Academies, Advisory Councils, and Governments – Roles and Responsibilities in Building Successful Societies Through Science, Technology and Innovation

Presentation to the Conference on

"Scientific Issues on Biofuels"

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Government of Canada's

Science, Technology and Innovation Council (STIC)

Canada

Academies

Roles and responsibilities are to:

- Elect members (fellows) in recognition of accomplishments of outstanding scholars
- Present awards and prizes to leaders in different fields of endeavour
- Outreach to society through different programs including forums on controversial topics (e.g. stem cells, aboriginal governance, euthanasia) and inquiry-based science education

Academies (cont'd)

Roles and responsibilities are to: (cont'd)

- Carry out assessments, using evidence-based science, by expert panels
  - independent and objective work that:
    - can help shape policy advice
    - educate and inform the public about major issues of timely importance (e.g. genetically modified organisms, groundwater, asbestos)
    - Such assessments often play a major role in resolving contentious issues.

Assessments – A Case Study

Genetically Modified Organisms (GMOs)

1. Royal Society of Canada – Expert Panel on the Future of Food Biotechnology (2001)
   - Study which addressed GMOs and related matters
   - Report received wide publicity and dissemination
   - Within 18 months, government accepted and began implementation of many of the recommendations
   - Since the report, little debate in Canada on GMOs (Académie des sciences/RSC Workshop on GMOs, Ottawa, September, 2009)

Assessments – A Case Study (cont'd)

"The Royal Society of Canada's report and recommendations can continue to guide the [Canadian Food Inspection Agency] in shaping its regulations so that we maintain our high scientific standards and keep pace with the new scientific discoveries, to assure that our food supply continues to be one of the safest in the world." (Website of the Canadian Food Inspection Agency, 2002)

Assessments – A Case Study (cont'd)

Genetically Modified Organisms (GMOs) (cont'd)

2. U.S. National Academy of Sciences (NRC) expert panel report on genetically modified crops (2010)
   - Assessment of the impact of GMOs reveals that use of these crops enables farmers to reduce chemical spraying, or to use less harmful chemicals.
   - Production costs for crops are lower, and yields are higher, benefiting farmers and consumers.
   - Report cautions against farmers using too many "Roundup Ready" crops, which are genetically engineered to be impervious to the herbicide. Thus weeds can be killed without affecting the crop. Overuse can lead to resistance by the weeds to the chemical.

Advisory Councils

1. Civil society-based advisory councils

- Established by nongovernmental organizations to advise different sectors of society (usually government) on matters of timely interest
- Examples include the Conference Board of Canada and think tanks such as the Brookings Institution in the United States

Advisory Councils (cont'd)

2. Advisory Councils created by government

- Provide objective advice to decision makers on issues of high priority to the nation
  - e.g. the Government of Canada's Science, Technology and Innovation Council (STIC)

