

**Alberta Science and Research
Authority**

1996-97 Annual Report

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MESSAGE FROM THE CHAIRMAN

The Alberta Science and Research Authority (ASRA) was mandated by the Alberta Government to provide a strategic vision to stimulate research and development activities in Alberta and to coordinate, on a government-wide basis, the activities of the Ministries that fund or perform research. ASRA reports to Government through the Minister Responsible for Science, Research and Information Technology. In a world where the economic driving forces are competitiveness and innovation, Alberta's success in the global economy will depend on its continuing commitment to research, education and innovation. In its second full year of operation, ASRA made a significant effort to provide a visionary leadership for the province's innovation system as well as coordinating the development of research activities on a government-wide basis. In this second annual report, ASRA focuses on the objectives set for itself for the 1996-97 year and the results achieved. Specific ASRA accomplishments included:

- A research and development (R&D) priorities consultation that identified nine high-priority research areas.
- Development of performance measures for Alberta's innovation system.
- A major study to document the barriers to commercialization of technology and recommended actions to overcome them to make Alberta an attractive place for investment.
- Establishment of a Science and Research Fund.
- Significant progress toward increased R&D investment in Alberta by pharmaceutical firms.
- Development of a database architecture to profile high-knowledge sectors.
- Significant progress toward describing the various elements of Alberta's decentralized R&D infrastructure and improving the planning and reporting process for R&D business plans to integrate more seamlessly with the business planning cycle.
- Preliminary steps toward creation of a biotechnology industry association as part of the efforts to build a stronger biotechnology industry.
- Publication of a vision paper for a strong Alberta health research industry.
- Publication of a newsletter and series of stories documenting research successes happening throughout the province to better inform Government and the public about the importance of science and research.

In addition, ASRA support contributed to success of the following initiatives:

- An Alberta Government initiative to create the Intellectual Infrastructure Partnership Program (IIPP), which will enable significant reinvestment in Alberta's research infrastructure;

- Initiation of the Agriculture Value Added Corporation (AVAC Ltd.);
- The merger of Alberta Research Council (ARC) with the Alberta Environmental Centre at Vegreville, which was a major adjustment for both organizations, and has put ARC in an even stronger position to work with government and industry in key sectors of the Alberta economy.

I wish to express my appreciation to the members of the ASRA Board of Management for providing their valuable leadership, time and commitment to undertaking ASRA's mission. On behalf of the Board, I also wish to thank the staff of the ASRA Secretariat, headed up by Dr. Robert Fessenden, President of ASRA, for their support and dedication. Lastly, a sincere thank you to the Minister Responsible for Science, Research and Information Technology, the Honourable Dr. Lorne Taylor, who has provided a strength of leadership and vision which greatly assisted ASRA in reaching its accomplishments. The support of Minister Taylor's Cabinet colleagues is also greatly appreciated.



R.B. (Bob) Church
Chairman of the Board of Management
Alberta Science and Research Authority

OVERVIEW

The main function of ASRA is to stimulate science and research and encourage a strong economy through the recommendation of policies and priorities for science and research that more effectively utilize the government's investment in this area. The Alberta Science and Research Authority Act defined ASRA's responsibilities in 1995. ASRA is comprised of a Board of Management of 25 members (Appendix 1) and is supported by a small secretariat (Appendix 1). The Chairman of the Board reports directly to the Minister Responsible for Science and Research.

Mandate

As the senior science and research body of the Government of Alberta, the Science and Research Authority works in collaboration with government ministries and other stakeholders to:

- stimulate research and development and related scientific activities in Alberta;
- develop a science and research policy and priorities that are compatible with the economic and social policies and priorities of the government;
- conduct an annual review and evaluation of all government science and research policies, priorities and programs;
- develop and monitor a financial management plan for the science and research investments of the government;
- promote communication on matters related to science and research; and
- encourage the science and research community and infrastructure in Alberta to attain international excellence to enable Alberta to be internationally competitive.

Contact:

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An Operational Overview

The small ASRA secretariat staff serves as support to the ASRA Board and to the Minister's office. ASRA conducts most of its work through board task forces (Appendix 2), which undertake projects that respond to the priorities identified in the business plan. Although some task forces consist entirely of Board members, most include members of the larger community.

ASRA secretariat staff provide project management support to board task forces and manage projects. Task forces complete their project work in three ways: 1) some work is done by the task force members themselves, 2) the secretariat liaison person completes some work, and 3) in many cases, private sector consultants are retained to undertake studies in support of the projects. The ASRA Board meets at about six-week intervals to review priorities, receive progress reports from board task forces, and formulate recommendations and action plans to influence implementation of recommendations. ASRA publishes reports that summarize significant studies (Appendix 3).

RESULTS ANALYSIS

Objectives and Accomplishments

Objective one: Develop a science and research strategy

Development of a strategy for Alberta's innovation system is a four-step process:

1. Determine R&D priorities
2. Develop a framework of performance measures for the innovation system
3. Develop the proposed strategy for the innovation system
4. Refine the strategy through a consultation process.

