

# STRATEGIES FOR INNOVATION

A framework for accelerating  
the Province of New Brunswick

April 2012

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# Executive Summary

New Brunswick has always been home to innovative companies and an innovative government, where ideas have stretched the boundaries of what is possible. Global markets have taken notice.

A prime example in the early years is the first pioneer in our region in the telecommunications industry: NBTel and the internationally recognized Service New Brunswick “single window model.” Recent examples of innovative companies include Radian6 and Q1 Labs, which were acquired by technology giants salesforce.com and IBM in 2010 and 2011, respectively, have captured the attention of the national technology industry and put New Brunswick on the map. Accounting for just over \$1 billion in commercial success in one year, the Radian6 and Q1 Labs acquisitions have together transformed “the image of New Brunswick from a have-not province to an innovation hotbed populated by smart technies and risk embracing investors.”<sup>1</sup> It is estimated that as many as 50 millionaires will have been created by the two deals, which generates not only short-term economic wealth, but potentially long-term gain with new seed capital and angel investors ready, willing and able to invest in New Brunswick innovations.

Despite the success of the province, to address several major challenges for the decade ahead, to transform the economic landscape for traditional and emerging industries, and to compete in an ever-changing global economy, a greater emphasis on innovation and the adoption of industry best practices is required.

As the “key driver of labour productivity growth and national economic prosperity,”<sup>2</sup> Innovation has been broadly defined as the economic element that is “continually pushing back the boundaries of what is possible.”<sup>3</sup> More specifically, innovation is the “implementation of a new or significantly improved product (good or service), or process, a new marketing method, or a new organizational method in business practices, workplace organization or external relations.”<sup>4</sup>

Strategies to create and sustain innovation economies have been developed all over the globe, most notably during the past 30 years. Success has been reinforced through stable long-term planning and commitment and nurturing the development of a culture of innovation. In some jurisdictions, these innovation economies are focused on knowledge-creation, cutting-edge science and research, international competitiveness and increased productivity.<sup>5</sup> Driving these strategic elements is the foundation of innovation itself.

New Brunswick is uniquely positioned to adopt an innovation-based economic development (IBED) policy that will be used to guide government’s support and involvement in priority sectors of the economy. An IBED policy framework for New Brunswick will help address economic transition by breaking down barriers between organizations and individuals and creating a culture that supports risk-taking, tolerates failures and celebrates success.

Focused on the priority sectors identified by the Department of Economic Development: 1) information and communications technology, 2) biosciences, 3) value-added food, 4) value-added wood, 5) industrial fabrication, and 6) aerospace and defence, the strategy objectives can be summarized into five categories: 1) innovate government, 2) make New Brunswick a better place to start and grow a

<sup>1</sup> Globe and Mail Report on Business: *High-tech deals spawn new generation of tycoons, new image for New Brunswick*

<sup>2</sup> Council of Canadian Academies, *Innovation and Business Policy: Why Canada Falls Short*, 2009

<sup>3</sup> Mandel, *This Way to the Future*, 2004

<sup>4</sup> OECD, *Ministerial report on the OECD Innovation Strategy*, 2010

<sup>5</sup> Australian Government Department of Innovation, Industry, Science and Research



business, 3) change the mindset of New Brunswickers to be innovative thinkers rather than passive learners, 4) build an innovation ecosystem that supports access to ideas, people and capital, and 5) improve local, regional, national and international collaboration between industry, academia and government.

**1. Innovate government**

Government must demonstrate leadership in innovative practices. It must unleash innovation in the public sector; develop proactive policy and regulatory systems; spearhead continuous improvement to government systems and processes; provide services and support to industry; and build the foundations necessary to act as both model user and early adopter of New Brunswick innovations.

**2. Make New Brunswick a better place to start and grow a business**

We must improve the competitiveness and promote the development of key industrial sectors; establish the business conditions attractive to both domestic and foreign investment in strategic technologies and sectors; and drive the local and provincial landscape.

**3. Change the mindset of New Brunswickers to be innovative thinkers rather than passive learners**

We must foster entrepreneurship; strengthen collaboration between industry and academia; and create a culture of innovation.

**4. Build an innovation ecosystem that supports access to ideas, people and capital**

We must strengthen the region's R&D capacity; increase access to capital; enhance education and training capabilities; integrate technology policies into the overall economic development planning; and build the foundations for innovation in business with sound framework conditions

**5. Improve local, regional, national and international collaboration between industry, academia and government**

We must strengthen collaboration between industry, government and academia; make intellectual property accessible to industry; expand mentorship programming; and build regional, national and international partnerships.

As evidenced with a long history of innovative companies that have changed the way we live, work and play, New Brunswick has the talent and the resources to build on its capacity and to become one of the most innovative communities in North America.

# Table of Contents

List of Acronyms . . . . .	7
1. Introduction . . . . .	8
2. Opportunity . . . . .	10
2.1 The New Brunswick Difference . . . . .	10
2.2 Exemplary Jurisdictions. . . . .	10
3. Strategy Objectives. . . . .	12
4. Gaps in New Brunswick . . . . .	13
4.1. Research and Development (R&D) Investment . . . . .	13
4.2. Education. . . . .	14
4.3. Access to Capital . . . . .	17
5. Accelerating the Province of New Brunswick . . . . .	20
5.1 Innovate government. . . . .	20
5.2 Make New Brunswick a better place in which to start and grow a business . . . . .	22
5.3 Change the mindset of New Brunswickers to be innovative thinkers rather than passive learners . . . . .	25
5.4 Build an innovation ecosystem that supports access to ideas, people and capital. . . . .	27
5.5 Improve local, regional, national and international collaboration between industry, academia and government . . . . .	32
Appendix A: Exemplary Jurisdictions . . . . .	34
Appendix B: Primary Stakeholders in Innovation Eco-System. . . . .	42



