

2nd Annual RESEARCH MONEY Conference

Technology Clusters: By Accident or Design?

February 19, 2003

National Arts Centre, Ottawa

CONFERENCE HIGHLIGHTS

Canada's technology cluster experts met in Ottawa February 19 to discuss the country's most successful technology clusters, and to provide advice for those looking at establishing a cluster. Representatives from business, finance, government and academia shared their experiences, and commented on the role stakeholders play in identifying and nurturing a successful cluster. The highlights from their discussions have been summarized in this report.

Opening Remarks: "Yesterday's Federal Budget: An S&T Perspective"

Mark Henderson, Managing Editor, RESEARCH MONEY

Budget Highlights: \$1.7 billion in this fiscal and the next two years in research and innovation

This includes:

- \$500 million for the Canada Foundation for Innovation for research hospitals
- \$75 million for Genome Canada
- \$102 million this year for venture capital investments by the Business Development Bank of Canada, with another \$88 million in FY03-04
- Permanent increase of approximately 10% for the three granting councils. This translates into \$55 million a year for Natural Sciences & Engineering Research Council, \$55 million for the Canadian Institutes of Health Research and \$15 million for the Social Sciences and Humanities Research Council.
- \$25 million in FY03-04 for the Canada Graduates Scholarships Program, increasing to \$55 million in FY04-05 and plateauing at \$105 million annually when fully phased in. Merit-based scholarships will give 4,000 students \$17,500 annually at the master's level and \$35,000 a year at the doctoral level.
- \$10 million for the National Research Council for cluster formation in Regina and Charlottetown, and to ensure Canada's participation in two major astronomy projects in Chile and New Mexico
- \$25 million for the Industrial Research Assistance Program, a 20% budget increase
- \$225 million annually for the indirect costs of university research. This is now a permanent program and follows a pilot program last year in which \$200 was distributed to universities based on funding they received from the three granting councils. Program structure and governance has not been announced.
- \$16 million over two years for Northern Science
- \$20 million for Toronto's Medical and Related Sciences
- \$15 million over seven years for the Rick Hansen Man in Motion Foundation
- \$30 million to sustain the SchoolNet Program and Community Access Program
- \$250 million endowment for the Sustainable Development Technology Canada foundation
- \$50 million for the Canadian Foundation for Climate and Atmospheric Sciences
- Tax incentives for renewable and alternative energy have been extended

Other S&T-related Initiatives:

- \$190 million over five years to Health Canada to improve regulatory review for human drugs.

- \$25 million over 10 years to the Canadian Health Services Research Foundation to launch the Executive Training for Research Application program (EXTRA)
- Phasing out of the Federal Capital Tax over five years
- Changes to the definition of qualified limited partnerships to make them more attractive for investment by pension funds

KEYNOTE ADDRESS: Innovation in the Communications Sector: Seizing the Opportunity

Greg Mumford, Chief Technology Officer, Nortel Networks

- Environment that gave birth to Nortel in the 1950s in Ottawa: vibration- and noise-free environment, quality of life, proximity to National Research Council and two universities, having an anchor customer (Bell Canada)
- Today the Ottawa technology cluster has 1,400 firms; over 200 companies in region can trace their beginnings to Nortel's influence, including Mitel and JDS Uniphase
- The Ottawa cluster is still maturing. It is shifting from a focus on the network infrastructure to "infostructure" – multimedia content, mobility and personalization
- What is needed to fuel this evolution: skilled people in technology and business, more partnerships between industry, public-funded research, and academia; collaborations with smaller companies; and university and government research labs that focus on commercialization
- Other ingredients for a sustainable cluster: effective taxation, regulation, intellectual property treatment, post-secondary education, immigration, procurement, favourable R&D tax environment
- Governments can help show the way by embracing a National Broadband policy that is not pre-emptive, but ubiquitous in its reach.