ASRA completed the first two steps during fiscal year (FY) 1996-97. The performance measurement framework is included as part of this report. ASRA intends to publish this framework as its first annual report on the health of the Alberta innovation system during FY 1997-98. ASRA also intends to complete steps 3 and 4 of the process during FY 1997-98 leading to publication of a strategy for Alberta's innovation system.

- As the first step in establishing a strategy for Alberta's innovation system, ASRA conducted an R&D priorities consultation between May and July 1996. About 300 Albertans provided input to the first stage of the consultation. About 160 participated in the four workshops that constituted the second stage of the consultation. Participants ranked 16 research application areas (RAAs) on attractiveness and feasibility and identified nine RAAs as warranting strong emphasis. ASRA published the results of the consultation as a summary and a complete report.
- As the second step in establishing a strategy for Alberta's innovation system, ASRA initiated a project to define performance measures for the innovation system. Working with the Technology and Research Advisory Committee (TRAC), ASRA developed a preliminary performance measure framework, acquired existing data to evaluate the measures, and retained several consultants to develop new data on some measures where data were not readily available. ASRA intends to publish the first annual report on the health of the Alberta innovation system during FY 1997-98.

Objective two: Increase industry R&D funding

The strategic plan to increase funding for R&D in Alberta by businesses is the essence of the strategy that will be finalized during the next fiscal year. During FY 1996-97, ASRA undertook specific actions that will result in increased business funding for R&D.

- ASRA supported the Alberta Government initiative to create the Intellectual Infrastructure Partnership Program (IIPP) in Advanced Education and Career Development. The IIPP was subsequently funded in FY 1997-98 at a level of \$15M per year for three years. The IIPP is expected to produce investment of as much as \$300 million over five years in the province's aging R&D infrastructure. Private sector and federal funds are expected to be from two to three times Alberta's investment.
- ASRA was successful in obtaining funding for the Science and Research Fund at a level of \$5M/year beginning in FY 1997-98. The S&R Fund will be used to jump start strategically important science and research initiatives in partnership with the private sector.
- ASRA's advice to the Minister of Economic Development and Tourism was important in the decision to renew Alberta's agreement for its share of funding to TRILabs. Alberta's investment represents only 12.5% of the budget of TRILabs, which is a critical element of the province's R&D infrastructure in telecommunications.
- ASRA worked in consultation with Alberta Agriculture, Food, and Rural Development (AAFRD) and private sector supporters to initiate the Agriculture Value Added Corporation (AVAC). The ASRA President served on the steering committee that provided direction during early design stages. Members of the ASRA Board served on the proto-board that provided oversight during the initial launch of the corporation. AVAC will attract significant federal and private sector funding providing excellent leverage for Alberta's initial investment.
- ASRA supported the Minister in making significant progress toward increasing R&D investment by pharmaceutical firms through a series of interactions with members of the Pharmaceutical Manufacturers Association of Canada (PMAC).

Objective three: Increase cost effectiveness of science and research infrastructure

ASRA has made significant progress toward describing the various elements of the infrastructure as it currently exists. The science and research infrastructure in Alberta is highly decentralized, with numerous agencies involved in both funding and performance. The other major accomplishment involves improving the planning and reporting process for R&D business plans to integrate more seamlessly with the business planning cycle.

- The ASRA Board reviewed R&D business plans submitted by all provincial departments and agencies. On the basis of this review, the Minister Responsible for Science and Research forwarded a series of general recommendations to Cabinet as well as specific recommendations to individual ministers. ASRA supported requests for increased investment in health, environmental, and agricultural R&D. ASRA expressed concern over the inadequate level of investment in forestry and environmental R&D.

- The ASRA Secretariat maintained liaison with science and research activities of departments throughout the year through the President's role as the chair of the interdepartmental Technology and Research Advisory Committee (TRAC) and the role of a senior ASRA Secretariat staff person as secretary.
- ASRA Secretariat coordinated the development and publication of the report "1996-97 Research Overview Report: Government Science and Technology Programs and Budgets", which summarizes R&D plans of all departments and agencies of the provincial government.
- The ASRA Secretariat funded and coordinated the Statistics Canada survey, "Scientific Activities of the Government of Alberta". The report of 1994-95 Survey Results was published in February (Statistics Canada, 1997) and data were collected for the 1995-96 survey.
- ASRA played an instrumental role in the amalgamation of the Alberta Environmental Centre (AEC) with the Alberta Research Council (ARC).
- ASRA completed a study documenting the R&D infrastructure of the Alberta Government.

Objective four: Improve technology management and commercialization

ASRA has made limited progress in improving the business environment supporting commercialization of technologies. ASRA completed a major study during FY 1996-97 that documented the barriers to commercialization and recommended actions to overcome them. ASRA continues to be actively engaged in attempts to implement the recommendations.

