FEDERAL SCIENCE AND TECHNOLOGY REVIEW

IC ional Workshop Highlights

VANCOUVER

SEPTEMBER 1-2, 1994

Chairperson: Karl Brackhaus, President & CEO Dynapro Systems Inc.
800 Carleton Court, New Westminister

Keynote Speaker: Hugh Wynne-Edwards, President & CEO, BC Research Inc. (Phone: 604-224-4331)

Participants: 94: 21 academic; 53 business; 19 government; 1 other.

Federal management of S&T investments

Promote science literacy, a science culture and career potential in the sciences for both women and men;
Include the social sciences in the definition of science;
Support the values of ethical, environmental and economic sustainability as key elements in all S&T research and development;
Promote collaboration and partnerships across public, private and academic sectors;
Build awareness of market oriented research, balancing it with the public good, and pure research components;
Rationalize S&T responsibilities among tiers of government;
Enhance the National Science and Engineering Research Council's (NSERC's) user focus and expand partnerships;
Provide financial incentives for federal laboratories to transfer technology externally;
Maintain IRAP system with the possibility of expanding it to cover start-ups and the Scientific Research and External Development priorities;
Focus more on the transition from innovation to enterprise.

Focus on the British Columbia and Yukon Region

In B.C. the focus is on job and wealth creation through the growing S&T infrastructure and culture that exists on Vancouver Island, the Lower Mainland and throughout the province. This S&T activity and expertise provides a critical basis for mounting the Canadian economic presence on the dynamic Pacific Rim.
B.C. recognizes that investment in it's human resource, as the key factor in all S&T R&D, is critical to science literacy and to a knowledge-based entrepreneurial and an innovative workforce of the future.

Setting Priorities

Interprovincial harmonization of investment\tax incentives;
Canada - the intelligent country: Human Resources are the key S&T resource -
Training and education of the human resource will ensure a workforce for the future knowledge-based economy;
Information Base for S&T Decision Support;

Our mission is to identify principles that can guide the federal government in setting priorities for investment in science and technology.

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S&T Infrastructure;
Basic research - link it to a fraction of GDP, based on the G-7 average;
Allow for mobility of S&T staff across sectors: industry, government, university and colleges;
Establish partnership training fund, by empowering users with industry training tax-credits;

Common Views

Establish a road map and an industrial strategy for Canada that is open, explicit, long-term oriented, flexible and reflecting the dual nature of our industry. To be developed by stakeholders, not government.
Provide performance benchmarks in S&T financing;

Set up a review of the tax treatment of Canadian value-added manufacturing
Consider reinstating the unsolicited proposal program (Public Works);
Recognize and support electronic highway to energize technology transfer;

Consider creation of tax-deductible Registered Personal Training Fund, using UI funds;
Link U.I. premiums to training through instituting U.I. premium tax-credits;
Generate more interest in science among young Canadians, TV is powerful medium - partner with entertainment industry;
Enhance teachers' knowledge in science, stressing gender sensitivities;
Allocate more granting council funds to students working in industry\university interphase;
Provide incentives for companies to improve the quality of internship programs;
Encourage entrepreneurship: increase "technology receptors" in industry, wealth generation.

Thoughts on the process

Meeting was well attended and participation energetic and thoughtful. Provocative opening remarks by commentator focused on the need for the S&T partners to take responsibility for the outcome of this review and to participate fully in the process to move away from the current culture of "entitlement".

Prepared by the Science and Technology Review Secretariat
in collaboration with the British Columbia and Yukon regional Industry Canada office
Phone: (613) 943-7034 or Fax: (613) 993-4812

Regional Workshop Highlights

SASKATOON

SEPTEMBER 8-9, 1994

Chairperson: Patricia Glenn, President, Intercura Consulting Inc.

Keynote Speaker: Bob Church, Professor Emeritus, University of Calgary (Phone:)

Participants: 126: 38 academic; 46 business; 22 government; 20 others.

Federal management of S&T investments

Government to foster climate encouraging industry to do basic research in Canada.
Conduct comprehensive evaluation of basic research program.
Improve S&T evaluation measures.
Establish stakeholder advisory boards for federal labs.
Natural Sciences and Engineering Research Council (NSERC) to fund inter-disciplinary research proposals.
Apply more risk-benefit analysis for government technology transfer.
Industry Minister should become champion of Canadian S&T.

Focus on the Prairies and NorthWest Territories region

Capitalizing on Canada's natural resource advantages is key to a national S&T strategy. Partnership among industry, universities and government laboratories is critical. S&T is a critical factor in developing more value-added environmentally sensitive processes and products, crucial to enhancing our competitive edge in export markets.

