



Strategic Health Innovations

moving ideas forward

Canadian Excellence in Biotechnology

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Strategic Health Innovations

Agenda

Canadian biotechnology profile

Canada's biotechnology strategy for success:

Policy environment

Cluster development

Networks

Incubators

Government funding

Canada's History of Successful Innovation

1920

Discovery of insulin to treat diabetes

1930

Production of Emmenin, the 1st orally active estrogen

1940

Development of a polio vaccine

1950

Isolation of the anti-cancer drug vinblastine

1960

Discovery of the hematopoietic stem cell

1970

Discovery of site-directed mutagenesis

1980

Discovery of the T-cell receptor

Demonstration of the antiviral properties of the AIDS drug 3TC

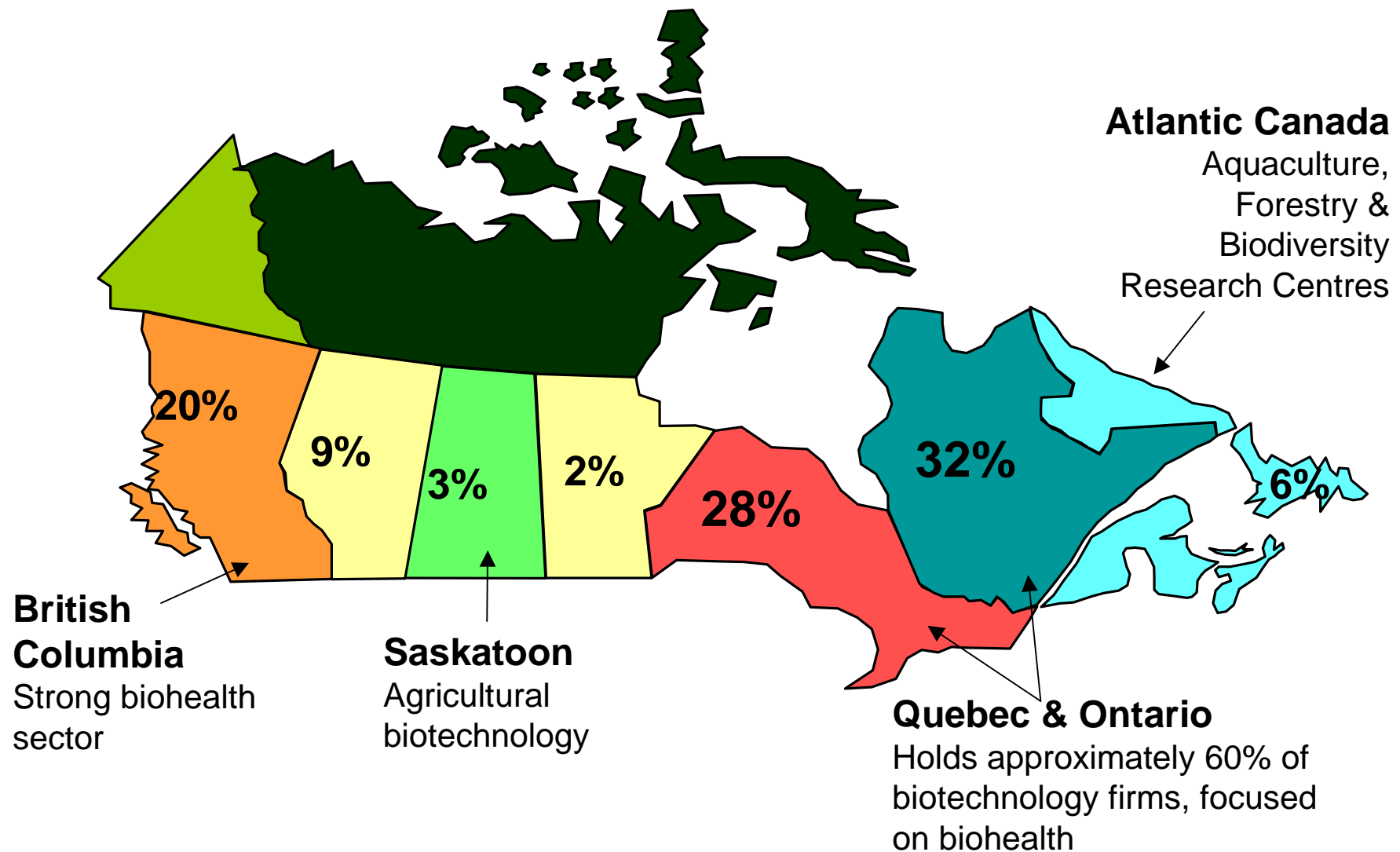
1990

Discovery of the gene for cystic fibrosis

2000

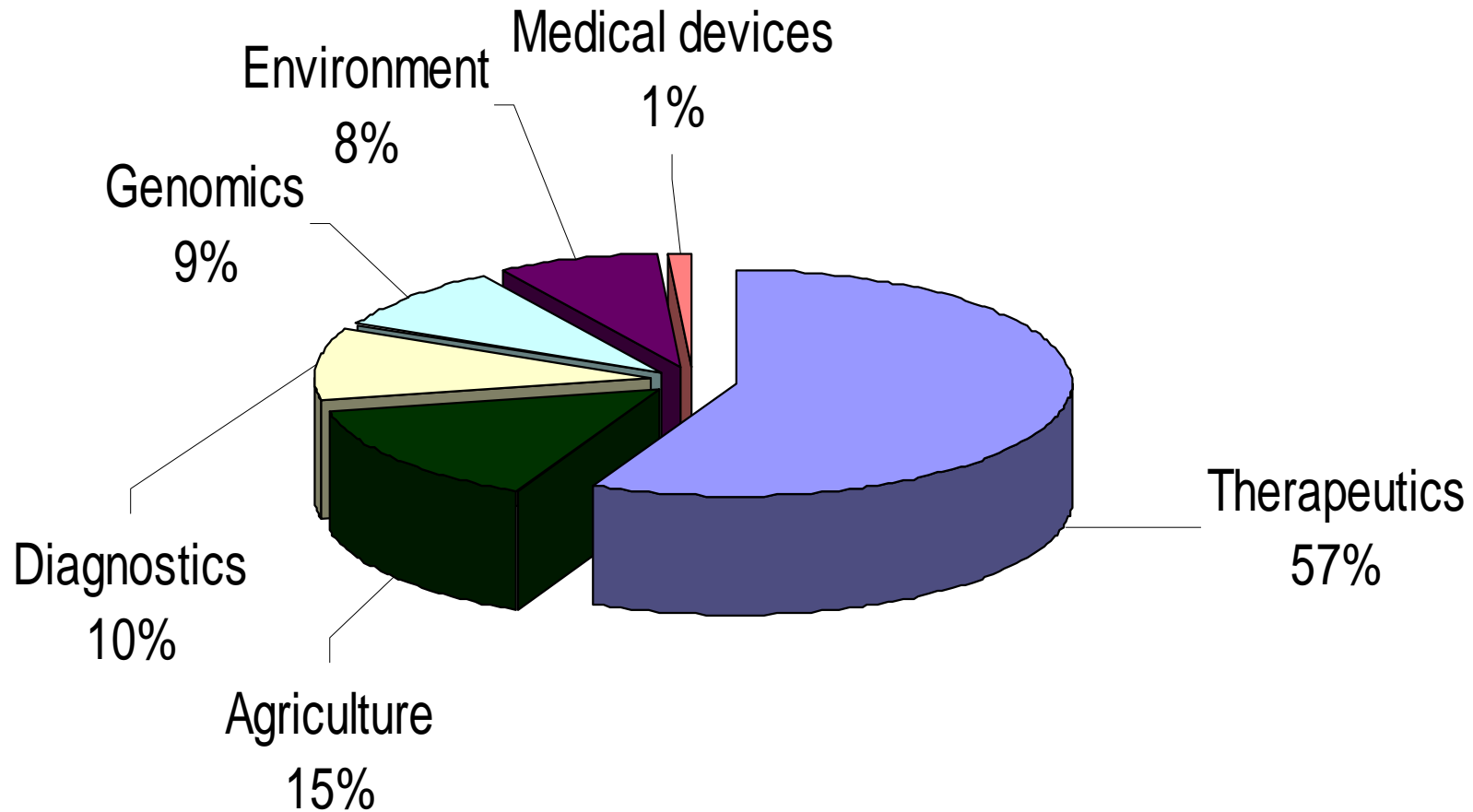
Discovery of genes involved in breast cancer, Alzheimer's, heart disease & many others

Regional Biotechnology Strengths



Sector Breakdown

Canada has over 400 biotech companies...