- ASRA conducted a study of barriers to technology commercialization in Alberta. The study involved interviews with more than 80 individuals and firms involved in all aspects of technology commercialization. The resulting "Barriers to Technology Commercialization" (Davitech, 1996) made 18 recommendations for concrete action in four issue areas: financing, management, infrastructure, and marketing. ASRA is working with Alberta Treasury, Economic Development, and Agriculture, Food, and Rural Development to implement the recommendations.
- ASRA has worked with various standing policy committees and Alberta Treasury in an effort to modify the current policy approach to tax treatment of businesses in the research-intensive, high-knowledge sector.
- ASRA provided support for Alberta's effort to recruit a computer-chip-fabrication facility to Alberta.

Objective five: Implement a communications initiative

ASRA's communications initiative seeks to (a) increase recognition of Alberta in the global community as a science and technology investment opportunity and (b) improve the level of support for science and technology among all Albertans. ASRA has developed a series of information products to communicate information about science and research in Alberta:

- ASRA newsletter;
- ASRA web site, which was visited approximately 3000 times per week; and
- "Selected Alberta Science and Research Success Stories: Volume II", which provides an additional 40 examples of social and economic benefits from science and research.

ASRA developed an internet-based database architecture to profile high-knowledge sectors.

ASRA initiated efforts to increase the effectiveness of the more than one hundred organizations engaged in promotion of science and research in Alberta.

- ASRA initiated an inventory of science promotion activities, which will be published during the first quarter of FY 1997-98.

ASRA facilitated a number of conferences and other special events that profiled Alberta's science and research community, such as:

- National Science and Technology Week.
- Global Networking '97 Joint Conference.

Objective six: Promote a strong biotechnology industry in Alberta

ASRA published a report, "The Commercialization of Biotechnology in Alberta", in 1995 that recommended actions necessary to build a strong biotechnology industry in Alberta. ASRA has continued to work with Alberta Economic Development and Tourism and various stakeholders in the biotechnology community to implement the recommendations of the report.

- Progress includes development of a draft business plan for a biotechnology industry association and implementation of an internet-based database of biotechnology expertise in the province.
- ASRA coordinated provincial efforts to obtain Department of National Defense support for a vaccine-production facility in Edmonton.

Objective seven: Promote Alberta's healthcare science and technology

The investment made by Alberta in the Alberta Heritage Foundation for Medical Research (AHFMR) has proved extremely effective in building outstanding capability in research. Alberta has achieved worldwide recognition for its excellence in bio-medical research. ASRA has been a key player in efforts to enhance the province's ability to capture the commercial benefits of this research excellence.

- ASRA supported completion of the report “Health Research: a strategic opportunity for Albertans” (the “Stewart Report”, 1996). Subsequent to publication of this report, ASRA has been actively engaged with a variety of stakeholders in efforts to implement its recommendations.
- ASRA has been consulted by and has provided advice to the team developing Wellnet, the provincial health information system

KEY PERFORMANCE MEASURES

In its 1996-1999 business plan, ASRA identified a preliminary series of performance measures for the Alberta Innovation System.

1. Total investment in science and research in Alberta
2. Private sector investment in science and research in Alberta
3. Number of people employed in science and research in Alberta
4. Level of tradable goods and services in science and technology sectors
5. Number of joint industry/government research and development projects
6. Percentage of new workforce entering science and technology careers

ASRA evaluated this preliminary performance measure framework in considerable depth during the year and modified it through consultation with TRAC. The resulting performance measures for the innovation system directly incorporate the first three preliminary measures. The fourth preliminary measure was incorporated in a modified form.

The fifth and sixth preliminary measures proved impractical in the form that they were stated and were not included in the current version of the performance measurement framework. The fifth measure was directed at measuring leverage obtained on Alberta Government R&D funds. The proposed preliminary measure was not considered relevant and data were not available for relevant alternatives. ASRA will work with departments during FY 1997-98 to develop relevant, practical methods to measure and track leverage on government investment. The sixth measure, although highly relevant, was impractical because of a lack of data. Advanced Education and Career Development and the universities have begun to collect data on career outcomes of graduating students. ASRA will work with them during FY 1997-98 to incorporate an appropriate measure into the Human Capital Capacity measure of the framework.

The following discussion summarizes the current version of the performance measures for the Innovation System. A more complete report is included as Appendix 2.

ASRA has selected the following measures as the key indicators of the health of the Alberta innovation system:

1. Investment in Research and Development (R&D)
2. Human Capital Capacity
3. Outputs of Research
4. Venture Capital Investment in High-Knowledge Firms
5. Performance of the Innovation Based Economy

INVESTMENT IN RESEARCH AND DEVELOPMENT (R&D)

R&D investment in Alberta is falling behind most of Canada

Throughout the world, Gross Expenditure on R&D (GERD) is a strong indicator of the health of the economy in countries, provinces, or states.