Introductory Remarks:

Jeffrey Crelinsten, Co-Publisher, RESEARCH MONEY

- Like any phenomenon in nature, technology clusters are the result of exponential growth
- A cluster is simply an observable level of technology-based commercial activity in a community
- That kind of activity can be going on in a community decades before it is readily observable on a community level
- Conference program designed with this picture in mind
- Session One reviews the observable characteristics of clusters based on study of over 100 clusters worldwide
- Session Two looks at experiences and challenges faced by existing clusters (activity going on for decades)
- Session Three explores emerging clusters and how to increase their level of activity more quickly
- Session Four examines how investment activity impacts on cluster growth and development
- Session Five asks what different levels of government can do to stimulate community activity that leads to cluster growth
- Session Six synthesizes the previous sessions

SESSION ONE: Clustering as a Contact Sport

Roger Voyer, Senior Associate, Impact Group

While there is no clear definition of a knowledge-based industrial cluster, there are eight characteristics of a successful cluster:

1. Recognition of Potential by Local Leaders
2. Support of Specific Local Strengths and Assets
3. Influence of Champions
4. Entrepreneurial Drive
5. Various Sources of Financing
6. Information Networks
7. Educational & Research Institutions
8. Staying Power

(using this schematic, Ottawa ranked second after Silicon Valley)

One delegate suggested adding two additional points to the “Octagon” list:

9. International benchmarking
10. Inter-cluster linkages, such as nano-IT and bio-IT

What you need to build and sustain a successful cluster

- Technological strengths - universities, government laboratories and major firms
- Local market strengths - government procurement, banking
- Social, cultural and entertainment infrastructure
- Entrepreneurial drive at the local level
- Various sources of financing, from angel, venture, government, debt/equity
- Strong information networks (informal networking to more formal associations)
- Educational and research institutions that have strong links to industry

SESSION TWO: Existing Clusters

Dale Botting, CEO, Saskatoon Regional and Economic Development Authority

Jeffrey Dale, President, Ottawa Centre for Research and Innovation

Camille Gagnon, President, Innovitech inc.

Moderator: Janet Eastman, Host and Associate Producer, Ottawa Citizen Business Television

Challenges Canadian clusters face in competing internationally

- Lack of self-promotion on the world stage and to internal stakeholders (e.g. municipalities)
- Limited access to skilled people
- Lack of industry presence on university campuses
- Difficulty attracting high profile scientists from other countries (potential solution: leveraging coveted facilities like the Canadian Light Source synchrotron to attract such “superstars”)
- Lack of operating capital
- Lack of uniform intellectual property rules between universities

Canada’s advantages internationally

- With the tech bubble bursting in the U.S., many Canadians are now coming back to Canada.
- Federal and provincial governments are more innovation-friendly

Role of the industry-university relationship in cluster development

- Companies drive the growth of cluster, not universities
- Universities can be the cornerstone of clusters if they have close ties with industry

- Through the Canada Foundation for Innovation and the granting councils, universities are now big business. In Montreal they account for \$500 million in construction now underway.
- Universities can be magnets for attracting talent.
- What universities still need: More physical space to accommodate company incubation, and closer ties with small and medium sized receptor companies

Government's role in creating clusters

- Regional development agencies (e.g. WED) and Industry Canada create early linkages with industry.
- Municipal governments: funding, promotion, leadership, facilitating partnerships between local industry and university and government, and setting aside land for clusters and university/industry expansion
- Biggest role for government: identifying promising industries, setting the tone and agenda for innovation

SESSION THREE: Emerging Clusters

Greg Barratt, President, Communitech Technology Association Inc.

Ron Britton, President & CEO, Fuel Cells Canada

Alain Caillé, Vice President (Research, Université de Montréal

Moderator: Tony Rahilly, Ontario Regional Director, IRAP

Conditions for developing a new cluster

- A strong interface between university and industry
- Introduction in 1950s of co-op education at University of Waterloo led to company creation and cluster development (city leaders were slow to respond)
- Available land
- Capital financing
- Highly skilled personnel
- Flexibility on IP
- Let the inventor own the intellectual property (e.g. Univ. of Waterloo)
- A positive the business environment (i.e. funding for Industrial Research Assistance Program and Business Development Bank of Canada)
- Changes to the SR&ED tax credits
- Anchor tenant (e.g. Ballard in Vancouver)
- Provincial funding support

Models for commercialization

- NRC Innovation Centre for fuel cells in Vancouver
- Univalor in Quebec – arm's length organization that manages IP for universities
- Accelerator centre in Waterloo (private sector board, tech transfer staff seconded from university)
- Companies on campus (U.S.)

LUNCHEON SPEAKER: The Innovation Atlas of Canada

Ron Freedman, President, Research Infosource Inc.

Michael Bordt, Chief, Intellectual Property and Human Resources, Innovation and Electronic Information Division, Statistics Canada

Overview:

- Research Infosource is working with Statistics Canada to develop the Innovation Atlas of Canada, a new resource that will provide detailed maps and data on who is doing what R&D in Canada, and where they are doing it
- Information on over 7,500 R&D performing companies
- Data will help in cluster analysis and formation
- Available this fall: four national maps listing companies, R&D Sectors, financials and personnel; 28 provincial/regional maps, and municipal maps

SESSION FOUR: The Investor's View of Clusters

Charles Cazabon, Vice President, Venture Capital, Business Development Bank of Canada

Denzil Doyle, Chairman, Capital Alliance Ventures Inc.