Government of Canada Role in S&T

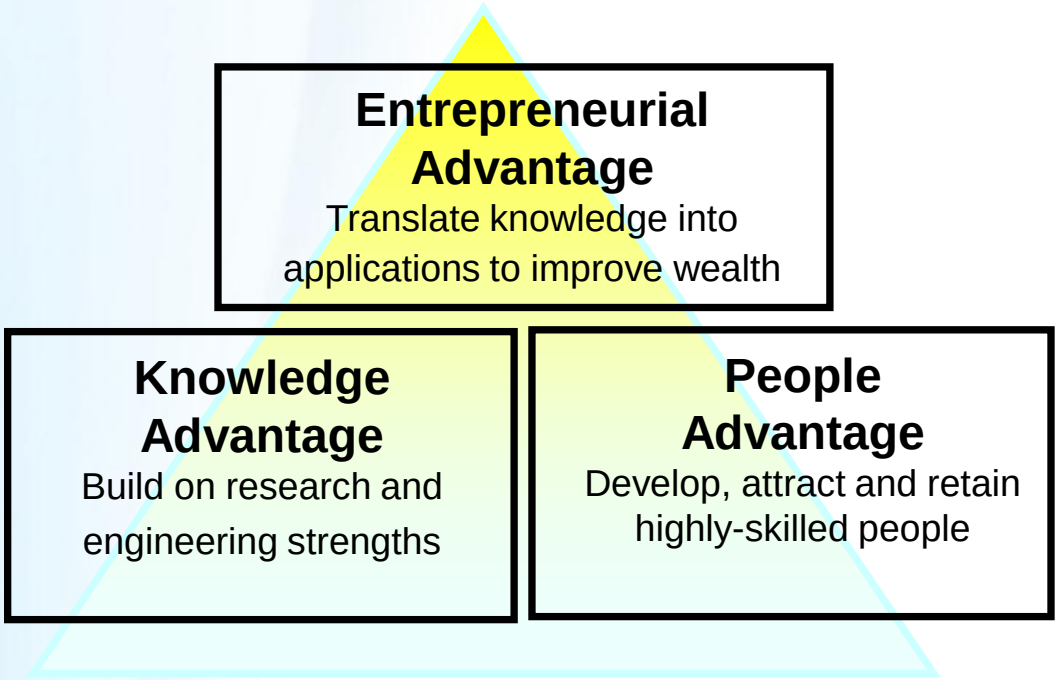
- **The Government of Canada supports S&T through:**
  - Business and tax environment that encourages private sector innovation
  - Federal Science and Technology Spending ($10.4 B in 2008-09) mainly on:
    - Higher-education support ($3.0 B)
    - Direct support programs to business ($1.0 B)
    - S&T in-house ($5.4 B)
- **Performers of R&D in Canada:**
  - Business sector performs 54% of R&D (2009)
  - Higher-education system performs 35% (2009)
  - Government of Canada performs 9% (2009)
  - Other (Provinces, provincial research organizations, non-profit institutions) 2% (2009)
- **Provinces and territories are also important players, funding higher-education and encouraging business innovation.**
- **Private sector role is critical to Canada's success in S&T and innovation.**

Canada's S&T Challenges and the Development of Competitive Advantages

- Canada needs significantly greater business investment in science, technology and innovation.
- Canada needs to use knowledge to its competitive advantage.
- Canada needs to make better use of a talented workforce.

Canada's Science and Technology (S&T) Strategy

Fosters three ADVANTAGES:



Embodies 4 PRINCIPLES:

- **Excellence**
- **Priorities**
- **Partnerships**
- **Accountability**

Established Science, Technology and Innovation Council :

- Reports to the Minister of Industry
- Consolidates roles and responsibilities for S&T advice

S&T Strategy: A Framework for Action

Entrepreneurial Advantage

- Foster a competitive and dynamic business environment
- Pursue public-private research and commercialization partnerships
- Increase the impact of federal business R&D assistance programs

Knowledge Advantage

- Focus strategically on research in the national interest
- Maintain our G8 leadership in public R&D performance
- Enhance value for money, accountability and responsiveness from Canada's three granting councils
- Explore new approaches to federally-performed S&T

People Advantage

- Enhance environment to attract and retain highly-skilled workers
- Increase supply of highly-qualified, globally-connected S&T graduates
- Foster an S&T culture

Federal S&T Investments

Knowledge Advantage

2008

- Large scale R&D projects in the automotive sector to develop greener vehicles
- Grand Challenges Canada (Development Innovation Fund) to create breakthrough discoveries that improve lives in the developing world

2009

- Federal labs infrastructure that supports regulatory mandates and private sector linkages ($250 million/2 years)
- Upgrades to key arctic research facilities ($87 million/2 years)
- Canada Space Agency for advanced technologies ($110 million/2 years)
- Canada Foundation for Innovation ($750 million/6 years)

2010

- Increased funding to granting agencies ($32 million/year)
- Genome Canada new funding ($75 million)
- Clinical Research ($10 million)

Federal S&T Investments

People Advantage

2008

- Vanier Graduate scholarships to support top Canadian and international doctoral students ($50,000/year tax free)
- Canada Global Excellence Research Chairs in S&T priority and sub-priority areas ($10 million for 7 years)