## List of Acronyms

<b>ACOA</b> Atlantic Canada Opportunities Agency	<b>CYBF</b> Canadian Youth Business Foundation	<b>NBCC</b> New Brunswick Community College	<b>SMEs</b> Small and medium enterprises
<b>BDC</b> Business Development Bank of Canada	<b>ECO</b> Executive Council Office (Province of New Brunswick)	<b>NBIF</b> New Brunswick Innovation Foundation	<b>STEM</b> Science, technology, engineering and math
<b>BERD</b> Business expenditure on research and development	<b>FAN</b> First Angel Network	<b>NCE</b> National Centres of Excellence	<b>SR&amp;ED</b> Scientific research and experimental development
<b>C3</b> Canadian Commercialization Consortium	<b>GDP</b> Gross Domestic Product	<b>NRC</b> National Research Council	<b>SSHRC</b> Social Sciences and Humanities Research Council of Canada
<b>CBDC</b> Community Business Development Corporations	<b>GERD</b> Gross Domestic Expenditure on research and development	<b>NSERC</b> Natural Sciences and Engineering Research Council	<b>TECNA</b> Technology Council of North America
<b>CCA</b> Council of Canadian Academies	<b>ICT</b> Information and communications technology	<b>OECD</b> Organization for Economic Co-operation and Development	<b>TME</b> Technology Management and Entrepreneurship Program
<b>(NSERC)-CCIP</b> Colleges Community Innovation Program	<b>IEBD</b> Innovation-based economic development	<b>PDC</b> Pond-Deshpande Centre	<b>TVC</b> Technology Venture Corporation
<b>CCNB</b> Collège communautaire du Nouveau-Brunswick	<b>ILO</b> Industry liaison officer	<b>PETL</b> Department of Post- Secondary Education, Training and Labour	<b>U de M</b> Université de Moncton
<b>CECR</b> Centres of Excellence for Commercialization and Research	<b>IP</b> Intellectual property	<b>R&amp;D</b> Research and development	<b>UNB</b> University of New Brunswick
<b>CICP</b> Canadian Innovation Commercialization Program	<b>IRAP</b> Industrial Research Assistance Program	<b>RPC</b> New Brunswick Research and Productivity Council	<b>U.S.</b> United States
<b>CIHR</b> Canadian Institutes of Health Research	<b>Mount Allison</b> Mount Allison University	<b>SBITC</b> Small Business Investment Tax Credit	<b>WMI</b> Wallace McCain Institute
<b>CRA</b> Canada Revenue Agency	<b>NB</b> New Brunswick	<b>SDTC</b> Sustainable Development Technology Canada	
<b>CEALT</b> Centre of Excellence for Advanced Learning and Technologies	<b>NBITC</b> New Brunswick Information Technology Council	<b>SNB</b> Service New Brunswick	

# 1. Introduction

Founded as a colony in 1784, New Brunswick established the University of New Brunswick in 1785, making it the first English-language university in Canada and the first public university in North America. As one of the first provinces to join together to form the Dominion of Canada in 1867 and home to the first incorporated city in Canada (Saint John),<sup>1</sup> New Brunswick and its people have demonstrated leadership, foresight and innovative practices for more than two centuries.

Innovative New Brunswickers such as James Elliot, Alexander McAvity, Benjamin F. Tibbets, Robert Carr Harris, Henry T. Austin, John E. Turnbull, Thomas Campbell, Edward MacDonald and Robert T. Mawhinney have changed the way we live, work and play, with inventions such as the scuba tank (1839), the compound steam engine (1845), the snow blower (1870), sardine cans (1932), the clothes washer and roller wringer (1843), combined hot and cold water faucets (1880), the crossword game (1926) and the dump-box for trucks (1920).<sup>2</sup>

New Brunswick has always been home to innovative companies and an innovative government, where ideas have stretched the boundaries of what is possible. Global markets have taken notice.

A prime example in the early years is the first pioneer in our region in the telecommunications industry: NBTel. Founded as the New Brunswick Telephone Co. in 1888, NBTel was based in Saint John until its merger with Aliant took place in 1999. NBTel was “considered by many to be one of the most innovative local telephone companies in North America.”<sup>3</sup> It is credited as the first Canadian telephone company to provide Internet service (1994), the first company to use a fully digital switching network (1993), the first company to offer all customers voice mail service, and the first telephone company in Canada to be given Canadian Radio-television and Communications Commission approval to provide television services (1998), a new business opportunity realized through its living lab innovation practice.

Service New Brunswick (SNB) was created in the mid-1990s to streamline how New Brunswickers interact with government, allowing access to multiple government services all from one location. This “single window model” was a revolutionary idea and quickly received international recognition. New Brunswick was one of the first jurisdictions to integrate multi-channel service delivery successfully, initially offering more than 100 government services by telephone, online, and in person at one-stop service centres. This innovative model has since become the standard in government service delivery worldwide. It is worth noting that SNB is the inspiration behind Service Canada and several other government service providers across the country such as Service BC, Service Ontario and Access Nova Scotia. Internationally, SNB assisted government agencies in the United Kingdom (Suffolk and Sunderland, England) and the United States with adoption of the model.

Today, SNB is still innovating and continually improving the way the citizens and businesses of New Brunswick are served. Innovation also continues in the private sector within companies such as CARIS, Irving, Ganong, McCain, Malley Industries, Industrial Rubber, Cube Automation and Cooke Aquaculture. These family-owned businesses have continued to evolve based on demand and thrive in the region while exporting products and services around the world.

Other home-grown New Brunswick companies such as Radian6 and Q1 Labs generated an estimated \$1 billion in combined corporate value when they became acquired by technology giants salesforce.com and IBM in 2010 and 2011, respectively. Each of the three major cities in the province has been

<sup>1</sup> Government of New Brunswick, *History of the Province of New Brunswick*

<sup>2</sup> New Brunswick Tourism and Parks *Extraordinary Facts and Figures*

<sup>3</sup> Grugal, *Don't Be Afraid to Innovate*, 2004



named one of the top seven intelligent communities by the Intelligent Communities Forum<sup>4</sup> and has demonstrated steady growth in population base, boasting a varied and increasingly multicultural population.<sup>5</sup> New Brunswick's success in bringing the brightest minds and ideas together has become an Atlantic Canadian success story and has further cemented the province as the next Waterloo, Ont., of the country.

Despite the success of the province, a greater emphasis on innovation and the adoption of industry best practices is required to compete in an ever-changing global economy and to transform the economic landscape for traditional and emerging industries.

Focused on information and communications technology, biosciences industrial fabrication, value-added wood, value-added food, and aerospace and defence, New Brunswick has the talent and the resources to build on its capacity and to become one of the most innovative communities in North America.