Currently, Alberta’s GERD from all sectors (business, provincial government, federal government, university) is:

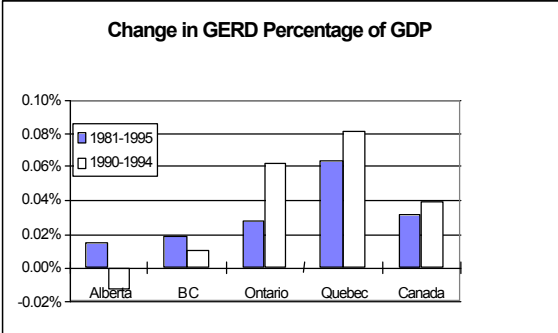
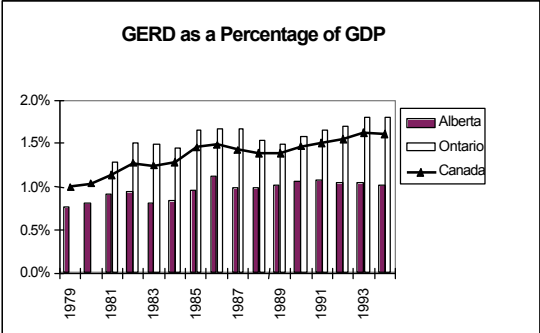
- about \$850 million per year (in 1994),
- 1% of Alberta’s GDP,
- 63% of the Canadian level of about 1.6% of GDP,

Of major Canadian provinces, Alberta’s GERD exceeds only GERD in British Columbia (0.9%).

During the 1990s, R&D investment in both Ontario and Quebec has exceeded 1.8% of GDP. In competitive jurisdictions elsewhere in the world, R&D investment is even higher.

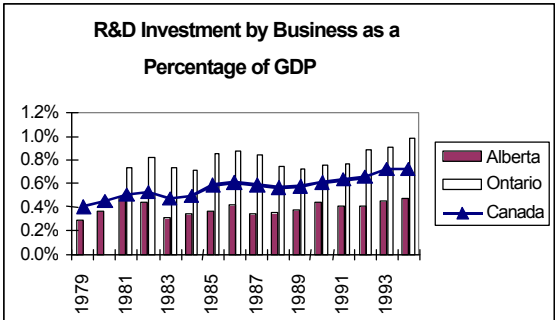
Jurisdiction	Alberta	Ontario	Quebec	USA	France	Germany	Japan
GERD/GDP	1.0	1.8	1.9	2.4	2.4	2.3	2.9

Although Alberta GERD has increased from 0.78% of GDP in 1979, the increase has been slower than for the country as a whole. R&D investment in Alberta has experienced the slowest growth rate in Canada for the past 15 years, steadily falling behind the rest of Canada. During the period from 1990 to 1994, R&D investment as a percentage of GDP in Alberta actually decreased marginally.



Alberta business R&D investment is lagging behind the rest of Canada

R&D investment by Alberta business is a critical element in sustaining the Alberta Advantage. Although R&D investment by Alberta businesses has grown during the past 15 years, investment in the rest of Canada has grown more rapidly.



HUMAN CAPITAL CAPACITY

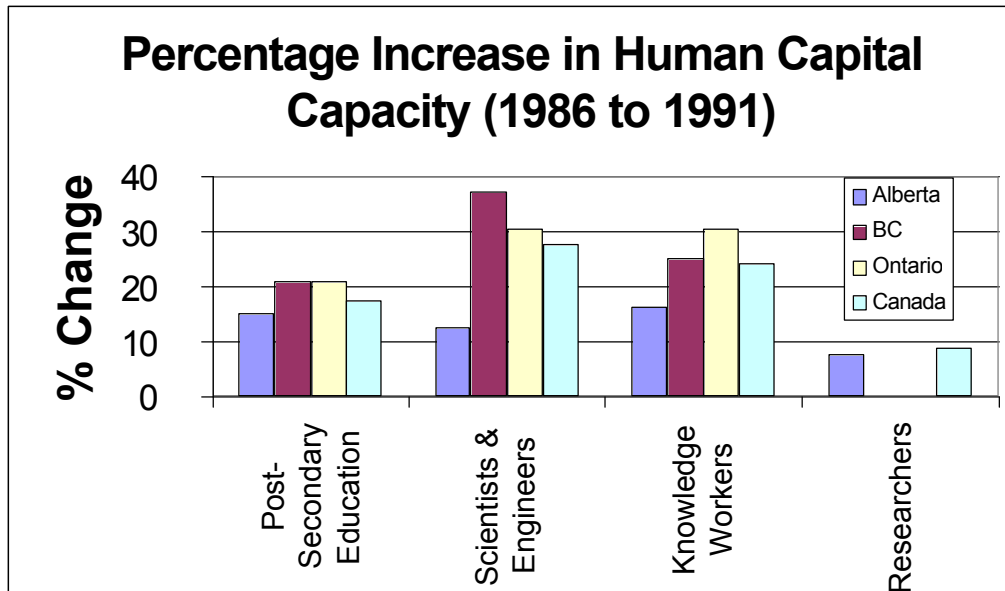
Growth of human capital capacity is slower in Alberta than in Canada as a whole

Alberta's capacity for innovation is a function of the numbers and level of excellence of people in the Innovation System. The percentage of the workforce in each of the categories below provides a measure of the Human Capital Capacity of Alberta.