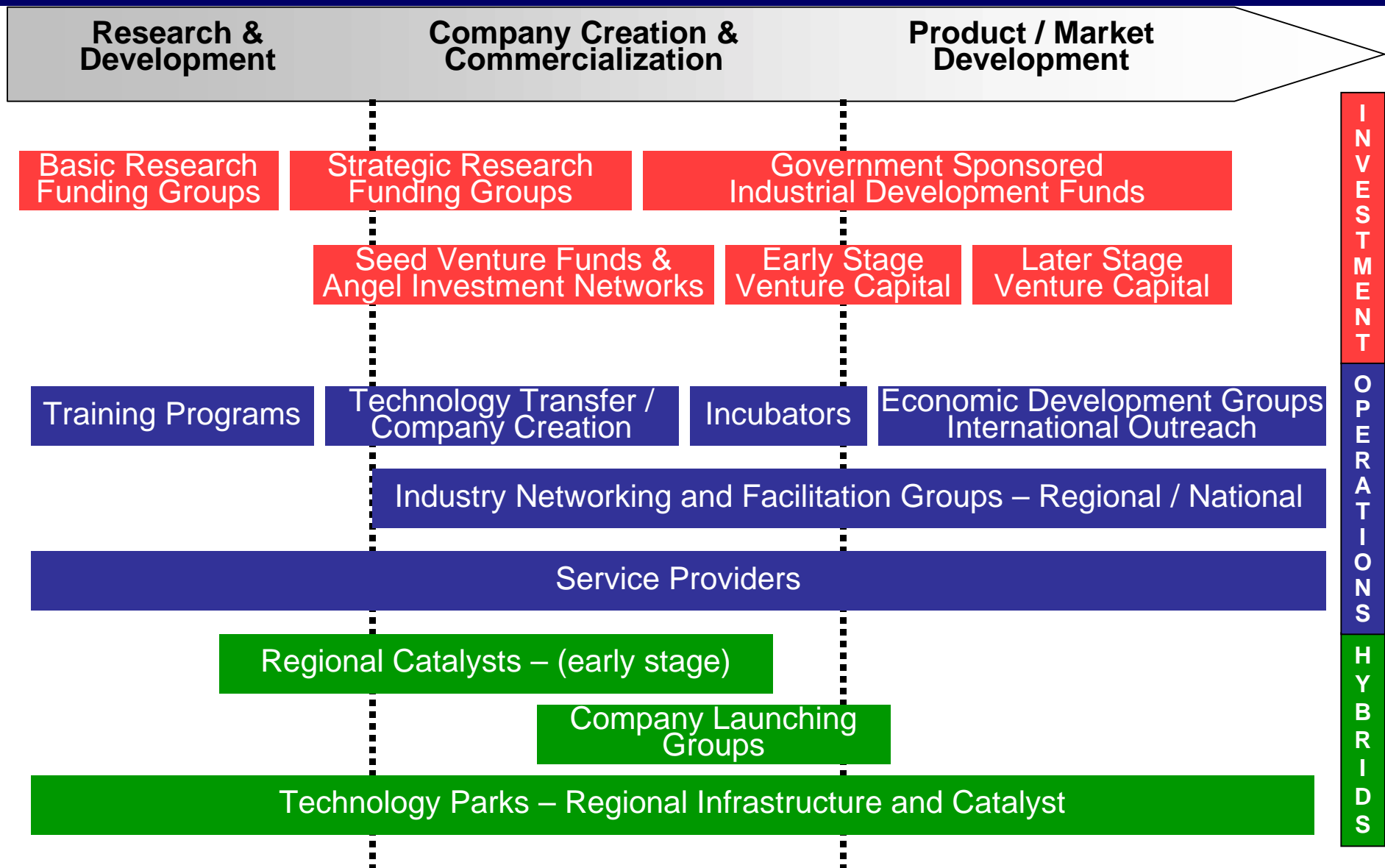


A High-Growth Sector

	2001	1997	Change
Number of Firms	391	227	72%
Biotech Revenues	\$ 3.7 B	\$ 813 M	454%
Biotech R&D	\$ 1.4 B	\$ 494 M	282%
Export Revenue	\$ 795 M	\$ 311 M	155%
Import Expenditure	\$ 471 M	N/A	N/A

The Canadian biotech sector is a competitive and vibrant market that is positioned for continued growth and success