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<sup>4</sup> Intelligent Community Forum

<sup>5</sup> Government of New Brunswick, *History of the Province of New Brunswick*

## 2. Opportunity

Innovation has been broadly defined as the economic element which is “continually pushing back the boundaries of what is possible.”<sup>6</sup> More specifically, innovation is the “implementation of a new or significantly improved product (good or service), or process, a new marketing method, or a new organizational method in business practices, workplace organization or external relations.”<sup>7</sup>

Now part of nearly every economic development strategy of every municipality and provincial and federal government in the G7, innovation has been credited for the transformation of economies once in crisis, such as Finland. Ranked one of the best innovation systems in the world, Finland went from laggard to leader in a remarkably short period by capitalizing on its small size, cohesive culture, collaboration, focus and a commitment from industry, academia and government. The country boasts an annual investment in R&D of \$6 billion or 3.9 per cent of its GDP.<sup>8</sup>

Similar to the Finnish system in many ways, including its natural resources, small size and cohesive culture, New Brunswick is uniquely positioned to adopt an innovation-based economic development (IBED) policy that will be used to guide government’s support and involvement in priority sectors of the economy.

An IBED policy framework for New Brunswick will help address economic transition; capture the benefits of investments in research, development and education; build and celebrate an entrepreneurial culture; help existing industries become more efficient and leading-edge; advance the diversification of the economy; and contribute in a meaningful way as part of the global innovation network.

### 2.1 The New Brunswick Difference

Competitive personal and business taxes, comprehensive and affordable broadband, bilingual workforce, multimodal transportation network, world-class research institutions, proximity to the U.S. market and a low cost of living are just a few of the advantages in building a business in New Brunswick.

The size and scale of the province presents an opportunity to adapt to market conditions and to build partnerships with industry, government and academia more rapidly and more efficiently than is possible in larger jurisdictions.

Proactive planning and enhanced collaboration with industry, academia and key federal government departments will ensure provincial strategies are aligned with national and global opportunities for partnership and programming access.

### 2.2 Exemplary Jurisdictions

Strategies to create and sustain innovation economies have been developed all over the globe, most notably during the past 30 years. Success has been reinforced through stable long-term planning and commitment and nurturing the development of a culture of innovation. In some jurisdictions, these innovation economies are focused on knowledge-creation, cutting-edge science and research, international competitiveness and increased productivity.<sup>9</sup> Driving these strategic elements is the foundation of innovation itself.

<sup>6</sup> Mandel, *This Way to the Future*, 2004

<sup>7</sup> OECD, *Ministerial report on the OECD Innovation Strategy*

<sup>8</sup> Council of Canadian Academies, *Innovation and Business Policy – Why Canada Falls Short*, 2009

<sup>9</sup> Australian Government Department of Innovation, Industry, Science and Research

Several jurisdictions have been explored to gain a greater understanding of best practices, emerging trends, funding priorities and potential policy adaptation by New Brunswick. Consideration was given to regions that provide insight on provincial, national, North American and international strategies. For the purpose of this report information was gathered for: Canada-Ontario-Toronto, Finland-Helsinki, United States-Massachusetts-Boston, Australia-Victoria-Melbourne and Israel-Tel Aviv. Several consistent trends for innovation in these areas include:

- engaging and investing in international collaboration efforts;
- fostering collaboration with academia;
- engaging industry;
- ongoing regulatory system and policy development;
- creating specialized centres of knowledge;
- ongoing intellectual property (IP) policy review;
- enhancing education and training capacities and capabilities;
- increasing access to capital;
- providing services and support to industry;
- fostering strong and effective public research;
- building the foundations for innovation in business with sound framework conditions;
- fostering entrepreneurship;
- unleashing innovation in the public sector; and
- investing in a knowledge-supporting infrastructure.

Funding priority trends in these regions include: education and training, R&D, priority sectors, international collaboration, e-Health, and research centres (centres of knowledge, centres of excellence, and/or centres of expertise).

It is worth noting that while the Canadian government has been “hailed around the world as a precedent-setting model”<sup>10</sup> for the development of its Network of Centres of Excellence (NCE), leading international innovation economies such as Finland and Israel have fewer programs, fewer sector priorities and greater overall public investment in developing and maintaining innovation-based economic development strategies. Strategic focus, long-term investments and long-term commitment to an innovation-based economic development strategy will be critical.

**Please note:** Detailed information (including trends and funding priorities) pertaining to the regions of Canada-Ontario-Toronto, Finland-Helsinki, United States-Massachusetts-Boston, Australia-Victoria-Melbourne and Israel-Tel Aviv can be found in Appendix A of this report.

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<sup>10</sup> Government of Canada, Networks of Centres of Excellence Programs

## 3. Strategy Objectives

An IBED policy framework for New Brunswick will help address economic transition by breaking down barriers between organizations and individuals and creating a culture that supports risk-taking, tolerates failures and celebrates success. The strategy objectives can be summarized into five categories:

### 1. Innovate government

Government must demonstrate leadership in innovative practices. It must unleash innovation in the public sector; develop proactive policy and regulatory systems; spearhead continuous improvement to government systems and processes; provide services and support to industry; and build the foundations necessary to act as both model user and early adopter of New Brunswick innovations.

### 2. Make New Brunswick a better place in which to start and grow a business

We must improve the competitiveness and promote the development of key industrial sectors; establish the business conditions attractive to both domestic and foreign investment in strategic technologies and sectors; and drive the local and provincial landscape.

### 3. Change the mindset of New Brunswickers to be innovative thinkers rather than passive learners

We must foster entrepreneurship; strengthen collaboration between industry and academia; and create a culture of innovation.

### 4. Build an innovation ecosystem that supports access to ideas, people and capital

We must strengthen the region's R&D capacity; increase access to capital; enhance education and training capabilities; integrate technology policies into the overall economic development planning; and build the foundations for innovation in business with sound framework conditions

### 5. Improve local, regional, national and international collaboration between industry, academia and government

We must strengthen collaboration between industry, government and academia; make intellectual property accessible to industry; expand mentorship programming; and build regional, national and international partnerships.

## 4. Gaps in New Brunswick

New Brunswick has identified four major challenges for the decade ahead: 1) the deficit, 2) health and senior care, 3) the size and quality of the labour force, and 4) economic development and community sustainability.<sup>11</sup>

To address these challenges, New Brunswick needs more people, a more highly educated workforce, and greater access to mentors, research and capital. Increased industry participation and private sector-led research will support provincial efforts to build a vibrant and sustainable economy that will transform the region.