2009

- Expansion of the Canada Graduate Scholarships ($87.5 million/3 years)
- University and college infrastructure ($2 billion/2 years)

2010

- Postdoctoral Fellowship program (140 at $70,000/year)

Federal S&T Investments

Entrepreneurial Advantage

2008

- Competition Policy Review Panel created to recommend measures to help build a competitive and dynamic business environment (June 2008)
- Centres of Excellence in Commercialization and Research program ($195 million/2 years)

2009

- National Research Council's Industrial Research Assistance Program (NRC-IRAP) to fund SMEs ($200 million/2 years)
- Development and demonstration of promising clean energy technologies ($1 billion/5 years)

2010

- ("SBIR") Innovation Commercialization Program ($20 million/year for 2 years)
- Clusters for economic development, led by NRC ($67 million/year for 2 years)

S&T Strategy's Four Priority Research Areas:

- Environmental science and technologies
- Natural resources and energy
- Health and related life sciences and technologies
- Information and communications technologies

Science, Technology and Innovation Council: A Modern Approach to S&T Management

- Streamlined advisory process to strengthen the voice of external experts and help Government address complex S&T issues.
- Council includes representatives from private sector, academia and government.
- The Council represents a unique approach to external S&T advice for the Government.
  - The Government, through the Minister of Industry, actively engages the Council, seeking timely advice on specific issues.
  - The Council is a valuable source of expertise, not solely for the Minster of Industry and the Minister of State for Science and Technology, but for all Cabinet Ministers and the Prime Minister.

Science, Technology and Innovation Council: A Two-Fold Mandate:

- The Council provides timely advice on science and technology issues, identified by the Government, which are critical to Canada's economic development and social well-being.
- The Council will produce regular state-of-the-nation reports that benchmark Canada's S&T performance against international standards of excellence.

Science, Technology and Innovation Council

- **Howard Alper**
  Chair, STIC
  Distinguished University Professor, University of Ottawa
- **Francesco Bellini**
  Chairman, Picchio Pharma Inc.
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- **Mihaela Ulieru**
  Canada Research Chair in Adaptive Information Infrastructures for the eSociety and Professor, University of New Brunswick
- **Harvey Weingarten**
  President and Vice Chancellor, University of Calgary
- **Rob Wildeboer**
  Executive Chairman, Martinrea International Inc.

Examples of advice requested of Science, Technology and Innovation Council:

Advice presented and accepted:

- Research sub-priorities
- Canada Excellence Research Chairs and Vanier Canada Graduate Scholarships – shaping design of the programs

Advice provided recently:

- Private sector research and development
- International S&T
- Government procurement to stimulate business innovation
- Major science research infrastructure (big science)

Canada's Comparative and Potential Strengths

Research and Development Priority Areas and Sub-Priority Areas

Environment	Water: • health • energy • security
	Cleaner methods of extracting, processing and utilizing hydrocarbon fuels, including reduced consumption of these fuels
Natural Resources and Energy	Energy production in the oil sands
	Arctic: • resource production • climate change adaptation • monitoring
	Biofuels, fuel cells and nuclear energy
Health and Life Sciences	Regenerative medicine
	Neuroscience
	Health in an aging population
	Biomedical engineering and medical technologies
Information and Communications Technologies (ICTs)	New media, animation and games
	Wireless networks and services
	Broadband networks
	Telecom equipment

State of the Nation 2008

Canada's Science, Technology and Innovation System

L'état des lieux en 2008

Le système des sciences, de la technologie et de l'innovation au Canada

Science, Technology and Innovation Council

Conseil des sciences, de la technologie et de l'innovation

Canada

State of the Nation 2008 Report

- Comprehensive reference
- Systemic view of science, technology and innovation
- Baseline from which future changes can be measured
- Starting point for discussion

. . . looks forward

State of the Nation 2008 Report

Drivers of innovation success:

- Private sector with science, technology and innovation strategies at its core
- Institutions that develop, recruit and retain strong talent pools
- Researchers who keep us at the forefront of knowledge
- A knowledgeable, adaptable and creative workforce