Support at every stage of the biotechnology industry value chain



Critical components of an emerging biotech industry

Stakeholders

Biotech Cluster

Global Strategy

Impact

Government

Industry

Academia

NGO

Investors

Companies

Researchers

Capitalizes on
Strengths and
Opportunities

Addresses
Weaknesses

Investment

New
companies

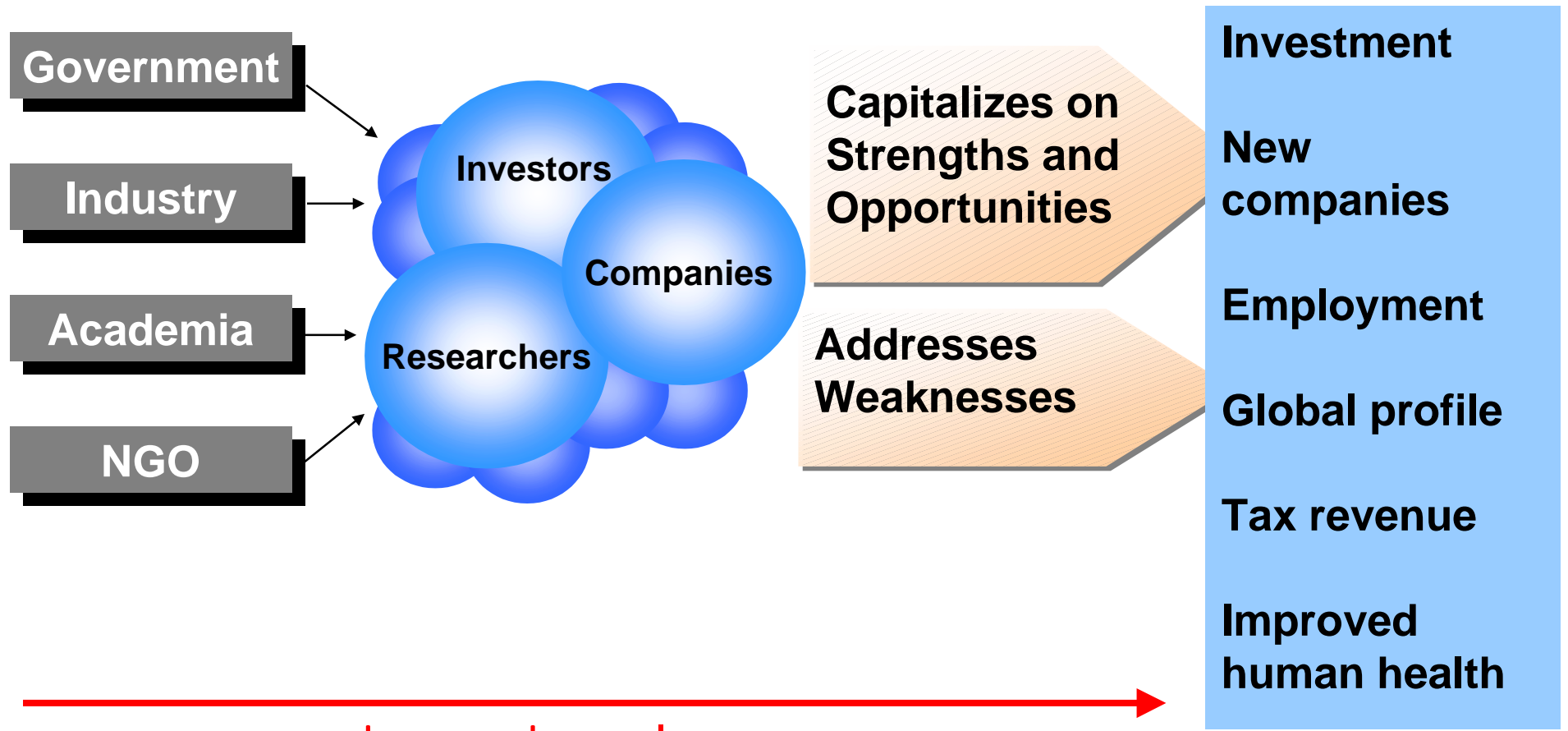
Employment

Global profile

Tax revenue

Improved
human health

increasing value



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Strategy for Success

Strategic direction

1

**Policy initiatives
(Federal and Provincial)**

- Innovation Strategy
- Canadian Biotech Strategy
- Ontario BioCouncil

Implementation

2

Cluster development

- Regional competitive advantage
- Barriers to entry
- Strategic partnerships
- Socio-economic benefits

3

Networks

- Links research with resources and investors with potential investments

4

Academic and Industry Research

- Academic excellence grows into successful large scale companies

5

Government funding

The key for a successful strategy



Policy

Cluster

Network

Academic and
Industry Research

Funding

National Policy: Innovation Strategy

Vision: Canada's Innovation Strategy was launched in February 2002. Its goal is to move Canada to the front ranks of the world's most innovative countries

Criteria for Success

Knowledge Performance — encouraging Canadian firms to reap more benefits from creating knowledge and bringing ideas to market. It also means increasing R&D investment in Canada by all sectors

Skills — ensuring that in years to come Canada has enough highly qualified people with the skills for a vibrant, knowledge-based economy

The Innovation Environment — modernizing business and regulatory policies to support and recognize investment and innovation excellence

Strengthening Communities — supporting innovation at the local level so that Canada's communities continue to be magnets for investment and opportunity

