

# INNOVATION AND NEW BRUNSWICK

GREATER OPPORTUNITY

## *An Innovation Agenda for New Brunswick*



2002-2012



**EMBRACING INNOVATION**  
**An Innovation Agenda for**  
**New Brunswick**

*Published by:*

*Province of New Brunswick*  
*P.O. Box 6000*  
*Fredericton, New Brunswick*  
*E3B 5H1*

*Canada*

*2002-2012*

*Printed in New Brunswick*



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## INNOVATION AND NEW BRUNSWICK

### **An Innovation Agenda for New Brunswick**

The Innovation Agenda for New Brunswick has been developed to guide government efforts to build New Brunswick's innovative capacity, enhance innovative performance and improve innovative outcomes by building dynamic industry clusters in partnership with other governments, the private sector, universities and other learning/research institutions. The agenda has been developed in consultation with the private sector, New Brunswick centres of learning, provincial government departments and research centres, and federal government departments and research organizations operating in the province.

Creating an innovation agenda is a specific action which was set out in *Greater Opportunity: New Brunswick's Prosperity Plan, 2002-2012*. The Innovation Agenda for New Brunswick is the result.

The Innovation Agenda establishes a goal for innovation, together with specific objectives, targets, strategies and actions to meet that goal.

### **Why innovation is important**

*"Innovation is the process by which new ideas are generated into new products, services, technologies and business processes to bring greater value to customers. It is not restricted to scientists or large corporations. Innovation is carried out by universities and community colleges as well as by small businesses. It is a never-ending process that must become entrenched in our province's economic culture."*

Greater Opportunity: New Brunswick's Prosperity Plan 2002-2012

Innovation means much more than research. Innovation is the ability to both generate and take advantage of new ideas and create new ways of doing things. The end result for New Brunswick will be improved competitive advantage. Innovation in industrial development and academic and commercial research is key to competitiveness, expansion and growth.

In order to prosper as a province, New Brunswick must be competitive. In order for the province to be competitive, it is essential that government, the learning/research and private sectors understand and act upon what it takes to successfully compete in today's global, knowledge-based economy. New Brunswick's future competitiveness will be determined by how well the province performs in three key areas: (1) improving the capacity for innovation; (2) increasing productivity; and (3) expanding export orientation.

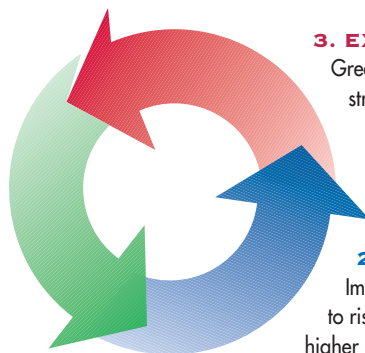




## GLOBAL COMPETITIVENESS

### 1. INNOVATION

Driving force behind productivity improvements, and development and commercialization of new, quality, value-added products and services



### 3. EXPORTS

Greater export growth with a stronger value-added orientation that expands our export base into the new economy

### 2. PRODUCTIVITY

Improvements in productivity lead to rising living standards and higher incomes

Figure 1: Global Competitiveness

New Brunswick must “embrace innovation” if the province is going to succeed as a place for leading-edge business, research and development in the global, knowledge-based economy of today.

In order to achieve this:

- The **private sector** must be encouraged to invest more, bring innovations to market, and commercialize new technologies.
- **Universities** and other learning/research institutions must continue their research and development (R&D) efforts, but link more effectively than ever before with the private sector and government to create strong partnerships.
- **Government** must play a strong supportive role in fostering an attractive business and investment environment for innovation, linking public sector R&D with the private sector, and engaging relevant businesses and entrepreneurs in collaborative efforts to build an innovation culture in the province.

Today’s achievements in innovation are the result of yesterday’s investments in research. Innovation in the future will depend on commitments made now to scientific research and development, as well as the active development of New Brunswick’s industrial receptor capacity, or the ability of industry in the province to commercially develop the outcomes of their research efforts.

For New Brunswick to succeed in the global economy, the province’s capacity for R&D innovation and commercialization must be significantly increased. The provincial workforce must possess the appropriate skills and experience to develop and use new products, processes and technologies. In addition, small and medium-size businesses must be able to develop or acquire, apply and commercialize knowledge leading to new and improved products, services, processes, skills and technologies.



## NEW BRUNSWICK'S CURRENT SITUATION

This section sets out New Brunswick's current innovation challenges and strengths, and positions the Innovation Agenda within the province's comprehensive, ten-year Prosperity Plan. It also lists actions taken to date by the government to build the province's innovation and R&D capacity.

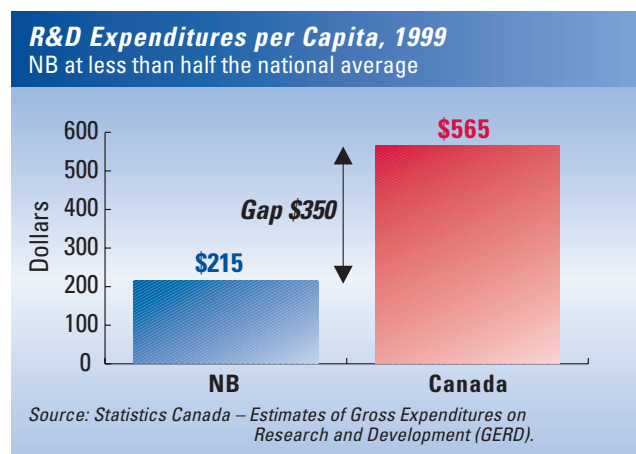
### The challenges

New Brunswick's challenges are similar to those faced by the other Atlantic Provinces. While some of these challenges are similar to ones which face Canada as a whole, others are unique to the province. These include the "innovation gap"; the structure of R&D spending; education, skills, and availability of researchers; and the province's industrial receptor capacity.

### The "innovation gap"

For more than a decade, New Brunswick's investments in R&D have not kept pace with inflation or those of competing jurisdictions. From 1988 to 1999, the province's share of national R&D expenditures declined from nearly 1.7 per cent of total expenditures to less than one per cent. This has caused an "innovation gap" relative to the rest of Canada.

Closing the innovation gap is critical to future productivity gains and long-term economic growth. With the second lowest gross per capita expenditures on R&D in Canada, New Brunswick's expenditures on R&D will have to increase by more than two and one-half times just to reach the Canadian average.