Setting Priorities

Aim at 2% GDP for S&T funding in Canada (current levels ~ 1.4%).
Re-balance funds between health care delivery and health care research.
Increased support to Industrial Research Assistance Program (IRAP).
Federal government outsource $1 billion of current intramural S&T within 2 years.
Convert Canadian health care systems to an evidence-based system within 4 years.

Common Views

Establish more innovative education/vocational programs e.g., work\study, co-op, distance learning.
Integration of Economy/Health & Environment means informed decision making.
Popularize science to all Canadians of all ages.
Include social sciences and humanities in the definition of science.

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Fiscal policy to encourage risk investment.
Enhance the process of closing the commercialization gap - through linkages and incubating centres.
Policies should be developed to drive human resource developments by all levels of government, given the importance of human resources to S&T.
Ensure Canadian women and other under-represented groups have equal role in S&T policy development.
Ensure that all primary school teachers have S&T elements in their education degree program.
Consider tax credits for social science research.
Focus on industry clusters with regional specializations.
Harmonize S&T support programs.
Harmonize regulation in Canada to remove barriers.
Promote science culture within society.
Government should be an enabler not a doer.

Thoughts on the process

The meeting was well attended, with considerable interest from the natural resource based sectors, especially with respect to the commercialization of technologies in both traditional and emerging sectors.

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Regional Workshop Highlights

ST. JOHN'S

SEPTEMBER 14-15, 1994

Chairperson: Dr. Linda Inkpen, Fortis Education Foundation, 139 Water Street, Suite 1202, St. John's, Newfoundland, A1B 3T2

Keynote Speaker: Dr. Jack Clark, President and CEO, C-CORE, Memorial University, Bartlette Building, St. John's, Newfoundland, A1B 3X5

Participants: 82: 19 business; 36 academic; 19 government; 8 others.

Federal management of S&T investments

The federal government has a critical role to play in fostering and delivering a new vision of the national innovation system (NIS). The focus of a NIS must be on wealth creation, social well-being and sustainable development. The existing system is fragmented and hence it is crucial for the federal government to increase interaction and build linkages by acting as a visionary catalyst in the process of change.

The federal government needs to evaluate the effectiveness of S&T activities, using the criteria of relevance and excellence, so that duplication and inefficiencies are eliminated.

Focus on Atlantic Region

The Atlantic Region has traditional strengths in the exploitation of natural marine resources, frontier research and development, as well as high-quality basic and applied research. Economic factors and globalization of the marketplace are propelling the region into a era of collaborative and innovative science and technology endeavours that will add value to traditional products, create and market new ones, ensure a skilled workforce and foster innovation from the community to the international level.

Incentive programs, similar to the previous unsolicited proposal program, are needed but with more rigorous evaluation criteria and private sector equity funding.

There should be strong support for small and medium enterprises in federal labs.

Priority setting and resource allocations should remain sector driven rather that centrally planned and controlled.

Research and development performed in federal laboratories that relate to intelligence gathering, regulations, research of strategic importance to Canada's future, national security and public policy formulation need to continue.

Annual reviews of performance against strategic plans should be conducted in all labs.

Federal labs should be encouraged to become more flexible and entrepreneurial provided that they do not compete with the private sector.

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A fair, equitable and transparent method should be devised for the licensing of intellectual property that originates from government labs.

Setting Priorities

A strong and aggressive public awareness campaign needs to be waged that illustrates the accessibility of science, its implications for all Canadians, and its limitations.

The federal government must continue to support basic research in which Canada excels and is relevant to Canadian economic and social goals.

The portability of pensions will encourage the exchange of researchers among government, industry and academia.

A certain fraction of S&T funds should be directed towards social and health sciences research.

Common Views

Canada needs a vision of a national system of innovation (NIS) that builds on relevance and excellence and that includes all Canadians and that involves all Canadians in the process of innovation.

Curiosity-type research should be performed in universities; targeted basic and mission orientated research should be carried out in federal laboratories in line with their respective mandates; applied research, where economically viable, should be carried out through partnerships and contracts with the private sector.

The knowledge and ideas of industry in R&D needs to be harnessed by involving industry early in the R&D cycle.

We need to develop an entrepreneurial culture in Canada through curriculum changes in primary and secondary schools. Universities and colleges must better prepare graduates as highly skilled workers and entrepreneurs.

All programs which support commercialization and technology transfer should have measurable objectives and should be independently reviewed at prescribed intervals.

There is a need for more investment in the development of health care services and products.