### 4.1. Research and Development (R&D) Investment

Investment in R&D in jurisdictions where innovation is a top priority has proven to generate results. For example, the success of the transformation of the Finland system during the past 30 years can be attributed, in part, to its emphasis on investing in education and R&D activities. Finland strives to measure its investment in R&D as a percentage of GDP, which is an estimated 3.9 per cent.<sup>12</sup> By way of comparison, Canada's GERD/GDP ratio in 2009 was 1.92 per cent, while New Brunswick's ratio was 1.17 per cent.<sup>13</sup>

Figure 1 illustrates the gross expenditures on R&D (GERD) funding sources of the Canadian provinces. Sources include: foreign, private non-profit organizations, higher education, business enterprise, provincial government and federal government.

As detailed in Figure 1, with \$1,080 per capita in GERD, Ontario accounts for the highest percentage of total annual Canadian expenditures in R&D. Quebec and Alberta rank second and third, with \$1,023 and \$812, respectively. New Brunswick trails all other provinces in Canada, ranking last.<sup>14</sup> While the total per capita investment in New Brunswick has nearly doubled since 1999 from \$215 per capita, the Canadian average also grew during the same period by 60 per cent from \$565<sup>15</sup> to \$903.

<sup>11</sup> Government of New Brunswick, *Major Challenges for the Decade Ahead*

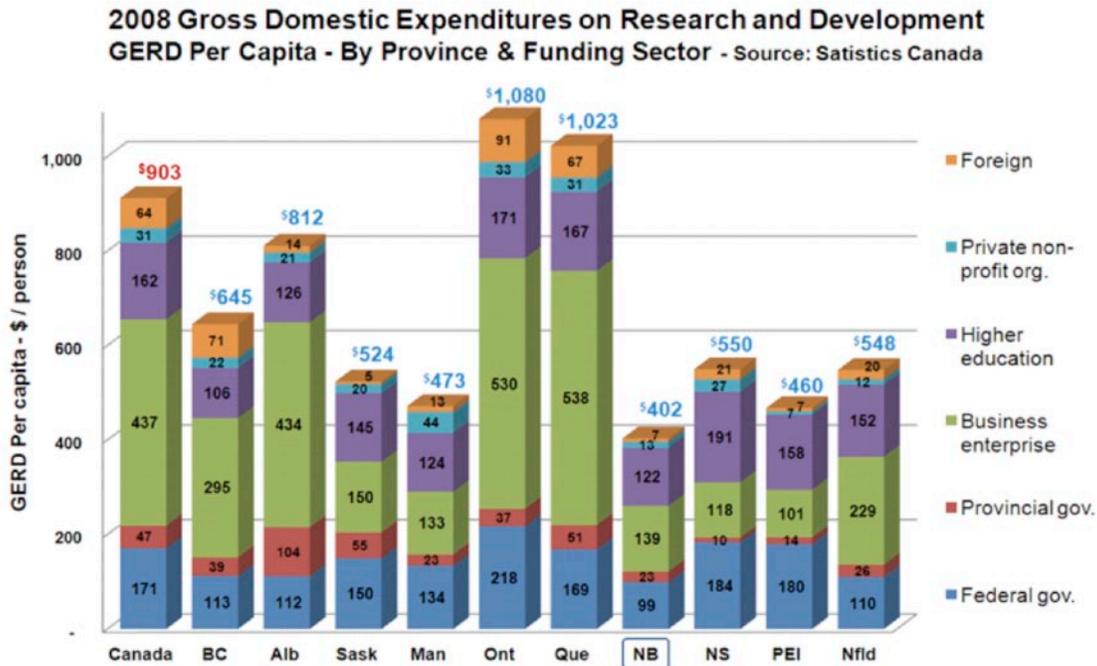
<sup>12</sup> Science and Technology Policy Council of Finland, *Science and Technology Innovation*

<sup>13</sup> *Gross Domestic Expenditures on Research and Development in Canada and the Provinces*, Statistics Canada, 2011

<sup>14</sup> Statistics Canada, *Catalogue no. 88-221X*

<sup>15</sup> Statistics Canada, *Estimates of Gross Expenditures on Research and Development (GERD)*, 1999

**Figure 1**  
**Gross Domestic Expenditures on Research and Development Per Capita<sup>16</sup>**



Business enterprise funding is higher in New Brunswick than in Nova Scotia, Prince Edward Island and Manitoba, with provincial funding equal to Manitoba and slightly higher than Nova Scotia and Prince Edward Island. However, investments from all other sources are the lowest in New Brunswick compared to every other province.

It is worth noting the most significant variance in total investment and the primary differentiator from Ontario and Quebec and other regions is the total investment made by business enterprises, which comprises about one-half of the total investments in comparison to just 32 per cent in New Brunswick. Most leading jurisdictions strive to achieve a 60- to 70-per cent investment from business enterprises for R&D activities.

## 4.2. Education

As detailed in Figure 2 below, research suggests those with a higher level of education will earn a greater amount of income during a 40-year period.<sup>17</sup> From a provincial fiscal due diligence perspective, the income tax generated from one person's annual salary of \$70,000 is equivalent to the same amount of income tax generated by 13 individuals with an annual income of \$20,000.<sup>18</sup>

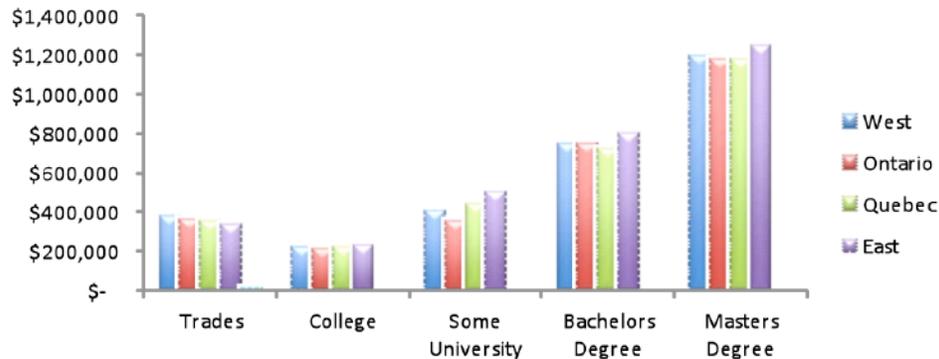
<sup>16</sup> Business New Brunswick

<sup>17</sup> Canada Millennium Scholarship Foundation, *Price of Knowledge*, 2009