The Science, Technology and Innovation Continuum

Encompasses:

- Research
- Discoveries/Inventions and Proof of Concept
- Technology transfer
- Capital investment

These result in new products, designs, processes and business methods

Tracking Performance

The Report examines:

- Conditions supporting a well-functioning system
- Who innovates and how much they innovate
- Indicators of performance (50+)
  - Business Innovation
  - Knowledge development and transfer
  - Talent

Vulnerabilities

- Low business R&D investment levels – persistent issue for decades
- Business performance of R&D as % of GDP – 15th in OECD
- Others investing heavily in education and R&D
- Low literacy and numeracy in labour force
- PhD graduates per million population – 20th in OECD
- Low collaboration between companies
- Low collaboration between private, higher education and government sectors

Strengths

- High quality Canadian research
- Funding for post secondary R&D as % of GDP: First in G8; Second to Sweden in OECD (2006)
- Canadian 15-year-olds rank in the top 5 in the OECD in science, math and reading
- Direct and indirect government support to business for R&D – 1st in OECD survey
- Recent measures increase our ability to attract talent
- Innovation leaders in every region and in many sectors

The Report Highlights Some Global Success Stories:

There are many more . . .

Positioning for Recovery and Long Term Competitiveness

- Research and entrepreneurship at international levels of excellence
- Focusing on areas of strength and significance for Canada
- Enhancing collaboration and mechanisms for collaboration at all levels

No one sector is responsible for performance or can achieve results alone.

Next Steps

Collective action in a number of areas would strengthen performance:

- Focus science, technology and innovation in sub-priority areas to accelerate development in areas where Canada should be a global leader
- Markedly enhance business R&D
- Renew efforts to better educate and cultivate the highly skilled people Canada needs to thrive in today's global economy
- Encourage, recognize, and reward the science and business innovators of tomorrow
- Aggressively pursue strategic international science, technology and innovation partnerships to advance Canadian interests

