="list-style-type: none"> • Aquaculture Centre of Excellence (ACE) • Living Home Project • Open Source Learning Lab • Citizen Society Research Lab • Safe Driving Research – Driving Psychology
Medicine Hat College	<ul style="list-style-type: none"> • Entrepreneur Development Centre • Water Resources Management – collaboration with Southeast Alberta Watershed Alliance (SEAWA) • Health and Community Development Project Initiatives
Mount Royal University	<ul style="list-style-type: none"> • Centre for Applied Research for Health & Wellness • Centre for IT & New Media, GPS/GIS, and Human Behaviour • Forensic Research Network • Criminal Justice Research Lab • Centre for Child Well-Being • Integrative Health Institute • Institute for Nonprofit Studies

Examples of Applied Research and Innovation Campus-based Enterprises / Program Capacities (continued)

AACTI Member Institution	Program and Enterprise Examples
NAIT	Under the umbrella of <i>nova</i> NAIT – <ul style="list-style-type: none"> • Boreal Forest Research Centre • Prototype Development Program • School of Electrical and Electronic Technology & Shell Manufacturing Centre – Mobile Robotics • Duncan McNeill Business Incubator • Other emerging areas – Green Chemistry & Engineering, Digital Simulation, Health Applied Research
NorQuest College	<ul style="list-style-type: none"> • Centre of Excellence in Print Media • Centre for Excellence in Intercultural Education
Northern Lakes College	<ul style="list-style-type: none"> • Forest Industry Operational Productivity – Collaboration with WOLF (Woodland Operators Learning Foundation)
Olds College	<ul style="list-style-type: none"> • Olds College School of Innovation (OCSI) • Prairie Turfgrass Research Centre • Bell e-Learning Centre • School competencies integrated with OSCI, include: Animal Science, Horticulture, and Business.
Portage College	<ul style="list-style-type: none"> • Aboriginal Community Development – Motivation for Multi-Barriered Adults
Red Deer College	<ul style="list-style-type: none"> • Centre for Innovation and Advanced Manufacturing (CIAM) • Rural Health and Community Development Program • Human-Wildlife Interaction Group
SAIT Polytechnic	Directed through Applied Research & Innovation Services (ARIS) Office <ul style="list-style-type: none"> • Green Building Technologies (GBT) – Net Zero Homes • Fabrication and Prototyping Lab • RFID Applications Development Lab (RAD Lab) • Water Lab - Pre Treatment of Water and Industrial Waste Water • Schools: a) Health & Public Safety and b) Hospitality and Tourism
The Banff Centre	<ul style="list-style-type: none"> • Aboriginal Leadership and Management Program • Banff New Media Institute (BNMI) - Advanced Research Technologies Labs