## Structure of R&D spending

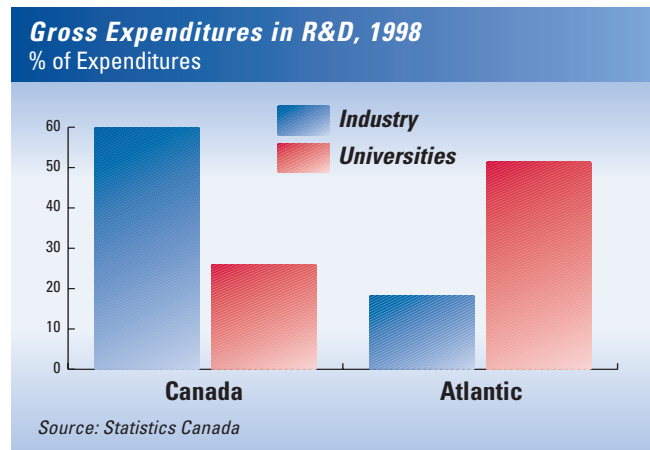
In strong knowledge-based economies, industries spend 70 per cent of the total investment in R&D while universities and the governments spend the remaining 30 per cent. In 1998, the federal and provincial governments combined spent approximately 14 per cent, universities 26 per cent and industries close to 60 per cent of the total investment in R&D in Canada. For the same period within Atlantic Canada, the figures are 27.6 per cent of expenditures by the federal government, 2.7 per cent by the provinces, 51.4 per cent by universities and 18.3 per cent by industry.

To become more competitive, both Atlantic Canada and New Brunswick must reverse this ratio and encourage much more significant R&D investments by industry.

Of particular importance for New Brunswick, the relative level of industry R&D expenditures per dollar of university R&D expenditures has also declined over the past decade. New Brunswick's ability to encourage private sector R&D expenditures is held back by the basic structure of the provincial economy. The economy is made up of many small and medium-size enterprises that are less able to invest time and resources in innovation due to their size and financial limitations.

This structure has increased the relative importance of educational and research institutions in performing R&D on behalf of and in conjunction with small and medium-size enterprises. This illustrates the necessity of strong industry/university interaction.

New Brunswick R&D institutions and innovators also face challenges in commercially developing their inventions due to the province's small industry receptor capacity. As a result, viable technology is often lost to New Brunswick by licensing to third parties outside the province. Many inventors and early-stage small and medium-size enterprises still encounter difficulties in protecting their own intellectual property. New Brunswick has also fallen short in terms of forging the necessary collaborative linkages to ensure the successful commercial development of institutional research efforts.







## Education, skills, and researchers



Photo courtesy of University of New Brunswick

The knowledge-based economy places a premium on a well-educated, skilled labour force. By 2004, more than 70 per cent of all new jobs created in Canada will require some level of post-secondary education, with 25 percent of new jobs requiring a university degree, according to the federal government. Building New Brunswick's innovation capacity requires investments not just in brick and mortar or companies, but also in people and skills.

Competition for people with high skill levels and research credentials is increasing each year, challenging New Brunswick to keep up. In particular, there is a general shortage of business managers that understand R&D, while many R&D entrepreneurs are skilled at neither management nor marketing.

Finally, New Brunswick, like other jurisdictions, faces the significant challenge of retaining post-secondary graduates and competing with worldwide demand for highly skilled individuals. Although the province has improved its performance in graduating more people with some level of post-secondary education, it still ranks below the Canadian average.

Another difficulty is the fact that provincial universities have lost some key researchers in the past. This must be reversed while also continuously - and successfully - competing to attract highly qualified people in key R&D areas of provincial strength.

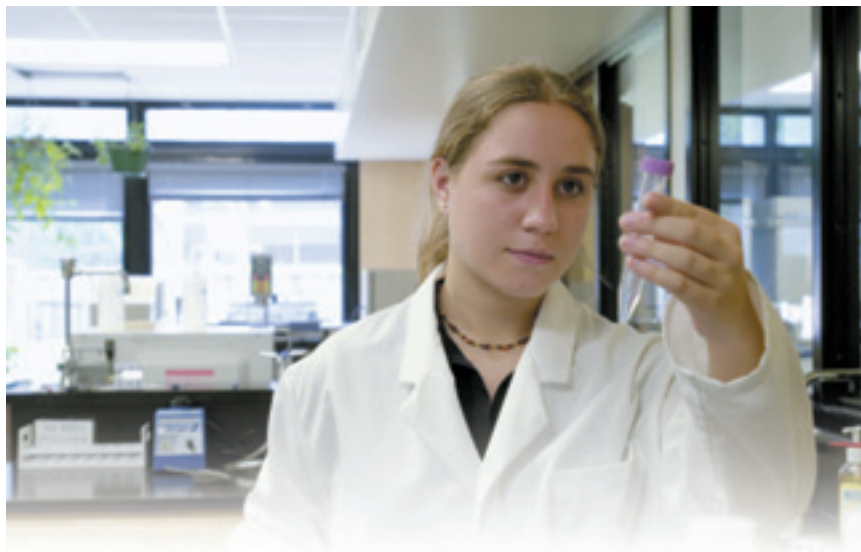


Photo courtesy of Université de Moncton

*New Brunswick's higher education institutions have been innovative in generating the necessary human capital for the knowledge-based economy. All of the province's universities have co-op programs that are working to retain young graduates and encourage them to pursue careers in key fields such as business and computer science. These efforts are broadening opportunities for New Brunswick's graduates.*

New Brunswick Innovation Performance: An Overview, June 2002



## New Brunswick's strengths

New Brunswick has many assets that can be mobilized to close the innovation gap. The province has many core competencies that can be built upon in learning/research institutions, an increasingly skilled workforce, and public resources that can be further developed and enhanced.

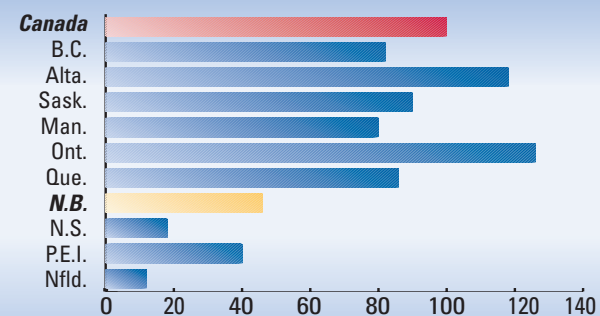
### R&D capabilities

New Brunswick does have significant R&D capabilities in the areas of knowledge industries (geomatics, information technology, engineering), life sciences (food science, wood sciences, bioscience, marine science), advanced manufacturing (plastics, metal, electronics) and value-added natural resources (wood, fish, aquaculture, agriculture, energy, minerals, peat moss).