State of the Nation – Communications Approach

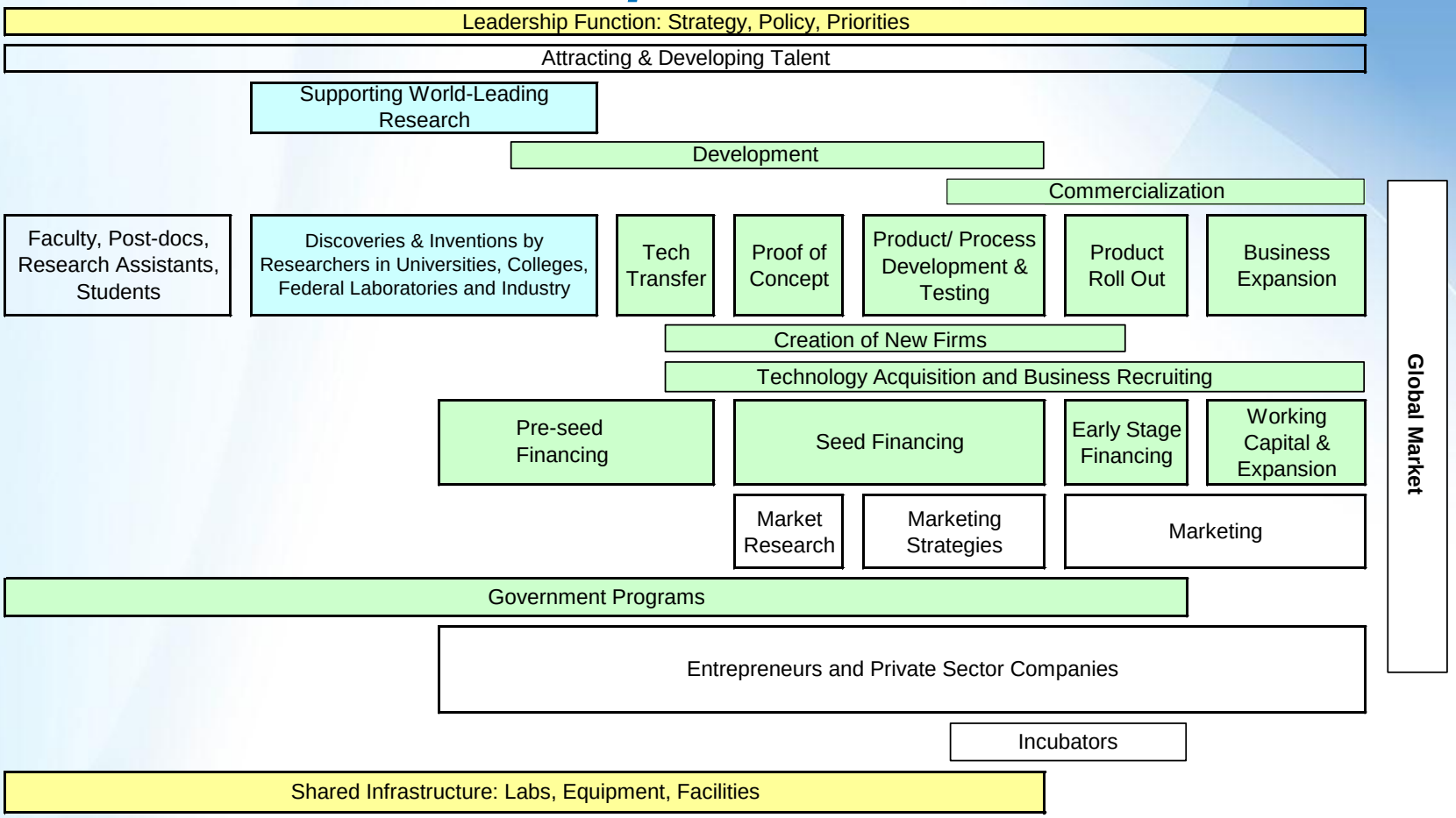
- Simple strategy with strong tactical execution
- Short key messages focussing on a few key take-aways: State of the Nation (strengths and weaknesses) and call to action
- Issues management: prepared for critics
- Identify key media and begin media outreach in advance of launch. Appeal to journalists' wish to cover a substantive story
- Provide backgrounder summarizing the rankings
- Small spokesperson team to ensure consistency for national media
- Divide media pitching into *themes* such as business, research and education
- Plant flag before upcoming high profile events: Canada National Science Day (May 27th)
- Regional briefings in Ottawa, Montreal, Halifax and Calgary to targeted audiences were appreciated and well received by audiences

State of the Nation Report Rollout

- Successfully launched in Ottawa on May 5th with subsequent stakeholder briefings
- Substantial print and radio coverage coast to coast
- All media reports reflected the STIC messaging
- Significant uptake on STIC web-site

Date	Event	Format
May 5	**Ottawa** – National Press Theatre, Crowne Plaza Hotel	News conference followed by media Q/As) Stakeholder briefing followed by moderated Q/A session
May 11 - 12	**Toronto** – Ontario Centres of Excellence, Discovery 09: Future Ready Toronto	Council Members attending and participating in conference incorporated key messages from report into in their comments
May 19	**Calgary** – collaborative event with Calgary Chamber of Commerce	Media and stakeholder briefing followed by moderated Q/A session
May 21	**Montreal** – collaborative event with Chambre de Commerce	Media and stakeholder briefing followed by moderated Q/A session
May 27	**Ottawa** – National Science Day – Chateau Laurier	Panel – State of Science in Canada
Oct 15	**Halifax** – collaborative event with Halifax Chamber of Commerce	Stakeholder briefing followed by discussion on business innovation

Innovation "Road Map"



It is essential to note that the process from talent to market is ***dynamic,*** and not linear as shown here.
The different aspects of the innovation process have been arranged in a linear way for simplicity of presentation.

Based on model described in "Connecticut's Innovation Network", The Department of Economic and Community Development, January 2006

Science, Technology and Innovation Council

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