<sup>18</sup> Government of New Brunswick, *Major Challenges for the Decade Ahead*

**Figure 2**  
Income difference based on education<sup>19</sup>

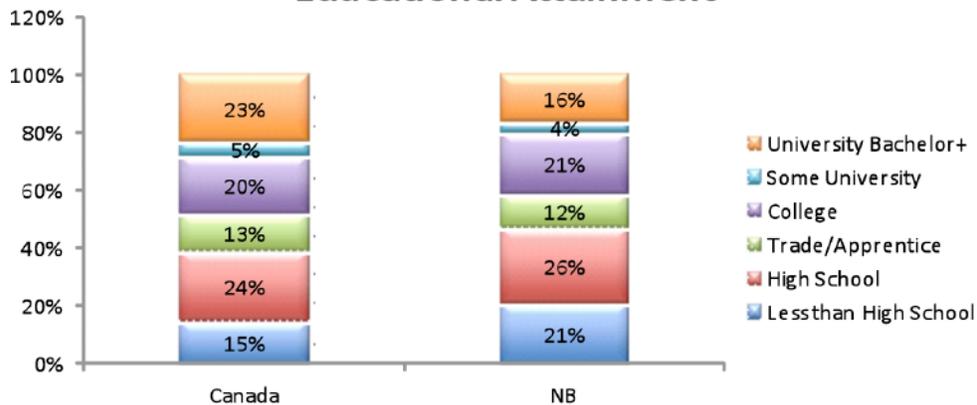
### Income difference in comparison to a high school graduate over a 40-year period



As detailed in Figure 3 below, 21 per cent of the New Brunswick population has less than a high school education, compared to 15 per cent as a national average, and 16 per cent have a university bachelor or above, compared to 23 per cent as a national average.

**Figure 3**  
Educational attainment of the population (25-64 years old)<sup>20</sup>

### Educational Attainment



Investment in education has been an important element to the success of innovation-based economic development strategies in regions such as Finland and other jurisdictions explored for the purpose of this report. As detailed in Figure 4, the Canadian average for provincial government expenditures as a percentage of general operating funding is 2.25 per cent, compared to 2.1 per cent in New Brunswick. Saskatchewan invests the most of any province as percentage of overall government operating funding with an estimated 3.6 per cent.

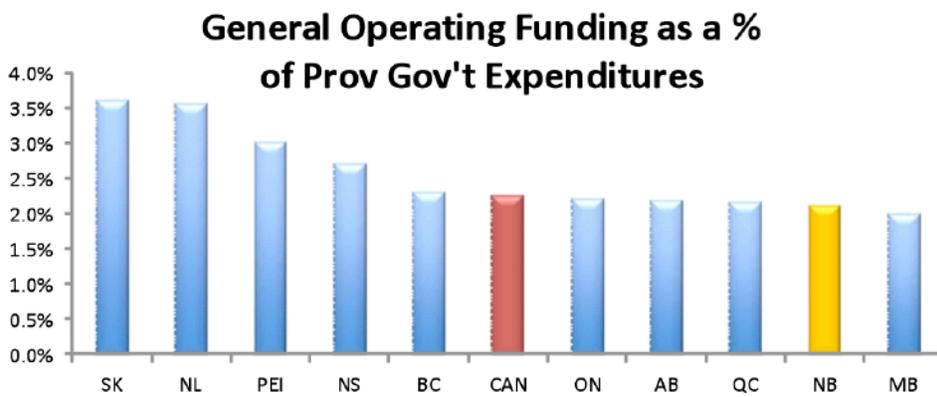
<sup>19</sup> Canada Millennium Scholarship Foundation, *Price of Knowledge*, 2009

<sup>20</sup> Statistics Canada, *Population Census 2006*

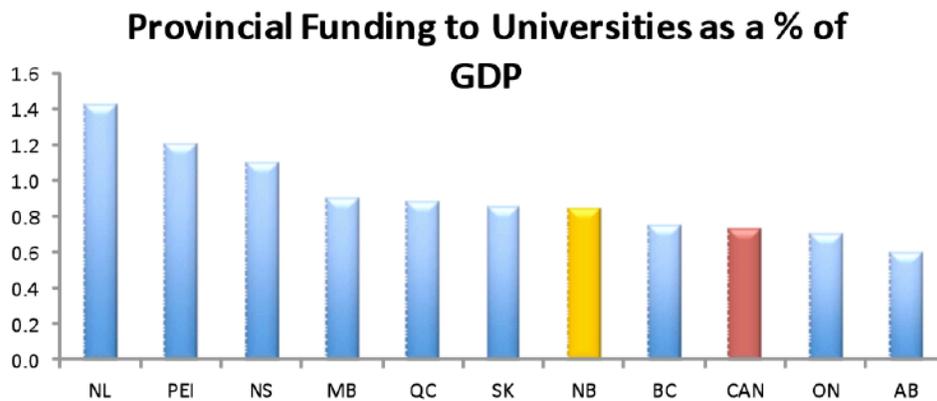
The average national investment of provincial funding to universities as a percentage of GDP is 0.73 per cent compared to 0.84 per cent in New Brunswick. It is important to note the GDP analysis is skewed as a result of the GDP being lower in New Brunswick, thus resulting in higher perceived contributions.

A greater investment in post-secondary education for both community colleges and universities will be required to reduce the skills gap, increase the labour force and improve literacy levels.