There is significant capacity in these sectors at the present time and they have considerable potential to spawn highly competitive clusters both nationally and internationally. This is shown in the province's performance in filing patents, one of the key indicators of innovative capacity. In fact, New Brunswick leads Atlantic Canada in patents.

### Patents per Capita, 2000

Provincial Comparisons, Canada = 100



Source: IC calculations based on Canadian Intellectual Property Office

*Based on data from the Canadian Intellectual Property Office, the equivalent of 1.6 patents per 100,000 people were issued by firms in New Brunswick in 2000, the best performance among Atlantic provinces but below the national average.*

New Brunswick Innovation Performance: An Overview, June 2002

### Linkages to private and post-secondary sectors

New Brunswick's R&D facilities have growing linkages to the private sector and span the entire economy. Private engineering and consulting firms, and other medium and large firms, have varied analytical and practical R&D capabilities as well. Most provincial universities have undergraduate and graduate programs with specialized facilities, institutes, research centres and "chairs" that promote interaction with industry. In addition, the New Brunswick Community College (NBCC) system is a comprehensive post-secondary educational network committed to the delivery of applied education and training directly related to the workplace.



Photo courtesy of Université de Moncton



## Innovation infrastructure

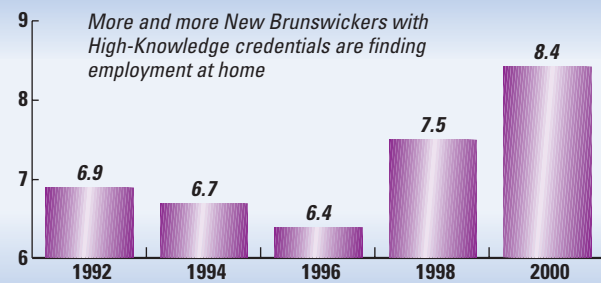
The province's innovation infrastructure consists of advanced telecommunications networks, research networks, R&D centres, research parks and innovation centres that support technology transfer and commercialization of research. New Brunswick has made significant investments in information technology and telecommunications (ITT) infrastructure. High-speed connections are available to local companies in support of new information technology product/service development and testing.

New Brunswick also compares favourably with other provinces in several elements of ITT infrastructure. New Brunswick has the highest per capita ratio of engineering firms in Canada and a strong base of IT companies in software and applications development. New Brunswick's overall innovation infrastructure is also being enhanced by the location of the National Research Council's new NRC Institute for Information Technology - e-Business in the province. This infrastructure also complements the government's comprehensive eNB.ca strategy.

## People and skills

New Brunswick has a good foundation of skilled people on which to build. The proportion of New Brunswick's labour force with at least a post-secondary diploma increased from 37 per cent in 1990 to 48 per cent in 2000. It has the highest high school graduation rate in Canada and a training and education network producing over 2500 information technology graduates a year. The province has a good representation of bilingual professionals in science, engineering and biosciences, an essential element for a strong and innovative society. As well, Spanish is now being taught online to New Brunswick high school students. Increasingly, key researchers are being recruited to New Brunswick to practice and are winning important national and regional scientific and research grants.

**New Brunswickers in High-Knowledge Industries**  
% employment in Private Sector



Source : Statistics Canada, Labour Force Survey



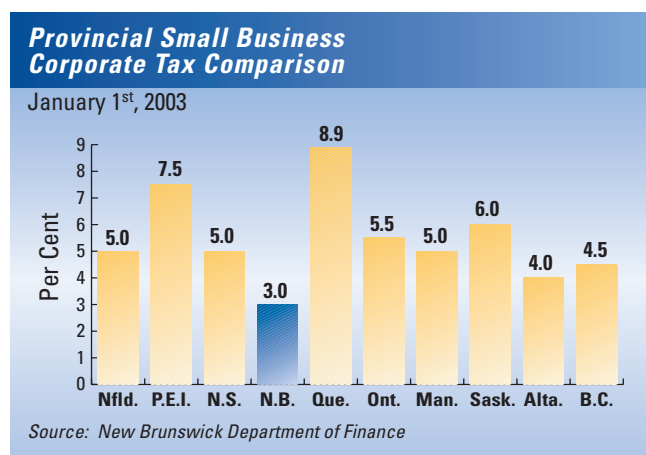
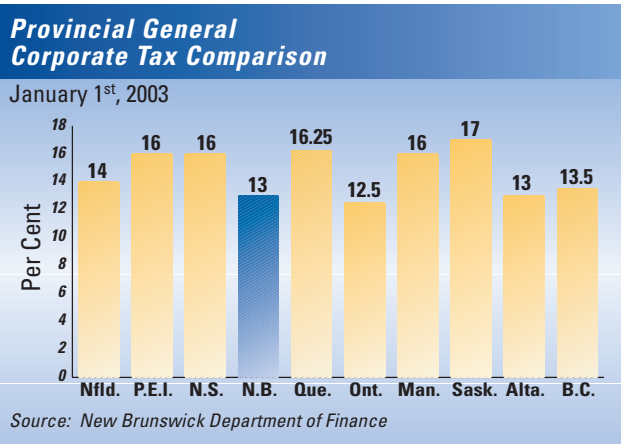
Photo courtesy of University of New Brunswick



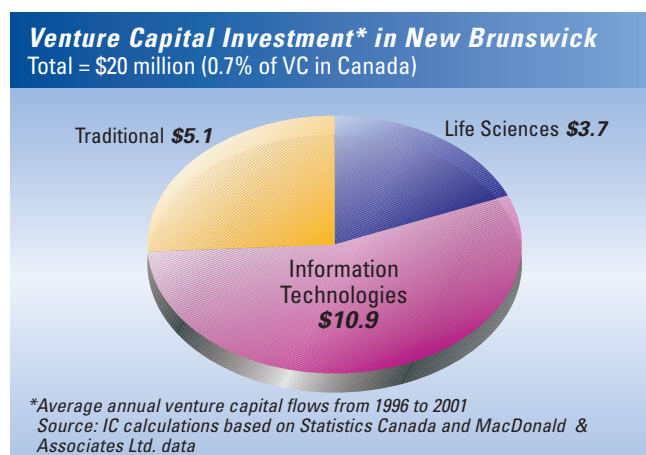


### Innovation business environment

New Brunswick's innovation business environment is improving each year. The province has reduced its corporate tax rate from 17 per cent to 13 per cent, effective January 1, 2003. New Brunswick's small business rate is currently the lowest in Canada at 3.5 per cent and is scheduled to be cut even further to three per cent on January 1, 2003. The small business income threshold has been doubled from \$200,000 to \$400,000. The government is also cutting red tape for businesses through its ongoing Red Tape Reduction process, making it easier for businesses to operate and grow in the province. A new Enterprise Network of fifteen community economic development agencies located throughout the province will foster innovation and business development at the community level.