Category	Workforce % in 1991	% Increase from 1986
Post Secondary Graduates	48.0	15.2 (est.)
Knowledge Workers	25.2	16.4
Scientists and Engineers	4.6	12.6
Researchers	0.55	7.6

Percentage of Human Capital in Alberta workforce

Between the census of 1986 and 1991, Alberta's human capital capacity lost ground relative to British Columbia, Ontario, and Canada as a whole. During this period, the proportion of the Alberta workforce made up of people with post-secondary education, those working as knowledge workers, scientists and engineers, grew. However, the human capital capability of the rest of Canada grew faster than in Alberta.

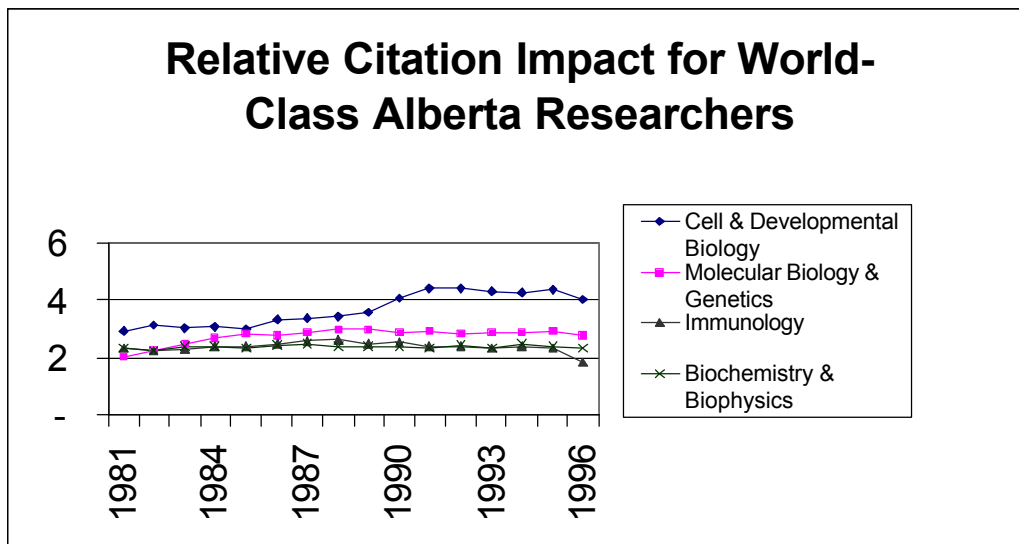


OUTPUTS OF RESEARCH

Citation Impact Index, the average number of citations that publications receive, estimates the value to their peers of the scholarly outputs by researchers. The number of patents assigned to Albertans is taken as an index of potentially commercially important R&D products.

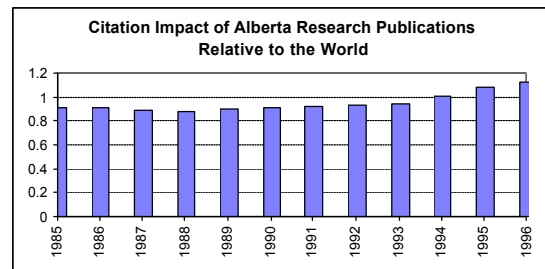
Investment in AHFMR resulted in world-recognized excellence in medical research

In a number of medical research fields, Alberta researchers have publication impacts two to three times that of the world average for those fields. In these few fields, Alberta has attained world scale excellence. This success demonstrates the effectiveness of the provincial strategy of investing in the Alberta Heritage Foundation for Medical Research (AHFMR).



Outside of biomedical disciplines, Alberta research has not attained world class status

The citation impact of papers published by Alberta researchers relative to the rest of the world has shown a small but steady increase from about 0.9 in 1988 to about 1.1 in 1996. In aggregate, papers by Alberta researchers are cited slightly more frequently than for the world as a whole.