Policy

Cluster

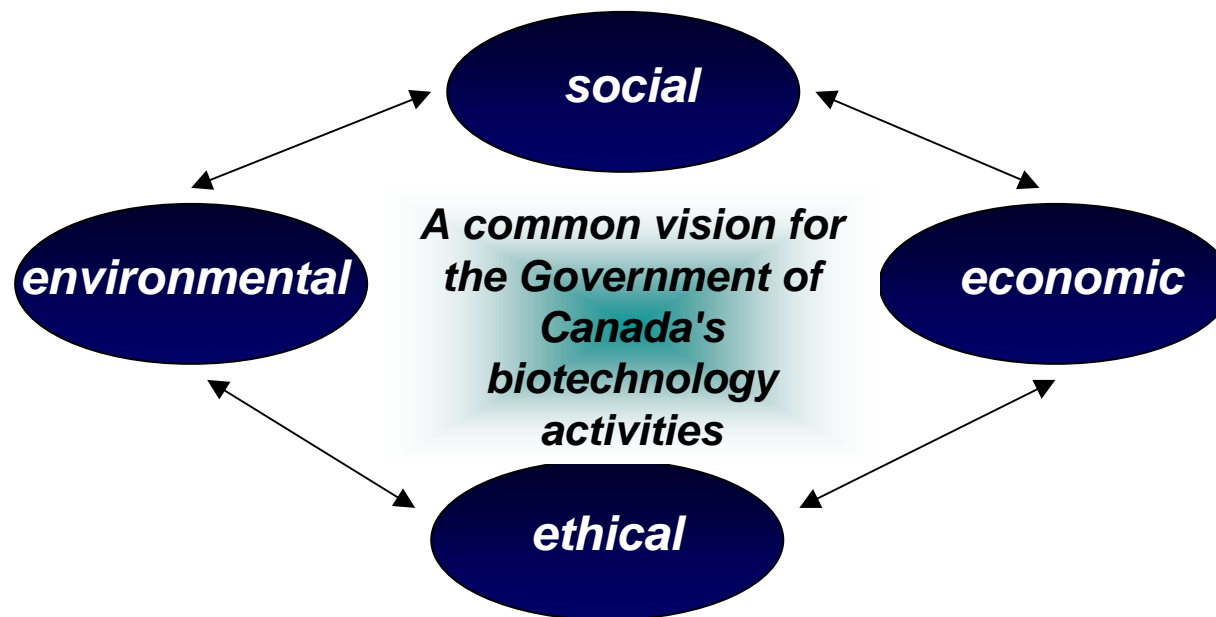
Network

Academic and
Industry Research

Funding

National Policy: Canadian Biotechnology Strategy

To fully realize biotechnology's potential to improve Canadians' quality of life and to position Canada as a responsible global leader in the development and application of biotechnology



What is a Biotech Cluster?

Definition of a cluster

- Jurisdiction that can attract/create a dynamic environment of:*
 - Competing and cooperating companies*
 - Suppliers*
 - Service providers*
 - Associated institutions*
- Enables a durable and productive industrial base*

Critical Factors

*Big, hairy
audacious goal*



*Globally
focused*



*Ambitious, yet
implementable*

Canadian Biotechnology Clusters

• **20% of biotech companies**

• **The 16th largest biotechnology community in North America**

Vancouver:

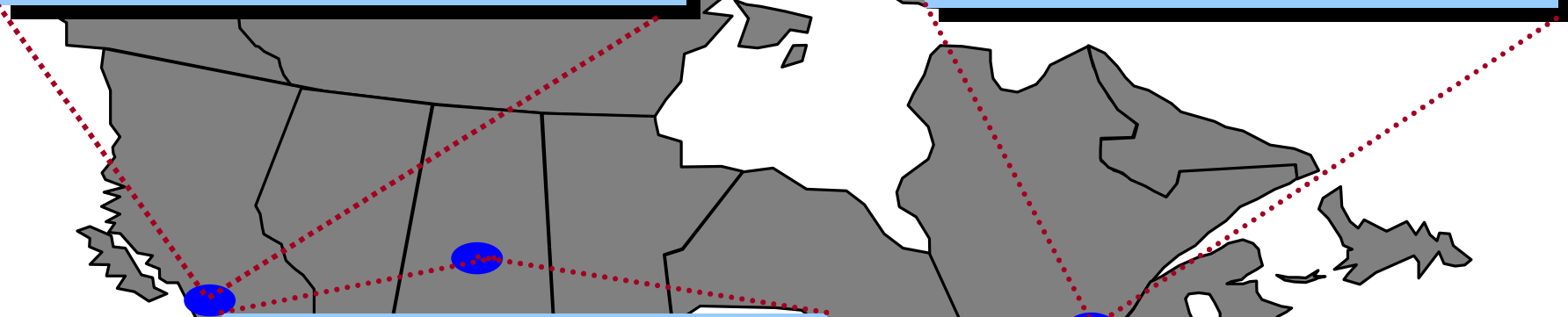
- 90 private-sector biotech companies, employing about 3,300 people
- 70% are Spin-offs from BC universities

• **32% of biotech companies**

• **Spends about 40% of the total CDN R&D (\$337 million) - 2002**

Montreal:

- 70% of the province's biotechnology companies
- Strengths in pharmaceuticals



• **Strong venture capital infrastructure, with two major provincial funds:**

• **Saskatchewan Opportunities Corporation**

• **Agri-Food Equity Fund**

Saskatoon:

• **The largest concentration of agbiotech R&D in Canada**

• **28% of biotech companies**

• **Ontario Innovation Tax Credit**

Toronto:

- The fourth-largest medical community in North America
- More than half of Canada's brand pharmaceutical industry

Policy

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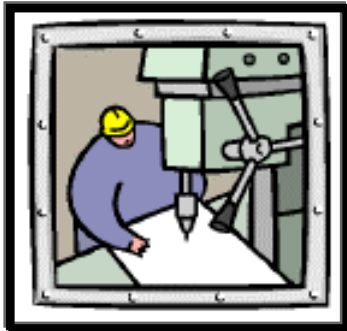
Academic and
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Funding

Biotechnology clusters are built through competitive partnerships

Partnering away weaknesses: By leveraging the local *strengths* and identifying the *gaps* in building a successful cluster, a region can fill in the missing components by *strategically attracting partners*

The challenge



Region has internationally recognized strengths in manufacturing...