**Figure 4**  
**Provincial general operating funding to universities as a percentage of government expenditures (2009)<sup>21</sup>**



**Figure 5**  
**Provincial funding to universities as a percentage of GDP (2009)<sup>22</sup>**



<sup>21</sup> Canadian Association of University Business Officers (CABO) as analyzed by PETL

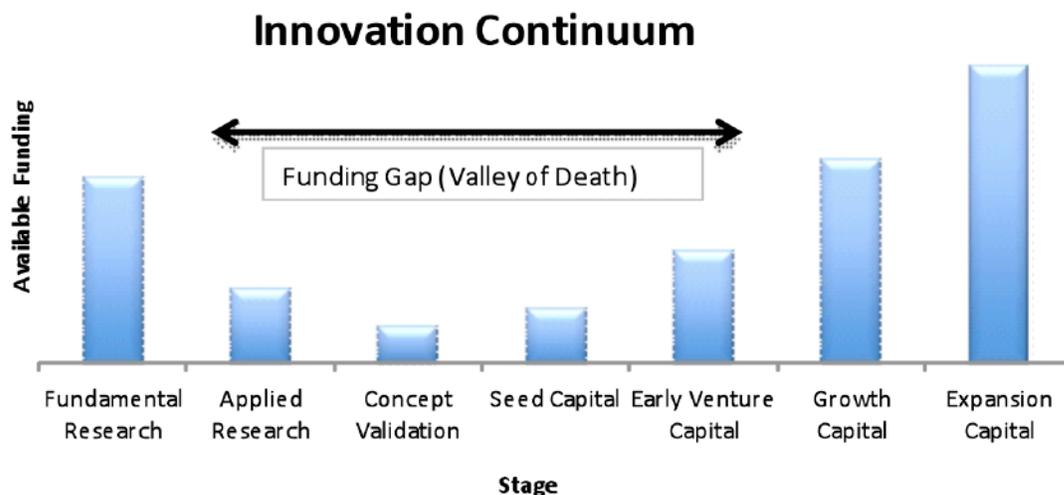
<sup>22</sup> Canadian Association of University Business Officers (CABO) as analyzed by PETL

### 4.3. Access to Capital

Access to capital, at the right time, has been cited as one of the greatest challenges facing entrepreneurs and businesses. As detailed in Figure 6, there are seven stages of a business cycle that will require capital investment: 1) fundamental research, 2) applied research, 3) concept validation, 4) seed capital, 5) early venture capital, 6) growth capital and 7) expansion capital.

Funding gaps (also known as the “Valley of Death”) generally occur in the applied research, concept validation, seed capital and early venture capital stages. Organizations such as the New Brunswick Innovation Foundation (NBIF) help to fill this gap; however, greater access to capital is required in the early and later stages of the innovation continuum to build more companies that will create a meaningful (and sustainable) impact on GDP.

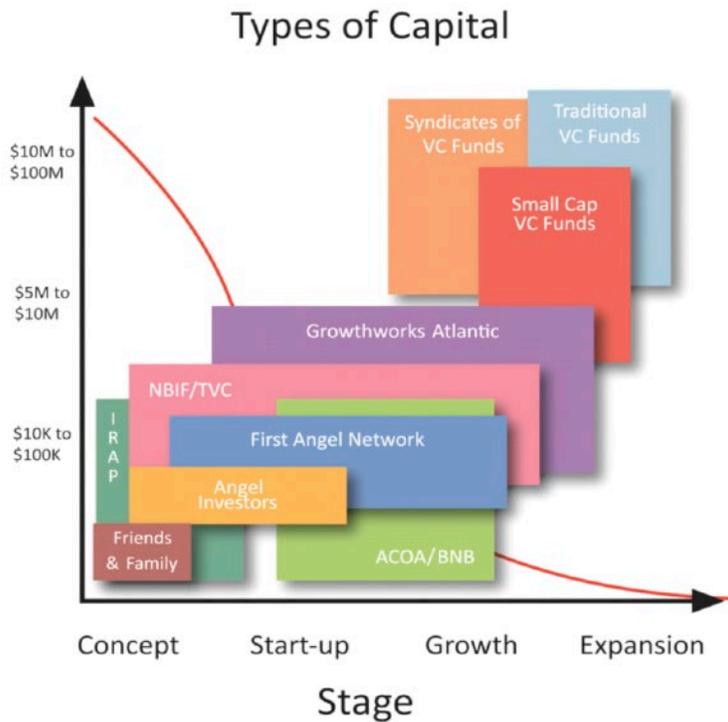
**Figure 6**  
**Innovation Continuum<sup>23</sup>**



As detailed in Figure 7, funding sources in New Brunswick include: venture capital (NBIF, Technology Venture Corporation [TVC], Community Business Development Corporations [CBDC], GrowthWorks, Business Development Bank of Canada [BDC] and other venture capital funds that may occasionally invest in Atlantic Canadian companies), angel investors (First Angel Network [FAN], Mariner Partners, and various individual angels that are active in the region), loans (Atlantic Canada Opportunities Agency [ACOA] programs, CBDC, Canadian Youth Business Foundation [CYBF], Department of Economic Development, and banks with personal guarantees from the entrepreneur), grants (NRC-IRAP, NSERC, BNB), and other (national one-time programs such as SDTC, SR&ED tax credits, SBITC program for investors).

<sup>23</sup> New Brunswick Innovation Foundation

**Figure 7**  
**Summary of capital sources in New Brunswick**



As detailed in Figure 8 there is an estimated \$196.20 per-capita investment by venture capital firms in New Brunswick, compared to the \$437.27 national average. Quebec leads the country in per-capita venture capital investments with \$715.19. New Brunswick ranks seventh, followed by Manitoba, Newfoundland and Prince Edward Island.<sup>24</sup>

<sup>24</sup> MacDonald & Associates Ltd. for VC numbers and Statistics Canada for population figures

**Figure 8**  
**Summary of capital sources in New Brunswick<sup>25</sup>**

<b>National Perspective</b>				
<b>Supply of Venture Capital in Canada by Province – 2010</b>				
	<b>VC Under Mgt</b>	<b>% of Canadian Supply</b>	<b>% of Canadian Population</b>	<b>\$VC per Capita</b>
Canada Total	\$14,922,489,339	100%	100%	\$437.27
Quebec	\$5,654,116,030	37.9%	23.2%	\$715.19
Ontario	\$5,703,157,120	38.2%	38.8%	\$431.15
BC	\$1,639,383,293	11%	13.3%	\$361.92
Saskatchewan	\$438,109,380	2.9%	3.1%	\$419.65
Alberta	\$925,830,304	6.2%	10.9%	\$248.82
Manitoba	\$152,353,450	1%	3.6%	\$123.41
Nova Scotia	\$205,524,162	1.4%	2.8%	\$217.53
New Brunswick	\$147,702,200	1%	2.2%	\$196.20
Newfoundland & Labrador	\$47,763,400	0.3%	1.5%	\$93.42
PEI	\$8,550,000	0.1%	0.4%	\$59.62
Atlantic Total	\$409,539,762	2.7%	6.9%	\$174.10

<sup>25</sup> Thompson Reuters

## 5. Accelerating the Province of New Brunswick

Viewed as both the direct and indirect driver of productivity growth and the primary source of national prosperity<sup>26</sup>, innovation at its core is about people: people who are willing to make changes, people who are willing to take chances, and people who are willing to build and support an ecosystem for individual and community prosperity.