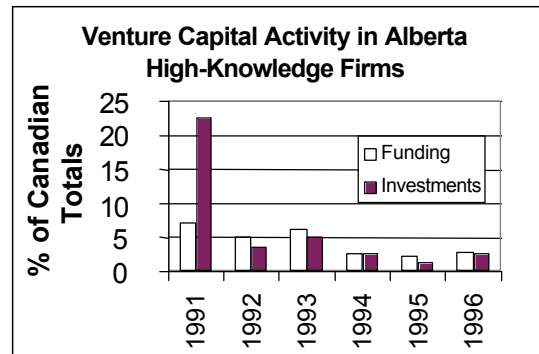


VENTURE CAPITAL INVESTMENT IN HIGH-KNOWLEDGE FIRMS

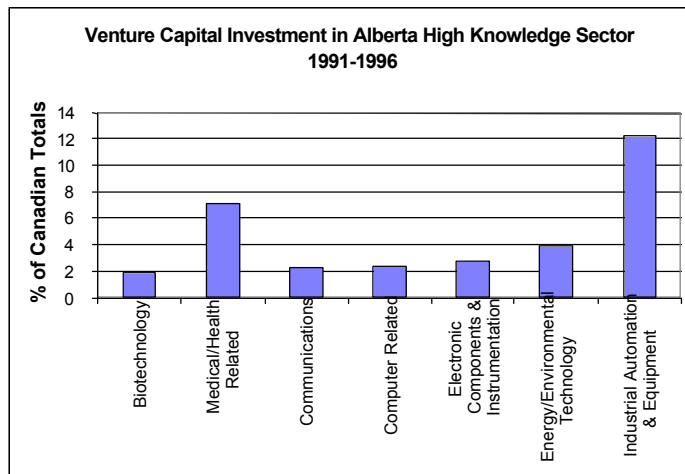
Investment in Alberta firms trails the rest of Canada

The ability of Alberta to commercialize the results of R&D and thereby reap the socio-economic benefits of new knowledge is determined by the receptor capacity of Alberta industry. Investment by institutional venture capital firms is especially important in supporting the growth in the number and size of firms in the newly emerging knowledge-based sector. Institutional venture capital investment is an important index of the status of the innovation system in Alberta.

Alberta has fallen far behind the rest of Canada in venture capital investment in the high-knowledge sector. Since 1992, less than 5% of institutional venture capital investment in Canada has occurred in Alberta.



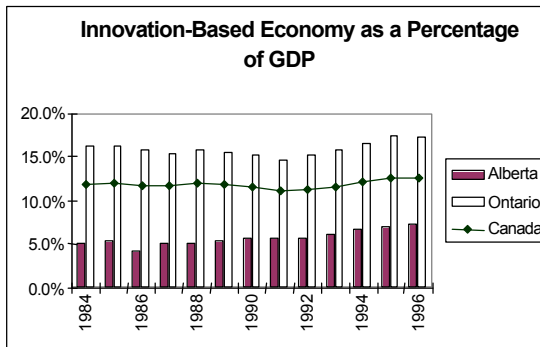
Investments between 1991 and 1996 in nearly all sectors of the Alberta high-knowledge industry have represented only a small percentage of investment in Canada.



PERFORMANCE OF THE INNOVATION-BASED ECONOMY

The GDP percentage of Alberta's Innovation-Based Economy grew at 4.3% between 1980 and 1995

Alberta's innovation-based economy grew from \$1.58 billion in 1980 to \$5.13 billion in 1995. During this same period, the innovation-based economy increased from about 4% of GDP in 1980 to about 7% of GDP in 1995, representing an average annual growth rate of about 4.3%.



In Ontario and Quebec, the innovation-based economy represents a larger percentage of the provincial economy; about 17% and 13% respectively.

The innovation-based economy consists of three elements, which differ in size and growth rate:

1. **Resource value-added industries** (agriculture and forestry), which constitute about 43% of Alberta's innovation-based economy, increased from about 1.5% of GDP in 1980 to about 3.2% of GDP in 1995, representing an average annual growth rate of about 5.3%.
2. **Energy value-added industries** (refined petroleum products and chemical manufacture), which constitute about 31% of Alberta's innovation-based economy, increased from about 1.4% of GDP in 1980 to about 2.2% of GDP in 1995, representing an average annual growth rate of about 2.2%. The rate of growth declined significantly in the past 10 years.
3. **High-knowledge manufacturing** (biopharmaceuticals, electronics and telecommunications, machinery, and transportation equipment), which represents 25% of Alberta's innovation-based economy, increased from about 1.0% of GDP in 1980 to about 1.8% of GDP in 1995, representing an average annual growth rate of about 4.5%. The rate of growth accelerated during the past five years.

FUTURE CHALLENGES

ASRA and the Minister are concerned about the state of Alberta's innovation system as revealed by performance measures outlined above. During the first half of FY 1997-98, ASRA will develop strategic recommendations for government action to improve the health of the science and research system. Development of this strategy and moving its implementation forward will be the most important priority for the Ministry in FY 1997-98.

