

Accelerating Canadian Productivity Growth: Stimulating Innovation through 4th Pillar Organizations

Brief to

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Standing Committee on Finance

Prepared by

CANARIE Incorporated
CMC (Canadian Microelectronics Corporation)
and
Precarn Incorporated

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Focus of Brief

To accelerate Canadian productivity, competitiveness, and economic growth, it is essential to achieve maximum leverage from all pillars of Canada's system of innovation. This brief identifies the essential role of *4th Pillar organizations*¹ to fully stimulate innovation in Canada.

The Challenge:

The Government is to be commended for improving Canada's capacity to innovate, particularly in the universities – but there is much more to be done.

Canada's innovation performance lags that of other countries. Innovation indicators published by the Conference Board of Canada (November 2001) indicate:

- Canada is “poor in creating innovation”, and other OECD² countries outperform us (our GERD to GDP (%) ranks 14th among OECD countries)³
- R&D financing by the Canadian private sector remains considerably below the OECD average (in term of business Investment, Canada ranks 15th)⁴
- Canada may have a structural shortfall of up to one million workers by the year 2020

To address this performance gap, Canada needs to leverage all available mechanisms to develop highly skilled people, translate research to commercial advantage, and enable companies to produce high value-added goods and services. Only through such measures will the economy support steadily increasing growth, exports and the incomes of individuals.

Recommendation:

It is our recommendation that government:

- Strategically utilize and leverage *4th Pillar organizations* to increase return on research investments, building upon previous and current R&D investment and results
- Establish long term commitment to *4th Pillar organizations* to sustain their effectiveness at the national and international levels
- Maintain effective performance reviews that demand high degrees of accountability

These recommendations follow from the outcomes of the National Summit on Innovation and Learning held in November 2002. The Priority Recommendation Number 1 from the Summit was:

¹ *4th Pillar organizations* provide a facilitating and catalytic role among the three traditional pillars in our economy: industry and business, universities and colleges, and government. They are typically structured as independent, not-for-profit entities, although often funded jointly by government and the private sector.

² Organization for Economic Co-operation and Development

³ OECD, Main Science and Technology Indicators, 2001

⁴ OECD, Main Science and Technology Indicators, 2001

“Enable the relationship between the receptor community and universities, colleges and researchers. Strengthen receptor capacity.”

To implement this recommendation, the Summit discussion group on Improving Research, Development and Commercialization proposed strategies including: strengthen research and business collaboration; establish clusters and managed networks for sustained interactions among stakeholders; and utilize *4th Pillar organizations* to facilitate partnerships between key stakeholders.

4th Pillar Organizations:

Definition:

4th Pillar organizations provide a facilitating and catalytic role among the three traditional pillars in our economy: industry and business, universities and colleges, and government. They are typically structured as independent, not-for-profit entities, and leverage private and public investment to implement shared-cost R&D programs; build shared R&D infrastructure; and supply technical products and services. To do this, they:

- Create networks of industry and university leaders
- Build partnerships and collaborations to undertake R&D
- Create a national, cross-sectoral vision for R&D excellence
- Develop, attract and retain highly qualified people

In short, *4th Pillar organizations* enable innovation and amplify its impact. They bring together communities of common interest to focus on important opportunities to stimulate innovation.

Proven Benefits:

4th Pillar organizations are catalysts for strategic government investment in enabling platform technologies, the fruits of which will contribute to the development of innovation and wealth across all industrial sectors. Specifically, they:

- Accelerate product development and time to market for Canadian companies
- Produce higher quality products and services
- Increase production of high-value, high-knowledge components of many export commodities
- Create jobs
- Develop new expertise
- Build multi-disciplinary teams to drive breakthrough research and discovery

The Value Proposition:

4th Pillar organizations offer a distinct value proposition for the three pillars. Most importantly, these organizations reduce the risks and costs of R&D investments to more effectively realize Canada’s innovation potential.