Because of intensified global competition (particularly the exceptionally rapid emergence of China, India, Brazil and Russia as economic powers), less resource-intensive and environmentally-damaging methods of production, and an aging population, productivity growth is imperative, and innovation is more necessary than ever.<sup>27</sup>

The framework of an innovation strategy for the province must provide solutions to stimulate youth engagement and create provincewide opportunities while streamlining programs and services to eliminate duplication and maximize efficiencies and outcomes. An environment that supports entrepreneurs, encourages calculated risks and facilitates world-class private sector-led R&D activities focused on provincial priority sectors will help to address some of the challenges within the province (as detailed in Section 4 of this report).

To position the province for long-term sustainable economic growth, ongoing support and ownership of an innovation ecosystem is required by industry, government, academia and the public. Moreover, the creation of a culture of innovation that transcends political agendas and survives to the next generation will be the true measure of success of the strategy.

### 5.1 Innovate government

Government must demonstrate leadership in innovative practices. It must unleash innovation in the public sector; develop proactive policy and regulatory systems; spearhead continuous improvement to government systems and processes; provide services and support to industry; and build the foundations necessary to act as both model user and early adopter of New Brunswick innovations. The following is a summary of recommendations to help government innovate:

#### 1. Continue to assess existing programs and services to identify opportunities for outcome and productivity improvement.

The evaluation of existing programs and services will unveil new opportunities that were previously overlooked. Efficiency in program delivery will speak to the need both for traditional innovation and social innovation, whereby the outcomes will include streamlined activities, investment efficiencies, increased productivity, enhanced social policy, and improved well-being of New Brunswick citizens.

As an example, government agencies and other organizations in Canada are adopting the “Progressive Excellence Program” from Excellence Canada (formerly the National Quality Institute), which provides measurable standards for improvement plans to ensure quality and efficiency objectives are met.<sup>28</sup> The benefits experienced by participating organizations include: lower attrition rates, reduced sickness and absenteeism, lower payments to workers’ compensation, reduction in employee grievances and staff turnover and savings in operating costs through

<sup>26</sup> Council of Canadian Academies, *Innovation and Business Policy – Why Canada Falls Short*, 2009

<sup>27</sup> Council of Canadian Academies, *Innovation and Business Policy – Why Canada Falls Short*, 2009

<sup>28</sup> Excellence Canada, *Canada’s Authority on Organizational Excellence*

increased productivity.<sup>29</sup> The program's New Brunswick participants include River Valley Health, the City of Saint John and the Department of Public Safety.

Lean Six Sigma is often held as a gold standard in business management strategies which aim to increase quality and efficiency. "Lean Six Sigma is a philosophy of doing business with a focus on reducing or eliminating defects in conjunction with improving the flow in the value stream." Lean Six Sigma combines reducing the variation of the process and making work better as well as making work faster and more efficient.<sup>30</sup> Global management company Accenture, which delivers Lean Six Sigma services, says that the techniques can "alleviate the fiscal pressures many governments are facing, and pave the way to high performance" and that goals of maintaining services while reducing budgets by 10 to 20 per cent can be "entirely realistic."<sup>31</sup>

**2. Re-engineer the health-care system, education system and other investment intensive departments to streamline efficiencies and maximize program delivery.**

Re-engineering the processes that operate the health-care system, education system and other investment intensive departments will play an important role in building a culture of innovation with the private sector. The review should include: identifying ways to modernize the education system (including e-learning, inter-disciplinary studies, online academic records), establishing a provincewide record system for improved data management consistent across all departments (including an e-Health record system), and establishing an audit process that measures what is being done and how.

**3. Develop an ownership model where government assumes oversight of the innovation-based economic development strategy within government by assigning a committee and a lead representative to manage and measure the process on an ongoing basis and collaborate with the intermediary (see Section 5.4).**

An internal committee of government, led by the government liaison (recommended through the Executive Council Office), should include representation from the departments of Education, Health, Transportation, Economic Development, Natural Resources, PETL, Aquaculture, Fisheries, and Agriculture.

**4. Develop a Buy New Brunswick (N.B.) policy (while abiding by trade agreements and restrictions) across all provincial agencies and departments. A Buy N.B. policy should include: economic impact as a criteria of the procurement process, backstop bonding through a government agency (such as RDC), and accepting greater risk tolerance for purchasing from companies with less experience and less history.**

Using government procurement policies to support the local economy is an old concept. A newer concept that has surfaced in recent years is using public procurement for innovation, which is "potentially a powerful innovation policy tool that can contribute to urban, regional and national competitiveness and economic development. It is also a policy tool that the scientific communities as well as many governments are currently rediscovering."<sup>32</sup>

<sup>29</sup> Excellence Canada, *Certification*

<sup>30</sup> Lean Six Sigma Canada

<sup>31</sup> Accenture, *High Performance Government*

<sup>32</sup> Tarmo Kalvet & Veiko Lember, "Risk management in public procurement for innovation: the case of Nordic-Baltic Sea cities," *Innovation: The European Journal of Social Science Research*, 2010

“Public procurement has played a major role in many revolutionary innovations. Defence procurement in the United States, for example, led to the emergence of commercial aircraft, nuclear energy, computers, the Internet and the civilian space industry. Some European nations have recognized procurement’s importance in creating innovation-friendly markets. Ireland, Spain, the Netherlands and the United Kingdom have already started using public procurement as a policy measure to stimulate innovation.”<sup>33</sup> Recommended tools in the adoption of a procurement strategy include: feasibility studies, linking payments to performance quality and spreading risk to include most of the relevant parties.<sup>34</sup>

**5. Develop a model user program whereby government acts as an early adopter and model user to help new innovations and businesses in New Brunswick, while at the same time testing innovative solutions within government.**

“Pre-commercial procurement” is a policy the European Commission has explored in recent years. The commission has posed that the European Union’s public sector is facing many challenges that require R&D to create innovative solutions – challenges such as high-quality affordable health care, energy efficiency and higher quality and improved access to education. “By acting as technologically demanding first buyers of new R&D, public procurers can drive innovation from the demand side. This enables European public authorities to innovate the provision of public services faster and creates opportunities for companies in Europe to take international leadership in new markets. Reducing time to market by developing a strong European home market for innovative products and services is key for Europe to create growth and jobs in quickly evolving markets such as ICT.”<sup>35</sup>