Access to venture capital, while more restricted than elsewhere in Canada, is still sufficient for New Brunswick to lead Atlantic Canada in venture capital investment per capita from 1996 to 2001. About 55 per cent of venture capital investment in the province was in the IT sector.





## The Strategic Framework

Building on our strengths is fundamental to facing the challenges of increasing New Brunswick's innovation capacity, global competitiveness and future prosperity. *Greater Opportunity: New Brunswick's Prosperity Plan, 2002-2012* establishes the long-term strategic framework through which the province will address the challenges outlined above and build on its strengths to close the innovation gap. It is the core plan that is being followed to implement the Innovation Agenda.

*The future prosperity of New Brunswick will be tightly linked to the innovation we bring to all of our activities. Creating an environment that rewards innovation and provides interesting opportunities will be a key requirement for retaining and attracting the best people. Our markets and competition are increasingly global, therefore, our capacity for commercial research needs to be focused and world class. Finally, we need to celebrate success and respect risk taking.*

Kerry McLellan, CEO, Kinek Technologies

Embracing Innovation is one of the building blocks of Greater Opportunity. It is directly linked to and supported by the other three building blocks: Investing in People, Creating a Competitive Fiscal and Business Environment, and Building Strategic Infrastructure.





The Innovation Agenda is an action priority of the Embracing Innovation building block, as set out in the Prosperity Plan. The following four cornerstone priorities are, in turn, the basis of the Innovation Agenda.

## Total Development

To ensure that New Brunswick's natural resource industries thrive, there must be a clear strategy to develop, adopt and adapt innovative technologies, processes and practices and add more value in secondary processing and transformation.

Total Development focuses on resource planning, value transformation, and competitive positioning to ensure New Brunswick's natural resource industries achieve their full potential in a competitive national and international marketplace, while ensuring they are environmentally sustainable for future generations.

Total Development strategies will map out integrated, value-added plans for the planning, research, harvesting and processing of the key natural resource sectors of forestry, agriculture, fisheries, aquaculture, and mining. A three year Total Development Fund has been created to support value-added innovation and competitiveness in these traditional resource sectors.

## R&D

R&D is central to building a competitive innovation capacity for New Brunswick. The government will support industry, university and other institutions in partnerships that focus on increasing industry's receptor capacity to commercially adapt the innovations developed by universities and other institutions. The aim is to foster collaborative and profitable linkages and alliances between all partners leading to greater commercialization potential for new R&D and innovations in focused industry clusters.

The R&D cornerstone of the Prosperity Plan has several action priorities aimed at capacity-building. The first action priority, an Innovation Summit bringing together private sector and universities to develop priorities and actions leading to this Innovation Agenda, was held on May 1, 2002.

A new, arms-length New Brunswick Innovation Foundation with an initial capitalization of \$20 million is being established as a key tool to encourage private and post-secondary sector R&D and innovation investments and growth. Representatives of the public, private, and university sectors will all sit on the board of the Innovation Foundation.

The 2002-03 New Brunswick budget provided further stimulus for investment and innovation, through the creation of a special \$15 million University Infrastructure Trust. This targeted funding will assist in ensuring research excellence and improving the teaching and research capacity of the province's universities.





## eNB.ca

eNB.ca, or electronic New Brunswick, is the government's comprehensive strategy to take full advantage of digital and online innovations and potential. eNB.ca encompasses four main priority areas:

- **e-Government** - providing all appropriate government services online by 2005. Creating a "government marketplace" to fully implement e-procurement and e-tendering. Enhancing government to government (G2G) and government to business (G2B) initiatives. Encouraging greater citizen participation in the use of e-technology through Community Access Centres. Establishing quality service standards for delivery of customer services.
- **e-Business** - continuing to establish a positive legal and regulatory framework in New Brunswick that enables e-business transactions. Implementing an e-business enabling strategy for small and medium-size enterprises. Building linkages between government, universities, the NRC, and the private sector to promote knowledge transfer and commercial development of products and services.
- **e-Learning** - promoting New Brunswick's e-learning cluster advantage as an export opportunity. Enhancing e-learning capabilities throughout New Brunswick's education and post-secondary education system. Using e-learning capabilities for private sector skills upgrading and training in businesses.
- **e-Infrastructure** - upgrading all New Brunswick schools and community colleges to broadband technology by 2003. Enhancing Community Access Centre capabilities. Supporting community-based initiatives such as the Acadian Peninsula Smart Community project.

The Premier's Roundtable on eNB.ca and Innovation has developed eNB.ca action plans and will continue to advise government in their implementation. The government has accepted 36 of the recommendations of the Roundtable's interim report, with 14 already being implemented. The government response to the report can be viewed online at:

<http://www.enb.ca/pages/actionplan.html>

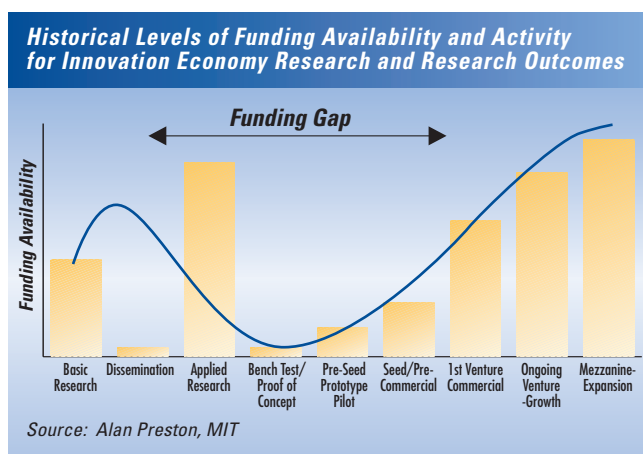




## Technology adoption and commercialization

To encourage partnerships and investments between private sector, research institutions and venture capitalists, the Province of New Brunswick has established the Technology Adoption and Commercialization Program.

