SUBMISSION TO THE R&D REVIEW PANEL

Executive Summary:

The federal government's review of business-oriented R&D funding support comes at a critical point in Canada's economic recovery from the latest recession. In the years ahead, it is important for the government to streamline funding mechanisms and explore synergies among government R&D investments. The time is ripe to invest in infrastructure required for the knowledge economy. A national digital infrastructure for research and innovation that "levels the playing field" for Canadian businesses would allow a greater focus on development and commercialization of innovative products and services and helps build a robust Canadian digital economy.

Recommendations:

- Provide sustained support for a national digital infrastructure which includes an advanced high-speed network coupled with computing and digital storage capabilities as well as the necessary software tools and expertise
- Invest in a national digital "test platform" to enable
    - Small and Medium Enterprises (SMEs) to develop, test and demonstrate innovative products and services
    - ICT Researchers to collaborate with the private sector and support innovation
    - MNEs to secure global R&D mandates for Canada
- Play a more proactive role as the "first customer" for relevant ICT technologies from the Canadian private sector, in particular Small and Medium Enterprises (SMEs)

Background

The Government of Canada has launched a review of the funding mechanisms that support business R&D. The federal government spends close to $7B, including $4B as part of SR&ED tax credits. Despite having one of the largest R&D tax credits, Canadian businesses have continued to lag behind their OECD counterparts in terms of R&D investments. Canadian businesses' expenditures on R&D (BERD) stand at 1% as compared to 2.01% in the US and 1.63% of OECD countries at large.

Following the foundational work by Council of Canadian Academies (CCA) and Science, Technology and Innovation Council (STIC) in determining the reasons for Canada's laggard position in innovation, the R&D review panel will prepare specific recommendations to the government after conducting public consultations.

CANARIE, as part of the innovation ecosystem, is pleased to provide its views on better alignment of government R&D funding programs and the required investments in digital infrastructure that will promote R&D success among Canadian businesses.

Questions and Answers

1. 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 defined in the Frascati Manual on R&D are broad and comprehensive but they don't delve into the implementation of each of those activities. An element missing from the discussion in this paper is the nature of research conducted in the knowledge economy. In the 21st century, research requires significant amounts of data and information to be transferred among various national and international stakeholders. While government has invested significantly in research-performing entities, there continues to be a constraint in terms of funding digital infrastructure that is foundational to 21st century data intensive, multidisciplinary research and innovation.

   One key area of government R&D investment should be in fundamental digital infrastructure. Investment in digital infrastructure is analogous to investment in physical infrastructure (e.g. roads, bridges, airports, ports, etc), in that they both enable businesses to find and serve new markets and customers, creating an innovation loop that has sustainable, positive economic benefits. Investments in digital infrastructure permit Canadian companies to realize a higher "yield" for their investments in R&D, as those investments are narrowly focussed on customer needs and product and service innovation, rather than on capital and operating costs for digital infrastructure.