Mary Macdonald, CEO, Macdonald & Associates Limited

Moderator: Brant Popp, Director, Policy, Western Economic Diversification Canada

View of Canada's investment climate

- Venture capital (VC) activity is down, disbursements are 35% behind one year ago
- No returns for investors and syndicates are harder to form
- Big deals are smaller, but the level of activity is stable
- Canadian market stronger than the U.S., particularly in IT. Bulk of activity is in Ottawa, Toronto, Montreal and Vancouver; "a testament to the role of clusters"
- Current climate is a challenge for seed companies; 75% of VC money is going into follow-on investments
- Post tech meltdown in Ottawa has resulted in better management and business plans.

What venture capitalists look for

- Excellent CEO (good leadership and technology know-how)
- Excellent management
- Marketing know-how
- Excellent scientific advisory board
- Companies with large market niches
- Co-investors to build a syndicate
- Small pool of technology focused on products and distinct markets
- Protected IP
- High level of returns.

Positive and negative sides to clusters

- They provide skilled workers, managers, directors and an entrepreneurial culture
- They attract most of the VC
- You don't always need a cluster. Promising technologies and companies can develop outside of clusters.

Role of government in cluster development

- Strong emphasis on innovation
- Get involved at the early stages of cluster development through financing (i.e. BDC's new VC fund)
- Implement smart policies that remove impediments to cluster growth
- Need policies that create an exit strategy for VCs and angel investors
- Don't push clusters where there's no market or interest

SESSION FIVE: The View from Government

Hon. Norman Betts, Minister, Business New Brunswick

Peter Hackett, Vice President, Research & Technology Development, NRC

Kent McMullin, Director, Business Attraction, Economic Development Edmonton

Moderator: Andrei Sulzenko, Senior Assistant Deputy Minister, Policy, Industry Canada

Clusters –Created through accident or design?

- Having a plan certainly helps if governments want to accelerate the process (i.e. New Brunswick's action plan for innovation)

Government's main roles

- Developing a knowledge economy
- Removing obstacles to innovation
- Acting as a catalyst for change
- Facilitator: government is a strong research performer that can bring multiple stakeholders together (e.g.. renewing federal labs would help them to partner more, and support cluster development)
- Funder (especially at seed level)
- Removing barriers between researchers and research performers.

What works?

- O Vitesse – a federal skills program that has a high impact
- NRC's industrial partnership facilities

What's needed?

- Industry and institutional champions. "We need new thinkers to guide clusters and competitiveness strategy."

SESSION SIX: Wrap-Up

Norine Heselton, Vice President, Information Technology Association of Canada

Stuart Smith, Chairman, Ensyn Technologies Inc.

David Wolfe, Professor, Political Science, University of Toronto

Moderator: Anthony Eyton, President & CEO, Precarn Incorporated

Wrap Up Comments

Four main ingredients for a successful cluster:

1. **Connections:** infrastructure, networks or personal business linkages between government labs, research institutions, universities and the private sector, including investment community. Also need connections between clusters.
2. **Highly qualified personnel.** New scholarships announced in the federal budget will help, but they are still slanted towards the social sciences, and not to the highly qualified people we need in photonics, software and related areas.
3. **Community:** Quality of life, collaboration amongst stakeholders, companies who are good corporate citizens, and a community that is economically diverse and has a critical mass of people.
4. **Government (“the key ingredient”):** Government is best in a supporting role. It cannot create clusters, but can create an environment that’s conducive to business.

Words of Advice

- Not every community needs a cluster. You can upgrade your innovative potential without a cluster.
- A cluster need not be locally focussed – could be linked to an international community of clusters.
- Governments should help communities assess and build upon their intellectual and human resources, rather than setting a goal of creating 10 internationally competitive clusters
- Clusters are not the goal, they’re the means to an end
- Government needs to better coordinate its research assets across departments for maximum impact at the community level (New Brunswick is good example of where this works)
- Bring back the unsolicited proposals program. Provided an opportunity for entrepreneurs to pitch government on innovative ideas.
- Need better coordination within government.
- Learn to think small. Look at launching many actions at the community level to build innovative capacity.