The program will provide targeted and leveraged investments in companies, key industry clusters and sectors to enhance the ability of the private sector to adopt and commercially develop new technologies that improve productivity, competitiveness and value-added capacity. This innovation related funding is intended to fill the gap in support for technological innovation and pre-commercial product development initiatives.



*Innovation is the key to wealth creation and higher incomes for Canadians. By improving productivity through innovation, businesses increase the wealth they contribute to the economy in the form of increased employment, higher incomes, and more capital investment. It is that wealth that sustains public spending and leads to better education, health care, social programs, and infrastructure.*

The Business Case for Innovation, Canadian Manufacturers & Exporters, 2002



## **Actions to date**

Since taking office in June 1999, the government has taken action to “embrace innovation.” These actions include:

- ✓ establishing a \$20 million Innovation Fund to support targeted and leveraged investments in companies and key industry clusters;
- ✓ establishing a three-year, Total Development Fund to assist in developing value-added resources and other innovative investments in New Brunswick’s traditional resource-based economy;
- ✓ creating eNB.ca, the government’s coordinated strategy for e-government, e-learning, e-business and e-infrastructure with its own office and assistant deputy minister;
- ✓ creating the Premier’s Roundtable on eNB.ca and Innovation, involving the private sector and universities to develop eNB.ca action plans which are now being implemented;
- ✓ adding \$3.6 million in provincial funding to the federal contribution of \$8.4 million to establish the NRC Institute for Information Technology - e-Business in New Brunswick;
- ✓ improving the delivery of e-government services through Service New Brunswick;
- ✓ implementing development policies for minerals and peat as part of the Total Development approach;
- ✓ establishing the Technology Adoption and Commercialization Program to enhance the ability of the private sector to adopt and commercialize new technologies that improve productivity, competitiveness and value-added manufacturing and processing;
- ✓ establishing the University-Related Research Parks Initiative with 50 per cent loan guarantees to encourage the development of university-related research parks to increase provincial R&D capacity; and
- ✓ providing a one-time investment of \$15 million through the creation of a special University Infrastructure Trust to help ensure excellence in the research and teaching capacity of New Brunswick’s universities.

*Innovation has become the key factor for generating wealth in advanced societies. A strategic focus on R&D and innovation is crucial to the future well-being of New Brunswick.*

John McLaughlin, president and vice-chancellor,  
University of New Brunswick



# THE INNOVATION AGENDA

## ***Innovation Agenda: Goal, objectives and strategic approach***

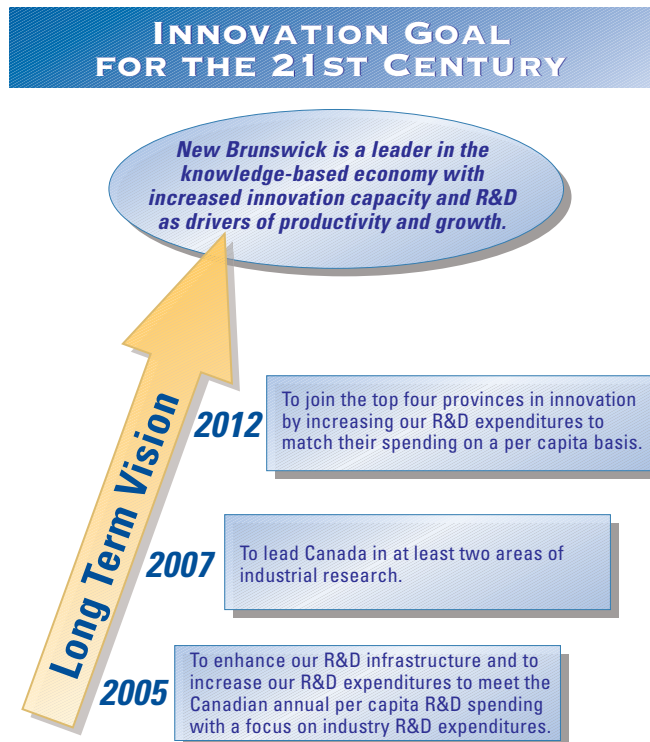
### **Goal**

The strategic goal of New Brunswick's Innovation Agenda is: New Brunswick is a leader in the knowledge-based economy with increased innovation capacity and R&D as drivers of productivity and growth.

### **Objectives**

The Innovation Agenda sets out three specific objectives:

1. join the top four provinces in innovation by increasing R&D expenditures to match their spending on a per capita basis;
2. lead Canada in at least two areas of industrial research;
3. enhance New Brunswick's R&D infrastructure and increase R&D expenditures to meet the Canadian average of annual per capita R&D spending with a focus on industry R&D expenditures.





## Strategic approach

The Innovation Agenda sets out three strategic approaches to achieving the goals and targets of the Agenda: 1. focusing on key strategic clusters; 2. building innovation capacity by linking to the Prosperity Plan's building blocks; and 3. creating strategic partnerships.

### 1. Focusing on strategic clusters

New Brunswick must specialize in key areas where it can build on existing strengths. By focusing efforts, the province can build internationally competitive innovation clusters. Four such clusters offer the strongest potential: knowledge industries, life sciences, advanced manufacturing, and value-added natural resources. New Brunswick has a good background in these areas and potential for high returns on investment.

### Knowledge Industries



Knowledge industries are the industrial growth nodes of the future. New Brunswick must build its competitive advantage through technology development, information transfer and global market intelligence. The establishment of the NRC Institute for Information Technology - e-Business provides another vehicle for the development of knowledge industries in the province.

The key areas of opportunity in New Brunswick are:

- Information technologies - building on New Brunswick's world-class recognition in TeleEducation infrastructure, online education and training, management, delivery tools and technologies, and online university environment.
- Geomatics - covering the areas of hydrographic and ocean mapping, and remote sensing of the earth as it applies to resource management and mineral mapping.
- Engineering - particularly in the areas of environmental, architectural, ocean technologies and remote monitoring.



In addition, New Brunswick also has a strong track record of successful knowledge industry companies on which to build.

*Exporting to more than 70 countries worldwide, CARIS has gained a reputation as a world leader in the marine and hydrographic defence industries, and are now leveraging this expertise to promote their experience and capabilities in the aerospace industry. Providing total solutions is fundamental to what CARIS stands for.*

Dr. Salem Masry, CARIS



## Life sciences

Fuelled by the rapid expansion and convergence of knowledge in biotechnology and information technology, on the one hand, and global increases in product demand and environmental degradation, on the other, the life sciences cluster is forecast to provide tremendous opportunities over the next quarter century.