Thoughts on the process

Dr. Jack Clark, the keynote speaker, challenged all delegates to the St. John's conference, to consider that if we wish to maintain our present quality of life we must create new wealth by backing our science and technology "winners and not the whiners". Galvanized by this challenge, views emerging from the conference stressed that a clear innovation system including all Canadians must be developed; industry, academia and government as the three cornerstones of innovation must be more closely linked; barriers to collaboration and cooperation must be removed; and, excellence in all aspects of innovation must be rewarded.

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Regional Workshop Highlights

MONTREAL

SEPTEMBER 22-23, 1994

Chairperson: Paule Leduc, Vice-présidente à l'enseignement et à la recherche, Université du Québec

Keynote Speaker: Pierre Fortier, Chairman of the Board and Senior Advisor, Innovitech Inc.

Participants: 134: 43 academic; 32 business; 32 government; 17 others.

Federal management of S&T investments

To facilitate the implementation of a national system of innovation the federal government should create the position of Senior Scientific Advisor to advise the Prime minister on all matters relating to the various aspects of innovation, S&T expenditures and priorities.

Canada's leadership during a period of fiscal restraint requires that the federal government reviews its existing in-house S&T activities for relevance and efficiency and that it maintains a strong foundation for basic research. Emphasis should be placed on providing assistance for the development of existing and new firms.

Focus on Quebec Region

Quebec has actively supported the liberalization of international trade and has encouraged investments which have made possible significant inroads in the development and commercialization of new technologies. S&T is considered an important activity leading to economic development and job and wealth creation. Policies and practices are being introduced to reduced or eliminate obstacles and impediments to economic activity in S&T and all stakeholders are expected to work cooperatively within their respective sphere of jurisdiction.

Federal laboratories must maintain a core capability to fulfill their mandates, concentrate on targeted basic research, establish independent advisory committees to set priorities and periodically review programs and activities. As much government research as possible should be contracted out. Federal laboratories should not compete with the private sector or with universities and should not be made to depend on non-government sources for their resourcing. Facilities and equipment should be made available to other stakeholders.

The government can facilitate technology transfer and commercialization by developing policies that encompass the entire process of research, training, development and innovation; by encouraging the involvement of communities and by developing mechanisms that facilitate communication between researchers and users of research. The federal government must streamline regulations to meet those of competitors internationally and to hasten the commercialization of innovations on the marketplace.

The health care system is undergoing major changes in strategy to focus on prevention, on out-patient treatment and on the establishment of a culture of health. The federal government can assist this process by encouraging experimentation with new models of health care systems and by ensuring access to health related information

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banks through the information highway and new technological initiatives like CANARIE.

The federal government must follow sound business principles when undertaking the rationalization of its S&T expenditures in the natural resources sector and recognize the significance of S&T in maintaining the sector's competitiveness. Continued support of federal laboratories is required for the development of the industry, for its penetration of international markets and to attain its goals with respect to sustainable development.

Setting Priorities

Policies should be developed to facilitate partnerships between all constituencies of the national system of innovation to improve the transfer of knowledge to the marketplace and to allow Canadian businesses to use technology more quickly. Administrative impediments should be removed to facilitate the movement of government scientists to industry and universities. Investments in R&D should encourage innovation and place greater emphasis on profit and risk sharing.

Childrens should be introduced to science at the preschool level. The information highway is a tool available not only for disseminating scientific information but also to develop a continuous learning culture.

Use the knowledge and research capacities of the social sciences and humanities to better understand the implications of technology development, measure social impacts and identify corrective action.

Support phase 2 of CANARIE and link existing documentary resources electronically.

An independent science and technology advisory body be established to advise the government on S&T priorities and expenditures. This body would ensure that Canada's interests are presented in international scientific organizations, advise government on involvement in new frontiers of science such as in atmospheric and oceans research. Sustainable development is identified as a new area of research which must be targeted.

Common Views

The federal government will not commit new or additional funds in S&T.

Stakeholders must be aware and respect each others' unique role and responsibilities and cooperate in resolving areas of competing jurisdictions. Fora should be established to facilitate exchanges between universities, industry and government.

The economic development associated with the commercialization of technologies applied to health constitutes an important benefit of health policies and a strategic incentive to investment in S&T.

The natural resources sector must develop within a framework of sustainable development.

Thoughts on the process

Pierre Fortier, the keynote speaker, emphasized the role of SMEs as the principal motor for economic development, the globalization of economies and increasing investments in R&D within Quebec and fiscal constraints at all levels of government. He provided an overview of measures taken by the governments of Quebec and Canada to stimulate investments in S&T. He challenged participants to review federal programs and expenditures to improve their performance and to create jobs and wealth.