APPENDICES

Appendix 1 -- ASRA People

ASRA Board

Board Members	ASRA Role	Affiliation
Mr. Albert Bell		President Albert Bell Development Consultants
Ms. Edwina Bobocel		Sr. Consultant, Community Ventures Limited
Dr. Len Bruton		Professor of Engineering, University of Calgary
Dr. Bob Church	Chairman	Owner, Lochend Luing Ranch
Dr. William Cochrane		President, W.A. Cochrane & Associates Inc. and Director, MDS Health Ventures Inc.
Dr. Ruth Collins-Nakai		Associate Dean, Faculty of Medicine, University of Alberta
Dr. Robert Fessenden	President	ASRA
Mr. Jack MacLeod		Shell Canada CEO (retired) and Foothills Hospitals Foundation
Mr. John McDougall		President, McDougall and Secord Ltd., Poole Chair in Engineering Management, University of Alberta
Honourable Dianne Mirosh		Minister Responsible for Science and Research, MLA, Calgary-Glenmore
Mr. Monte Montemurro		Senior Vice-President and Chief Technical Officer, Pan Canadian Petroleum Ltd.
Mr. Michael Pfeiffer		President and CEO, QC Data International
Mr. Glenn Rainbird		President and CEO, TRLabs
Dr. Rob Rennie		Vice-President, Agrium Inc.
Mr. Ed Stelmach, MLA		MLA, Vegreville-Viking
Dr. Lorne Taylor, MLA,	Vice-Chairman	Chairman, Alberta Research Council and MLA, Cyprus-Medicine Hat
Mr. Ben Thorlakson		President, Thorlakson Feedyards

ASRA Staff

Staff Members	Responsibility	
Ms. Arlane Caruk	Administrative Officer	
Dr. Robert Fessenden	President and CEO	
Ms. Marie Gillis	Administrative Assistant	
Ms. Catherine Gordey	Communications Strategist	
Dr. Ted Heidrick	Senior Science Advisor	
Mr. Marvin Mishio	Science Advisor	
Dr. Stephen Moran	Senior Science Advisor	
Dr. Charles Reichert	Senior Science Advisor	Resigned March 1997

Appendix 2 -- ASRA Task Force Membership

Biotechnology Commercialization Task Force

Name	ASRA	Affiliation
Dr. William Cochrane	CHAIR of Task Force, Board Member	W.A. Cochrane and Associates Inc.
Dr. Ruth Collins-Nakai	Board Member	Faculty of Medicine, University of Alberta
Dr. Bob Fessenden	President	ASRA
Ms. Cheryl Knebel		National Entrepreneurship Development
Dr. Tony Noujaim		President and CEO, Altarex Inc.
Ms. Barbara Nyland	Director	ASRA
Mr. Tom Ogaranko		Knowledge Channel Corp.
Mr. Bern Philip		Economic Development
Dr. Rob Rennie	Board Member	Vice-President, New Products R&D, Agrium Inc.
Dr. Alfred Sailer		Acumen Capital Finance Partners Limited

Communications Task Force

Name	ASRA	Affiliation
Ms. Edwina Bobocel	CHAIR of Task Force, Board Member	Community Ventures Limited
Mr. Albert Bell	Board Member	Albert Bell Development Consultants Ltd.
Dr. Bob Fessenden	President	Alberta Science and Research Authority
Ms. Catherine Gordey	Associate	Alberta Science and Research Authority
Mr. Mark Patton		Executive Assistant to Minister Responsible for Science and Research
Mr. Bill Rice		Personnel Administration Office

R&D Priorities Task Force

Name	ASRA	Affiliation
Mr. John McDougall	CHAIR of Task Force, Board Member	Poole Chair in Engineering Management, University of Alberta
Ms, Edwina Bobocel	Board Member	Community Ventures Limited, Athabasca, Alberta
Dr. Ruth Collins-Nakai	Board Member	Faculty of Medicine, University of Alberta
Dr. Bob Fessenden	President	ASRA
Mr. Monte Montemurro	Board Member	Canadian Oil Sands Investments Inc
Dr. Stephen Moran	Senior Science Advisor	ASRA
Mr. Glenn Rainbird	Board Member	TRLabs
Mr. Ben Thorlakson	Board Member	Thorlakson Feedyards

Scholarly Activities in Post Secondary Institutions Task Force

Name	ASRA	Affiliation
Dr. Rob Rennie	CHAIR of Task Force, Board Member	Agrium Inc
Dr. Len Bruton	Board Member	University of Calgary
Dr. Bob Fessenden	President	ASRA
Mr. John McDougall	Board Member	Poole Chair in Engineering Management, University of Alberta
Ms. Barbara Nyland	Director	ASRA
Dr. Seamus O'Shea		University of Lethbridge

Science and Research Infrastructure Task Force

Name	ASRA	Affiliation
Dr. Len Bruton	CHAIR of Task Force, Board Member	University of Calgary
Mr. W.D. (Bill) Croft		Calgary Research and Development Authority
Dr. Bob Fessenden	President	Alberta Science and Research Authority
Mr. Jack MacLeod	Board Member	Calgary, Alberta
Mr. John McDougall	Board Member	Poole Chair in Engineering Management, University of Alberta
Mr. Monte Montemurro	Board Member	Canadian Oil Sands Investments Inc
Dr. Charles Reichert	Senior Science Advisor	Alberta Science and Research Authority