There is a considerable range of new products and services emerging in life sciences in which New Brunswick companies are participating. These include conventional foods with enhanced nutrition (e.g., omega-3 eggs, soy products); nutraceuticals (e.g., blueberry flavonoids, ginseng); bio-energy products (e.g., ethanol, bio-diesel); bio-medical products (e.g., diagnostic devices, therapeutants, drugs); bio-materials (e.g., bio-paint, bio-plastics); and environmental protection and bio-remediation products and processes.

In cultivating a life sciences cluster, New Brunswick will support development of enabling platform technologies and processes stemming from its areas of traditional and emerging strengths, including:

- Biotechnology - genetic collections of potatoes, potato propagation, breeding and pest management, phyto-pharmaceuticals, bio-medical engineering, bio-remediation, bio-informatics.
- Wood science - forest protection, forest improvement, pulp and paper science, conifer propagation/breeding and forest pest management, genetic collections of trees.
- Marine science - aquaculture (salmon physiology, shellfish ecology), fisheries and seafood processing (value-added), equipment development, environmental research, marine sciences (environment applications, marine technologies, oceanography, fish health), genetic collections of marine life.



This sector holds great promise for diversification and new product development.

*The spruce budworm is one of the most damaging forest insects in Canada. Fighting this pest has always been a challenge. Recent findings by Dr. J. David Miller from Carleton University, colleague Dr. John Findlay of the University of New Brunswick and Greg Adams, silviculture manager for J.D. Irving, Limited have demonstrated that naturally occurring fungi living in white spruce needles produce toxins that weaken the spruce budworm. The research is the only study of its kind in the world. Greg Adams is enthusiastic about the findings. "Our goal is to have white spruce that are naturally more resistant to spruce budworm within five years," he says. "We would also like to explore the potential for similar research on other pests."*

J.D. Irving, Ltd., news release for National Environment Week 2002





## Advanced manufacturing



Manufacturing in the 21st century will be driven by advanced processing technologies and will involve the manufacture and/or use of new materials. This will result in goods manufactured at higher productivity levels to meet very stringent international quality standards.

New Brunswick has strength in at least three areas of manufacturing. These are metalworking, electronics and plastics. There is considerable potential for building on the province's considerable strengths in this sector by adopting new technologies, new mechanical equipment and new materials.

Areas of potential growth are:

- Plastics - packaging, wraps, containers and vessels, signs, pipes and hoses.
- Metalworking - fabrication, chassis, building materials, transportation equipment, conveyors, harvesting equipment and containers.
- Electronics - communication devices such as multiplexers, switches and circuits, sensors, probes, smart materials and gaming devices.

New Brunswick has strong long-term potential for development in these areas.



**Mathis Instruments** is a research, product development and manufacturing company focusing on thermal testing devices. This patented, non-destructive testing technology is reaching into a large number of industries and markets and establishing interest all over the world. Mathis Instruments is working with a number of visible research groups. A TC Probe trial site was established at the National Research Council, Industrial Materials Institute in Quebec. Films-based research towards a thin film application of the product is occurring with participation from Georgia Institute of Technology in Atlanta, Georgia.

Two departments within the University of New Brunswick (Mechanical and Chemical Engineering) have conducted or are presently conducting work with Mathis Instruments relating to composite curing, and orientation research in injection molded products. Mathis Instruments will endeavour to become a local proving ground for grass roots technology innovations and partner with companies to help deliver new products to a world market.

Dr. Nancy Mathis, Mathis Instruments Ltd.



## Value-added natural resources

The province's natural resource sectors have been a mainstay of economic development and jobs since Confederation. Finding new ways of adding value to New Brunswick's natural resources and encouraging secondary manufacturing and processing is essential to bridging to long-term competitiveness in the global marketplace. Innovation and R&D are key elements in achieving this goal.

The Total Development approach, with its emphasis on innovation, offers tremendous potential to ensure these sectors remain competitive and a secure economic contributor to the province and its residents.

Focused innovation efforts in the natural resource sectors include:

- Wood - composites, engineered building materials, furniture, paper and allied products and other value-added wood products.
- Fisheries - value-added fish and seafood products; alternate species.
- Aquaculture - value-added products, new species development.
- Agriculture - value-added products, food safety, new product development.
- Mining - value-added from metallic minerals such as lead and from industrial minerals, particularly limestone and potash; development of new exploration technologies targeting deeper seated mineral bodies; finding new methods of treating reactive acid tailings and ways of extending the life of present mines.
- Energy - alternate energy sources such as wind turbines and solar, refurbishment of the province's electrical generating capacity, expanded natural gas distribution.
- Peat Moss - soil amendments, peat pots, fertilizers, soil protection agents and peat equipment.



## Innovation Agenda action priorities:

1. *Undertake cluster development through leveraged investments in each of the targeted areas of: knowledge industries, life sciences, advanced manufacturing, and value-added natural resource sectors.*
2. *Position New Brunswick as a leader in the e-economy through the eNB.ca strategy.*
3. *Implement Total Development strategies for forestry, mining, agriculture, fisheries, and aquaculture sectors with a focus on innovation and R&D leading to more value-added and secondary processing and transformation.*





## 2. Building innovation capacity: Linking the building blocks

Linked together, each of the Prosperity Plan's building blocks will help build New Brunswick's innovation capacity. This reinforces the integrated approach being taken through the Innovation Agenda.

### Investing in people



The knowledge-based economy requires an increasingly skilled and well-educated labour force. For New Brunswick, that means investing in quality learning and a strong public education system; ensuring workers have the skills and training to remain competitive for jobs; recruiting highly qualified people such as researchers to work in New Brunswick; and encouraging young New Brunswickers graduating from post-secondary education to remain in the province and contribute their talents and skills.

New Brunswick must ensure that the education system can anticipate and address future skill requirements so that the province will have the skilled individuals it needs to work in strategic R&D areas. Graduate study fellowships, post-doctoral fellowships, research positions and co-op training programs between industry and learning/research centres are ways in which the province can build up this capacity.

It is crucial for the province's future success to take measures now to reduce the "brain drain" of skilled New Brunswickers. New Brunswick must retain its best and brightest, both in the educational systems as well as in industry. At the same time, the province must take steps to repatriate seasoned and successful business persons who have acquired business knowledge and succeeded elsewhere to return and assist New Brunswick enterprises.

By focusing on its education and human resource strengths, the province can develop a training system that will involve all institutions (universities, community colleges and R&D centres), including industry, in training and retaining people for new opportunities.