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Regional Workshop Highlights

TORONTO

SEPTEMBER 29-30, 1994

Chairperson: Ms. Wanda Dorosz, President and CEO, Quorum Growth Inc., Toronto, Ontario

Keynote Speaker: Dr. Alan G. Davenport, Professor and Director of the Boundary Layer Wind Tunnel, University of Western Ontario, London, Ontario

Participants: 195: 44 academic; 76 business; 20 government; 18 others.

Key messages from the delegates:
S&T generate wealth; they pay their own way; a little investment goes a long way. Canadian science must stay at the leading edge of research. A vision for an Innovative Canada: *"We see a Canada where S&T advance the quality of life for all Canadians, where innovation is a dimension of our national identity and where the commercialization of the products of research is a national priority."* Goals for this vision include: An S&T infrastructure providing a competitive advantage to Canadian-based firms, a focus on strategic markets, an emphasis on technology transfer and commercialization, excellence in education and training, a private sector which pays its fair share, the protection of society and the quality of life. Business will focus on strategic areas where they compete effectively.
Roles of the four cornerstones: Business must drive innovation through international marketing.
Education must prepare people who can function in tomorrow's global society. Communities must foster a cooperative business environment. Federal labs must support government missions, help industry and perform international science.

Focus on Ontario Region

Ontario has traditional strengths in manufacturing, automobile production, technology-based firms and financial institutions, as well as high-quality basic and applied research. Economic factors and globalization of the marketplace are propelling the region into a era of increasing technological sophistication involving more collaborative and innovative science and technology endeavours, to create and market new products and to upgrade manufacturing processes, to ensure a skilled workforce and to foster innovation from the community to the international level.

The government must promote a national strategy, a science culture, provide stable funding and policies and create an environment conducive for innovation.

Granting council funding of university research needs to be maintained and if possible increased. The S&T foundation is the independent researcher. Bridges have to be built to and from universities to industry. Industry should solicit R&D proposals from universities. The number and range of Networks of Centres of Excellence should be increased. Big science decisions need a national process and national commitment, where they fit Canadian expertise and needs.

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For sustainable development, there is a continuum of common knowledge which underpins both regulatory and industrial development responsibilities of federal departments. This knowledge should be used to encourage innovation, not just for banning products and creating barriers. Sustainable development is critical for the future of resource-based industries, and S&T are the key. Canada needs cost effective, world-class science, knowledge and understanding and a good partnership between government and industry to address both the costs and the profits implicit in sustainable development.

Current linkage organizations should be studied to learn how to remove blocks and build bridges.
External review is necessary for accountable management of federal science. Federal labs should out source R&D where possible to foster linkages and to develop a receptor capacity and S&T skills within firms.
Harmony is needed between federal and provincial S&T policies, programs and strategies. The financing system needs to be better informed and linked into the innovation system.
We need new models for education and training based on information technology, internships, linkages with industry.

Social science has much to offer in the national system of innovation, from language and cultural assistance in marketing to anticipating the social, ethical, workplace and personal impacts of new technology. Social science should be part of the S&T strategy and should receive the same form and level of funding support as does physical science.

Accountability for the S&T strategy must be vested in one minister who must oversee an assessment process whereby the government receives public, qualitative and quantitative, assessment reports on its performance against both long and short term S&T goals and on other issues such as gender equity.
The government needs to accept S&T advice from diverse sources, not one monolithic organization even if this means receiving conflicting advice. NABST should evolve to become an agency for listening to, filtering and interpreting this advice.

To develop a national S&T strategy, we must start with the First Ministers. Each province must have a minister responsible to oversee their S&T strategies, as with the federal government. Federal-provincial mechanisms are needed to support big science decisions, and to gain critical masses of capability when required.

Common Views

Canada needs a vision of a national system of innovation (NSI) that builds on relevance and excellence and that includes all Canadians and involves all Canadians in the process of innovation.

The knowledge and ideas of all sectors must be better linked in order to strengthen national innovation.

We need to develop an entrepreneurial culture in Canada through curriculum changes in primary and secondary schools. Universities and colleges must better prepare graduates as highly skilled workers and entrepreneurs.

Canada needs an S&T-aware and informed populace and parliament.

Thoughts on the process

Dr. Alan Davenport, the keynote speaker, showed the participants the depth and breadth of Canadian science, and how it is still relatively unknown to the average Canadian. He provided hints and suggestions of areas where the delegates might want to suggest changes. Unfortunately he had more to say than time was allotted for. John Manley and Jon Gerrard demonstrated their commitment to the importance of S&T in Canada and encouraged the participants to provide candid and clear guidance to the government so that the strategy which is needed will be excellent and appropriate.

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