Financing Technology Commercialization Task Force

Name	ASRA	Affiliation
Dr. Bob Church	CHAIR of Task Force, Board Chair	Lochend Luing Ranch
Ms. Edwina Bobocel	Board Member	Community Ventures Limited
Dr. Bill Cochrane	Board Member	W.A. Cochrane and Associates Inc.
Mr. W.D. (Bill) Croft		Calgary Research and Development Authority
Dr. Bob Fessenden	President	ASRA
Mr. Bruce Healy		Davitech Consulting Inc.
Dr. Stephen Moran	Senior Science Advisor	ASRA
Mr. Ben Thorlakson	Board Member	Thorlakson Feedyards

ASRA Health Task Force

Name	ASRA	Affiliation
Mr. Jack MacLeod	CHAIR of Task Force, Board Member	Calgary Alberta
Mr. Al Bell	Board Member	Albert Bell Development Consultants Ltd.
Dr. Bob Church	Board Chair	Lochend Luing Ranch
Dr. Ruth Collins-Nakai	Board Member	Faculty of Medicine, University of Alberta
Dr. Bob Fessenden	President	ASRA
Ms. Barbara Nyland	Director	ASRA

Information Technologies Task Force

Name	ASRA	Affiliation
Mr. Michael Pfeiffer	CHAIR of Task Force, Board Member	QC Data International
Dr. Bob Church	Board Chair	Lochend Luing Ranch
Dr. Ruth Collins-Nakai	Board Member	ASRA
Dr. Bob Fessenden	President	President
Ms. Barbara Nyland	Director	ASRA
Mr. Tom Ogaranko		Knowledge Channel Corp.
Mr. Glenn Rainbird	Board Member	TRLabs

ASRA Executive Committee

Name	ASRA	Affiliation
Dr. Bob Church	CHAIR, ASRA Board	Lochend Luing Ranch
Ms. Edwina Bobocel	Board Member	Community Ventures Limited
Dr. Len Bruton	Board Member	University of Calgary
Dr. William Cochrane	Board Member	W.A. Cochrane and Associates Inc.
Dr. Bob Fessenden	President	ASRA
Mr. Jack MacLeod	Board Member	Calgary, Alberta
Mr. John McDougall	Board Member	Poole Chair in Engineering Management, University of Alberta
Mr. Michael Pfeiffer	Board Member	QC Data International
Dr. Rob Rennie	Board Member	Agrium Inc.

Appendix 3 -- ASRA Publications

Alberta Science and Research Authority List of 1996/97 Publications

Alberta Health Research Industry Task Force, 1996, *Health Research: A Strategic Opportunity for Albertans*: Alberta Science and Research Authority, 57 pp.+ Appendix.

Alberta Science and Research Authority, 1996, *Selected Alberta Science and Research Success Stories*: Alberta Science and Research Authority, 40 pp.

Alberta Science and Research Authority, 1996, *Selected Alberta Science and Research Success Stories: Volume II*: Alberta Science and Research Authority, 40 pp.

Alberta Science and Research Authority, 1996, *ASRA R&D Priority Setting Consultation: Summary Report*: Alberta Science and Research Authority, 7 pp.

Alberta Science and Research Authority, 1996, *ASRA R&D Priority Setting Consultation: Guidance Toward an R&D Strategy for Alberta*: Alberta Science and Research Authority, 44 pp.

Healy, B., Portman, N., and Doyle, D., 1996, *Barriers to Technology Commercialization in Alberta*: Alberta Science and Research Authority, 59 pp. + Appendices.

APPENDIX 4 -- PERFORMANCE OF ALBERTA'S INNOVATION SYSTEM

Innovation and prosperity are strongly linked. Investment in science, research and technology development is critical to the success of Alberta within the global economy. Research and development sustain and propel economic activity to higher levels by improving efficiencies, production and profitability.

Science and research also have an important impact on the lifestyles and well being of Albertans. Economic growth stimulated by science and research has many benefits to society including increased employment opportunities and improved social services. In addition, many significant advances in areas such as health and environmental protection are based on Alberta's long-term investment in science.

Science and the technology flowing out of research have already had a significant impact on the development of the economy of the province and the overall welfare of Albertans. Although Alberta has abundant natural resources, successful resource development has depended on technological advances to overcome significant barriers. For example: the short growing season in agriculture, the small, slow-maturing trees in forestry, and the immobility of the hydrocarbons in the oil sands.

Alberta's future prosperity depends on the province's ability to develop our most important resources, **knowledge and people**. Science and Research will play an even more critical role in development of the knowledge resource than they have played in developing the province's natural resources.