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

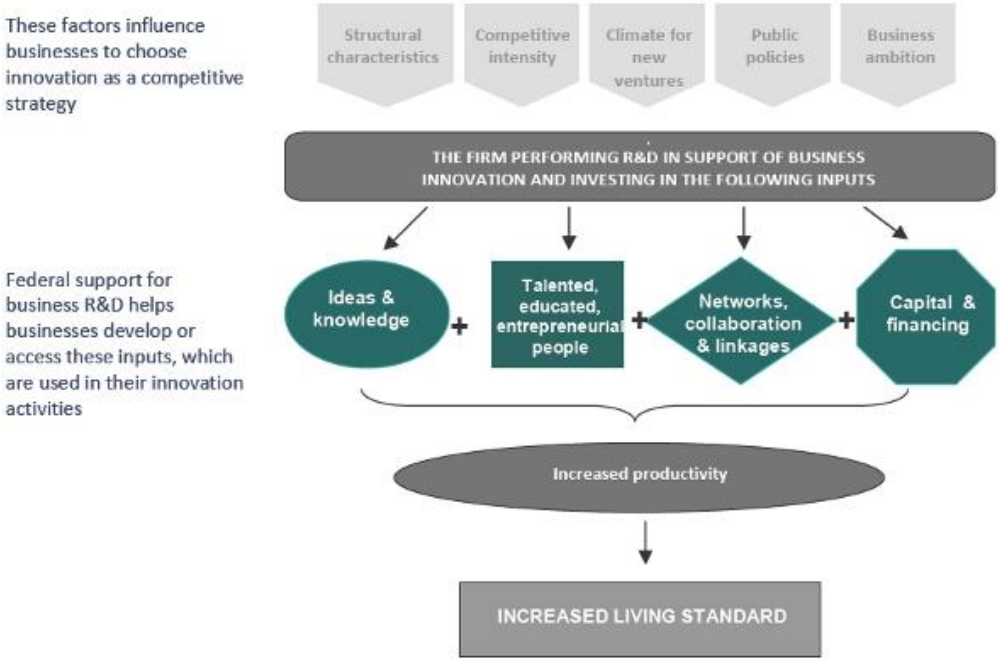

   Figure 2, presented above, depicts the basic components of business innovation quite accurately. However, it is important to recognize the infrastructure that underpins the inputs depicted in Figure 2. For example, a lack of digital infrastructure to support the transfer of "ideas and knowledge" to "entrepreneurial people" will result in delays or

inefficiencies in the commercialization of these new ideas and knowledge. All the leading innovation-oriented jurisdictions (i.e.US, EU) have recognized the importance of investing in digital research infrastructure and have started to make targeted investments in this area. For example, the EU has allocated over €309M for FY 2011[1] as part of the ICT theme under the Framework Program 7 (FP7).

3. 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?

   This questions delves into the "technology push or pull" conundrum that is one of the leading topics in the Canadian innovation debate. Technology pull from the market has been recognized as a better model of innovation and it can best be addressed by Canadian firms as they understand their markets better than government labs or universities. Therefore, it is imperative that Canadian firms conduct their own R&D.

   However, it is also a well known fact that Canadian businesses have been reluctant to invest in R&D. Canadian Business expenditures on R&D (BERD) are well below the OECD average. In our opinion, one of the impediments is the high cost of setting up and maintaining company-specific R&D infrastructures. Government should invest in permanent digital "test platforms" that provide Canadian firms with a testing and development environment that supports product and service innovation and eliminates R & D infrastructure costs for individual companies. CANARIE has recently launched the Digital Accelerator for Innovation and Research (DAIR) Program, which is a national digital R & D "testbed" for Canadian companies to develop and validate their products before commercial roll-out. This national "test platform" will also enable Canadian researchers to collaborate with the private sector and link their R&D efforts to innovation. Researchers and companies will be able to collaboratively develop new products and services, including Future Internet technologies.

   Another limiting factor on R&D for Canadian businesses is the lack of knowledge about global markets trends. As noted earlier, most Canadian companies are SMEs with few employees and cannot stay updated with global market trends. In the current global knowledge economy, market needs are addressed by global supply chains with large corporations acting as "anchors". Therefore, it is critically important for Canada to attract large multinationals enterprises (MNEs) that can facilitate Canadian SMEs entry into global markets through global supply chains. One of the ways to attract large MNEs to Canada is to offer leading-edge research infrastructure which will enable them to conduct research and develop new products and services in Canada. In our opinion, CANARIE's DAIR initiative could be such an attraction for large MNEs to set up an R&D presence in Canada.

4. Regarding the creation of demand for business innovation, what role, if any, do you believe that government should play in being a "first customer" for R&D investments in Canada?

   Government has an important role to play in creating demand for business innovation, given that close to 99% of businesses are Small and Medium Enterprises (SMEs). For most SMEs, finding the "first customer" presents a huge challenge as they lack credibility as well

[1] http://cordis.europa.eu/fp7/ict/e-infrastructure/docs/wp2011.pdf

as references to demonstrate the viability of their products/services. One of the most important roles that the government can play is to invite companies to develop innovative solutions to fulfill government's future needs – similar to the Small Business Innovation Research (SBIR) program[2] in the US. But before such a program can be effectively leveraged, the government should invest in a permanent digital "test platforms" where technologies can be developed, tested and validated to meet market and functional requirements. Such testing platforms would enable governments to test and potentially mitigate risks associated with new technology adoption.

5. Is there a difference between R&D and innovation? If yes, how are they different? Should government focus on R&D or innovation? What should the balance be?

   The topic has been debated in Canadian innovation policy circles for years but the common consensus has been to focus more on R&D than innovation. Innovation usually is defined as applying a new "idea" that brings efficiencies to an existing process. In our opinion, government should continue to support R&D but must identify key areas where it would take additional steps, as identified in the previous question, to support innovation. However, it is also important to note that R&D is a major driver of innovation and thus the balance of R&D and innovation investments cannot be a rigid mathematical formula. But government should ensure that all R&D investments have a "built-in" innovation component – where a vision is laid out as to how the results of the R&D activity will be introduced into the marketplace.

[2] http://www.sbir.gov/about/index.htm