...but lacks the necessary R&D capabilities for a biotech cluster

The solution



Search for partners who have the R&D strengths and gaps in manufacturing



The foundation is now set for cluster growth

Policy

Cluster

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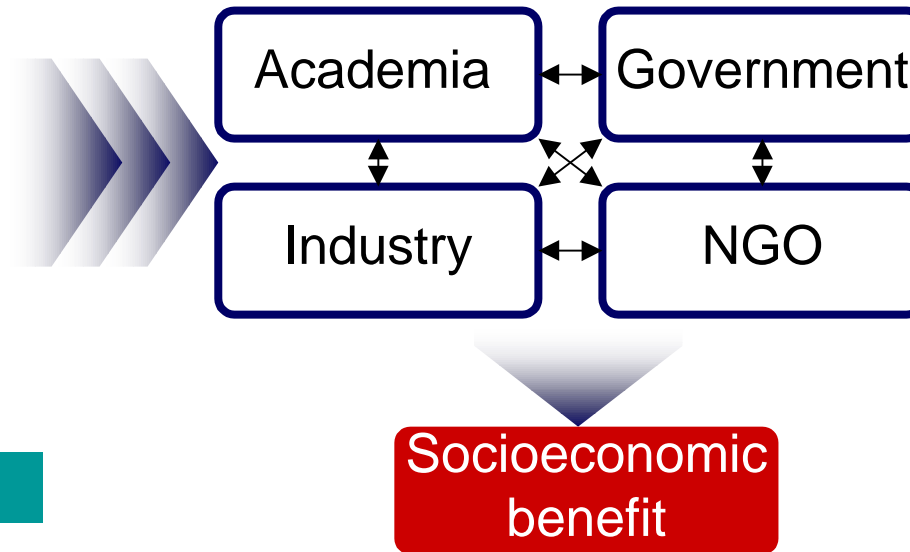
Academic and
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Network of Centres of Excellence



Research & Entrepreneurial Talent



Networks of Centres of Excellence are unique partnerships among universities, industry, government and non-governmental organizations aimed at turning Canadian research and entrepreneurial talent into economic and social benefits for all Canadians

Innovative Research Initiatives



- The **Biomolecular Interaction Network Database** is an **international** not-for-profit biomolecular data management project
- **BIND** is affiliated with the Samuel Lunenfeld Research Institute (SLRI) and the University of Toronto



- A \$21 million National Centre of **Excellence in stem cell genomics**
- Involves more than 50 leading researchers at **24 Canadian institutions**

L.I.F.E. Initiative



- The Living Implants from Engineering (L.I.F.E.) Initiative
- An international effort to create a bioengineered heart within 10 years
- Led by University of Toronto professor Michael Sefton

Policy

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Funding

Canada's 645 biopharmaceutical products in development cover more than 20 therapeutic areas

Cancer
138 products

Infectious disease
55 products



Cardiovascular disease
51 products

Central nervous system
66 products

Policy





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Canada's Proteomics "Big Five"

	73 prioritized targets
<i>Affinium™ Pharmaceuticals</i>	\$25 million raised in second venture round
	Collaborative research initiatives with Cephalon, Abgenix, Eli Lilly
	Received TSE listing in July 2001
	First diagnostics for Mad Cow Disease and human variant Creutzfeldt-Jacob's Disease (vCJD),

The Importance of Government Funding

- In Canada, federal funding opportunities total \$2 billion annually



- Provincial funding provides an additional \$2.7 to \$2.9 billion in annual investments