### **Innovation Agenda action priorities:**

1. *Launch the Quality Learning Agenda aimed at improving our K-12 education system, focusing on literacy and numeracy for pre-school and early learners, enhancing post-secondary access, and building a culture of life-long learning for adults.*
2. *Establish a Job Start Strategy that will support recruitment, retention and repatriation of young New Brunswickers with a post-secondary degree.*
3. *Support university recruitment of key researchers in priority R&D areas leading to cluster development.*

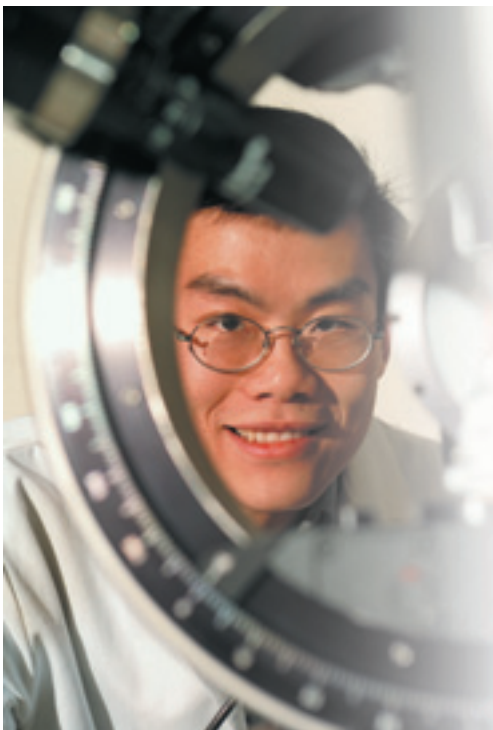


Photo courtesy of University of New Brunswick



## Creating a competitive fiscal and business environment

A competitive fiscal and business environment will enhance New Brunswick's innovation climate. This includes strong provincial finances with balanced budgets, investing in clear public priorities like health and education, and providing tax relief for people and businesses so the province is more competitive and better able to create jobs.

At the same time, as the government creates an overall competitive fiscal and business environment, targeted steps can be taken with business, universities, and communities to encourage R&D investment and technology adoption and commercialization by businesses, particularly small and medium-size businesses.

Such steps include enhancing New Brunswick's R&D tax credit to encourage more private sector investment in R&D and innovation. As well, the province can assist industry in accessing the Federal Scientific Research and Experimental Development Tax Incentive Program (SR&ED) through guarantees of bank lines of credit against the SR&ED tax credit receivable. This has the potential to bring millions of R&D dollars to New Brunswick industry.

Investments in financing small and medium size enterprises (SMEs) for seed capital or early stage R&D and commercial development activities will enable them to participate in joint ventures with universities and other research organizations.

Innovative projects require leveraged investment from private sector investors and other government agencies. The province will support innovation projects with venture capital invested in SMEs. Financial tools which will support such projects include the New Brunswick Innovation Foundation and improvements to a number of working ventures and labour sponsored venture capital funds.

Assisting New Brunswick firms to become more competitive through technology transfer and innovation is the aim of the government's Technology Adoption and Commercialization program.

To enhance the innovation capability of New Brunswick companies, it will be necessary to train entrepreneurs and managers in all aspects of the innovation process. Government must also be supportive by enabling all aspects of intellectual property management and technology commercialization.





### **Innovation Agenda action priorities:**

1. *Continue to provide tax relief to people and businesses so New Brunswick improves its competitive taxation position even further.*
2. *Enhance New Brunswick's R&D tax credit system in cooperation with the federal government.*
3. *Provide guarantees of bank lines of credit against the SR&ED tax credit receivable to facilitate the flow of SR&ED.*
4. *Provide leveraged investment in seed and early stage R&D and commercialization activities of SMEs through the New Brunswick Innovation Foundation.*
5. *Improve venture capital support for SMEs.*
6. *Support training of entrepreneurs and managers in all aspects of the innovation process.*



### **Building strategic infrastructure**

Strategic infrastructure in today's competitive innovative environment requires a new focus on "connectedness," digital technology, IT networks, and private sector/university collaborative ventures. The Innovation Agenda will focus on each of these areas.

A world-class research and development network that offers low cost access to a gigabit digital data communications network is a current priority. The recent commitment by the National Research Council to establish its new Institute for Information Technology - e-Business in New Brunswick, coupled with a Federal/Provincial commitment to strengthen digital networking between the University of New Brunswick at Fredericton and Saint John, Université de Moncton and NBCC - Miramichi will form the foundation of a strong Internet-based networking infrastructure. The government's eNB.ca strategy will roll out specific action plans to support this approach.

A forward-looking broadband initiative aimed at providing expanded, high-speed Internet access to all New Brunswick schools and community colleges is already underway. By collaborating with the federal government, it is hoped this important step can be expanded to include all New Brunswick communities, creating a leading edge broadband infrastructure network throughout the province.

Connectivity is also a vital infrastructure component that encompasses database sharing, equipment sharing and access to the expertise of others.



The province will also encourage the development of university-related research parks for the purpose of increasing provincial economic and regional development. Universities, public and/or private sector institutions will be supported by loan guarantees of up to 50 per cent of construction capital costs for high tech buildings in university-related research parks located on a university campus or on university-owned land in close proximity.

Targeted strategic infrastructure improvements for research facilities and laboratories in New Brunswick's universities will be implemented as resources permit.

### ***Innovation Agenda action priorities***

- 1. Complete broadband access for all high schools and community colleges by the end of 2003.*
- 2. Partner with the federal government to implement a comprehensive joint broadband initiative throughout New Brunswick building on the province's education focus.*
- 3. Implement the government's new University-Related Research Parks policy.*
- 4. Continued targeted strategic infrastructure improvements in New Brunswick universities and research facilities.*

### ***3. Creating strategic partnerships***

Partnerships and collaboration are key to innovative success in New Brunswick. Strong relationships amongst all partners - private sector, public sector, and post-secondary institutions - are necessary to ensure the partners maximize resources and focus on common objectives.

The government has already initiated this strategic partnership approach through the Premier's Roundtable on eNB and Innovation, the New Brunswick Innovation Foundation, and by collaborating with the federal government in specific innovation and economic development initiatives.

All levels of government must work to bring focus, support and coordination to the Innovation Agenda. The federal government is a key partner for the province in achieving its innovation goals. The recently released *Canada's Innovation Strategy* and *Knowledge Matters: Skills and Learning for Canadians* by the federal government are important benchmarks for new collaborative approaches in the future. Federal investments through the Atlantic Innovation Fund will help build New Brunswick's innovation capacity.