Industry: Industrial R&D is often focused on short-term goals, with little funding for “higher risk” research that leads to next-generation product development. *4th Pillar organizations* offer industry:

- Facilitated and simplified access to technology, ideas, highly qualified people, partners, project funding and commercialization services
- Trusted brokerage of collaborations
- Compression of the technology learning curve of companies

Universities: University research can often lead to innovative technologies that have the potential to become successful products, but all too often they are not successfully commercialized. *4th Pillar organizations* offer universities:

- Facilitated access to research partners, research funding, commercialization opportunities and competitive intelligence to help facilitate commercial outcomes
 - Investors, on one side of the valley, are ready to finance credible teams intending to realize product potential
 - Technology, on the other side of the valley, is not yet in a product-ready state and without the financing and management team
 - 4th pillar organizations help to establish the combination required to move the concept from unacceptable to acceptable risk

Governments: Canadian taxpayers are seeking greater return on their tax dollars. *4th Pillar organizations* offer governments:

- Proven framework for organizational and program innovations
- Prudent management and leverage of public funds
- Opportunities for consolidated and simplified management of funding allocations
- Credible source for competitive intelligence and consensus-based advice

4th Pillar organizations connect these three pillars, and eliminate barriers to innovation by bridging governmental, sectoral, and geographical divides.

4th Pillar Case Study - Three Examples:

CMC, Precarn and CANARIE are representative of Canada’s national *4th Pillar organizations*. They have proven track records for generating return on R&D investment.

CMC:

The Government of Canada, industrial and provincial government partners, together provide through CMC, focused investments to support university-based research. This provides Canadian universities with enhanced ability to develop highly skilled people with microsystems expertise. This knowledge base serves as the foundation for companies in key industrial sectors such as health care, information and communications technologies, aerospace, automotive, environment, energy and resources. CMC exemplifies the efficient use of government and industry funding. For 1990-2000, DoyleTech Corporation (2001) estimates:

- The value of federal and provincial taxes generated through CMC's influence on industry revenues is estimated at \$3.6 billion;
- Government investment totalled \$45 million; the payback to government for every dollar invested is \$80;
- The number of post-graduates with CMC support employed by Canadian industry is 6,000 person-years; from 1995–2000, CMC also enabled or influenced 54 start-up companies.

Precarn:

Utilizing funding from Industry Canada and other federal sources, Precarn makes possible collaborative efforts that bring together expertise and resources from across Canada to tackle promising, but high-risk, technology opportunities. From 1997 to 2003, by investing about \$25 million in public funds into company-led collaborative projects, Precarn levered \$43 million in industrial R&D investment. Currently, Precarn has an active portfolio of 60 projects under administration, each of which combines the expertise of private companies, government laboratories and university researchers. In one recent project example, Precarn:

- Worked with experts from government, industry and universities to help map out technology opportunities and challenges related to Canada's electrical power supply
- Capitalized on its lead role in intelligent systems development, and on the power of its national research network, to pull together a national workshop to stimulate collaboration on innovative approaches to the challenges
- Delivered results: a project involving two power utilities, a provincial laboratory and two universities, that fast-tracked development of an intelligent system that will improve the security of the electrical distribution system and will help prevent future blackouts

CANARIE:

With almost \$400 million in support from the Government of Canada, CANARIE has worked for over ten years with industry, academia and government labs to provide four generations of world-leading research and education networks, currently CA*net 4, and deliver more than ten collaborative research and innovation programs focusing on areas such as e-business, e-learning and e-health. In delivering these two cornerstones of the federal government's Connecting Canadians agenda, CANARIE has helped to generate economic, social and cultural benefits and contributed to the health, prosperity and well-being of all Canadians. In 2002, the federal government recognized CANARIE as one of the leaders of innovation in the country and CANARIE continues to be a model of innovation for many countries around the globe.

Going Forward:

4th Pillar organizations have a critical role to play in addressing the innovation challenge. CANARIE, CMC and Precarn have come together to explore new forms of collaboration that address key issues identified by Canadians. These organizations are representative of internationally respected *4th Pillar organizations*, which, together with the other three pillars, are essential to boost Canada's productivity, competitiveness, and economic and social well being in the global arena.

Every Canadian has a stake in Canada's innovation performance. We must leverage the greatest strengths of industry, government and universities, while accounting for and managing their specific interests. We must achieve consensus quickly, capitalize on discovery and mobilize for action. *4th Pillar organizations* play a critical linking role in Canada's system of innovation, providing maximum leverage and return on R&D investment.