Policy

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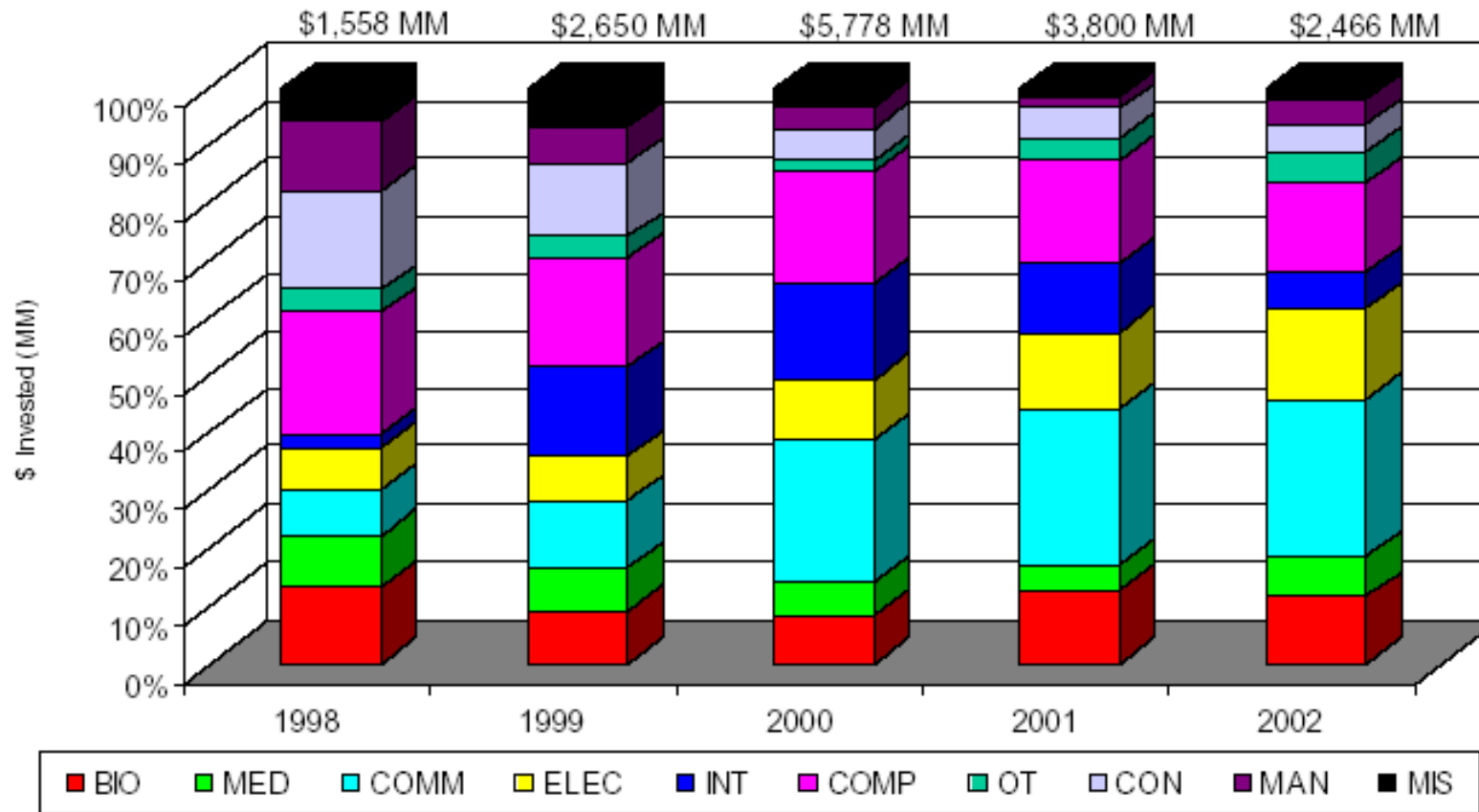
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The Importance of Private Sector Funding

Amount invested by Sector (Canada)



Canadian Excellence in Biotechnology: *Critical Success Factors*

- ✓ Academic excellence in basic research
- ✓ Supportive government infrastructure
- ✓ Attractive economic environment
- ✓ Access to major markets
- ✓ Strong interconnected network of support services
- ✓ Significant funding from both public and private sources
- ✓ Expanding biotech clusters



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