Recent examples of federal/provincial collaboration include creating the new NRC Institute for Information Technology - e-Business and establishing the local community economic development Enterprise Network. The two levels of government must work cooperatively to coordinate and prioritize R&D and innovation support initiatives, support co-op programs and research apprenticeships and establish a framework of supportive legislation and partnership investment.

The private sector must become a much stronger player in R&D and innovation in the province. This will require strong, strategic, collaborative relationships with governments - federal, provincial and municipal - as well as with universities, colleges and other learning and research institutions. The private sector must become more active in supporting pre-commercial development and providing on-site technical training for students. Individuals must be encouraged to select careers and educational pursuits to meet the challenges of the new economy, while employers must increase investments in staff training, identify their future labour requirements and participate more fully in co-op and internship programs that will give them the skills and resources they need to innovate.

Educational and training institutions must begin to work cooperatively by forming partnerships and by sharing resources. Appropriate curricula and programs must be developed to meet the needs of a more innovative industry and a knowledge-based economy. Greater support of co-op and internship programs between industry and learning/research centres is required. New Brunswick's educational and training institutions, as well as other research organizations must conduct more applied R&D for industry and proactively pursue technology transfer to the private sector.

Strategic innovation partners include: universities and community colleges, research institutions such as RPC, Huntsman Marine Science Centre and Genio; government facilities like the National Research Council's Institute for Information Technology - e-Business, the Atlantic Forestry Centre and the Potato Research Centre; private sector researchers such as JD Irving Ltd., McCain Foods, Whitehill Technologies, and Mathis Instruments; private investors, including venture capitalists; and federal departments and agencies, such as the Atlantic Canada Opportunities Agency and Industry Canada.





While the strength of innovative economies is often centred in cities and urban areas, many of the strongest and most innovative growth centres stem from communities working collectively, solving important problems and capitalizing on economic opportunities locally. These communities think locally - then are positioned to act globally.

The new Enterprise Network of fifteen Enterprise Agencies throughout the province is a key means of ensuring that the local business community is fully engaged in the innovation process. They are helping to develop innovative clusters at the local and regional level.

To support this approach, a Strategic Clustering Initiative will be undertaken. Led by the private sector with support from the government, this initiative will encourage industry cluster development at the local, provincial, national, and international levels.

### ***Innovation Agenda action priorities:***

- 1. Build strong, strategic, collaborative relationships amongst all partners to ensure that resources are maximized and focus on common objectives.*
- 2. Partner with the federal government in joint and collaborative initiatives to build New Brunswick's innovation capacity.*
- 3. Ensure that the local business community in every region of the province is fully engaged in the innovation process through the new Enterprise Network.*
- 4. Undertake a Strategic Clustering Initiative in the targeted innovation clusters of knowledge industries, life sciences, advanced manufacturing, and value-added natural resources, involving industry, learning and research institutions, and communities.*



## TOP TEN ACTION PRIORITIES

The top ten action priorities of the Innovation Agenda are:

1. Establishing an **Innovation Foundation** to help build the province's R&D and innovation capacity;
2. **Improving** New Brunswick's **R&D Tax Credit** system;
3. Establishing the **Technology Adoption and Commercialization Program** to enhance the ability of the private sector to adopt and commercialize new technologies that improve productivity, competitiveness and value-added production;
4. Establishing a **Job Start Strategy** that will support recruitment, retention and repatriation of young people and of seasoned and successful business persons and skilled researchers;
5. Providing a one-time investment of **\$15 million** through the creation of a **special University Infrastructure Trust** to assist in ensuring excellence in the research and teaching capacity of New Brunswick's universities;
6. Implementing the **University-Related Research Parks Initiative** to encourage the development of university-related research parks for the purpose of increasing provincial R&D capacity;
7. Undertake a comprehensive **Strategic Clustering Initiative** aimed at targeted innovation clusters, led by the private sector and involving industry, learning and research institutions, and communities;
8. Establishing the **Enterprise Network of 15 community economic development agencies** that will result in a strongly coordinated approach to economic development that involves all partners and stakeholders at the regional level;
9. Encouraging **high-speed broadband Internet connectivity** around the province and in our schools and community colleges as part of the New Brunswick "Learning Grid". This will ensure that all regions of the province can benefit from the developing new economy; and
10. Implementing the **eNB.ca strategy** based on action plans developed by the Premier's Roundtable on eNB and Innovation.





## PROGRESS INDICATORS

The Prosperity Plan sets out several objectives and targets that are designed to enhance the innovative capacity of the province over the long term. Innovation is central to the future economic growth, productivity and competitiveness of the province.

There are many measures of innovative capacity that are used to compare economies and several innovation indicators have been developed that assist in determining some of the more important indicators that best influence progress. In general, these relate to the quality of the common innovation infrastructure, the cluster-specific innovation environment and the quality of linkages for distributing R&D results to industry from public institutions.

In moving towards the targets set out in the Innovation Agenda, the following are examples of input indicators that may be used to monitor progress towards establishing a more comprehensive innovative capacity index:

- Number of invention disclosures, applications for patents, patents issued, and the number of international patents awarded annually;
- Number of industry/university relationships;
- Number of new business starts, the number of mentors and the number of repatriated business persons;
- Federal, provincial, non-profit and foreign R&D expenditures in New Brunswick by both public (university and government) and private sector;
- R&D expenditures performed by universities compared to total R&D expenditures;
- Private sector R&D expenditures in New Brunswick;
- The number of full-time equivalent scientists and engineers in all sectors; the number of science and engineering university and college graduates in New Brunswick by degree and discipline and the number that are retained in the local economy; and
- The level of public spending on secondary and post-secondary education divided by Gross Domestic Product (GDP).

The New Brunswick innovation output targets include:

- Increased innovation capacity in terms of the number of high quality jobs created and retained;
- Increased productivity in value created per job;
- Increased value of exports and product sales;
- After tax profit margins; and
- GDP per capita, including effectiveness (in hours worked), intensity (in productive hours), utilization (in the number employed in the labour force) and profile (the potential labour force per population).



## CONCLUSION

New Brunswick's Innovation Agenda will help New Brunswick companies become more innovative and more globally competitive. Ultimately, it will result in a higher standard of living and a better quality of life for all New Brunswickers. The Government of New Brunswick is committed to working in collaboration with its innovation partners - the private sector, universities and other learning/research institutions, community colleges and the federal government - to reach the provincial goal and meet provincial targets for innovation.