**6. Establish a 10-per-cent top-up for New Brunswick companies that successfully access the Canadian Innovation Commercialization Program (CICP).**

Introduced by the federal government through Public Works and Government Services in 2010, CICP provides contracts of up to \$500,000 and helps companies in the pre-commercialization stage. The program provides information on how to do business with the Government of Canada; awards contracts to entrepreneurs with pre-commercial innovations; and tests and provides feedback regarding the performance of their goods and services.<sup>36</sup>

## **5.2 Make New Brunswick a better place in which to start and grow a business**

We must improve the competitiveness and promote the development of key industrial sectors; establish the business conditions attractive to both domestic and foreign investment in strategic technologies and sectors; and drive the local and provincial landscape.

The following is a summary of recommendations to help make New Brunswick a better place in which to start and grow a business:

<sup>33</sup> Gabriela Prada, “Leveraging the Buying Power of Government for Innovation in Health Care,” *Inside Edge*, 2009

<sup>34</sup> Tarmo Kalvet & Veiko Lember, “Risk management in public procurement for innovation: the case of Nordic-Baltic Sea cities,” *Innovation: The European Journal of Social Science Research*, 2010

<sup>35</sup> European Commission

<sup>36</sup> Public Works and Government Services Canada

- 1. Focus provincial public and private-sector R&D activities, education capacity, and investment attraction initiatives on the priority sectors.**

Priority sectors as identified by the Department of Economic Development are: 1) information and communications technology, 2) biosciences, 3) value-added food, 4) value-added wood, 5) industrial fabrication, and 6) aerospace and defence.

- 2. Align, prioritize and establish metrics for post-secondary research investment around priority sector and industry needs.**

Within five years, 50 per cent of all research activities geared toward priority sectors is recommended to maximize provincial focus and potential commercialization opportunities through post-secondary education research results.

- 3. Develop an export development strategy that will identify opportunities, markets, value proposition and partners for priority sector growth.**

The New Brunswick Information Technology Council (NBITC) suggests that increasing the export of information and communications technology (ICT) goods and services should be our principal focus in facilitating economic growth. "Growing the ICT goods exports to the Canadian average alone increases exports by \$332 million, grows provincial GDP by just under one per cent and would add an estimated 3,200 jobs."<sup>37</sup>

Future NB, an industry-led task force that includes government, education and other leaders, also references the need for increased export development. "We need to grow our base of export-focused private sector economic activity to grow our population and provide the necessary tax revenue to sustainably fund public services."<sup>38</sup>

- 4. Develop a promotional strategy for outside markets that positions New Brunswick as a collaborator with other innovation markets, articulates market access advantages and promotes employment opportunities.**

It is recommended the promotional strategy be developed and implemented by the innovation intermediary (see Section 5.4 recommendation 1) once operational.

- 5. Create an environment where the tax structure and the regulatory and policy system are constantly improved to enhance the investment opportunities for New Brunswick companies.**

Sound economic fundamentals and a stable policy and regulatory framework are the general factors which deem a location attractive for foreign investment in innovation.<sup>39</sup> As detailed in Appendix A, exemplary jurisdictions where innovation strategies have proven to be impactful conduct an ongoing review of policies and regulations to ensure the right system is in place to accelerate economic growth. The U.S., for example, recently passed the new *America Invents Act*, which is designed to update the U.S. "patent system to encourage innovation, job creation and economic growth."<sup>40</sup>

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<sup>37</sup> NBITC, *Government Procurement and Growing the ICT Sector*

<sup>38</sup> Future NB, *Vision and Strategy*, 2011

<sup>39</sup> OECD, *Attractiveness for Innovation: Location Factors for International Investment*, 2011

<sup>40</sup> United States House of Representatives Committee on the Judiciary, *America Invents Act*, 2011

- 6. Revise the small business investment tax credit (SBITC) program to accommodate both personal and corporate contributions, solutions to stimulate access to venture capital funding for New Brunswick companies.**

The annual investment cap is currently 30 per cent, up to a maximum of \$250,000. It is recommended the cap be doubled to a maximum of \$500,000 and that the credit be applied to both individuals and professional corporations such as holding companies for doctors, lawyers and other high net-worth residents to encourage greater investment in New Brunswick businesses.

- 7. Eliminate the provincial corporate tax for venture capital corporations to create a competitive advantage for venture capital firms to invest in New Brunswick companies.**

At 10 per cent, the New Brunswick corporate tax rate is tied with Alberta for the lowest in the country. Despite the competitiveness of the tax rate, limited incentives, if any, exist to entice venture capital firms to invest in New Brunswick innovations and businesses. A reduction or elimination of the New Brunswick corporate tax rate for venture capital firms would create a meaningful competitive advantage in comparison to other provinces and potentially spark new investments in the region.

- 8. Leverage university and college alumni and ex-pat networks to generate leads for investment attraction, and talent recruitment.**

There are an estimated 120,000 alumni listed in the databases of the University of New Brunswick (UNB), the Université de Moncton (UdeM), Saint Thomas and Mount Allison universities. Other jurisdictions are capitalizing on alumni to stimulate economic growth and generate leads for both talent and business expansion. The University of Waterloo, for example, works closely with its research and technology park, the region of Kitchener/Waterloo, Communitech (innovation intermediary), and industry associations to leverage its alumni network and drive the local economy.

- 9. Enhance population growth strategy to include the recruitment of expert technical researchers to coincide with industry job demands and priority sectors, based on skills and sectors rather than location.**

Access to talent is noted as one of the principal constraints to ICT growth.<sup>41</sup> Having the right people with the right skills at the right time will accelerate commercialization and business opportunities for existing New Brunswick businesses and lead to the expansion of new businesses to the province. A strategy customized to the needs of private sector and industry demands will have a meaningful impact on the economic growth of the region. Additionally, it is recommended that collaborations be established (or expanded upon where applicable) with Citizenship Immigration Canada to facilitate the delivery of student visas to foreign students.

- 10. Improve credentials and accreditation of foreign professionals, and include provisions for family member placements, aligned with federal initiatives, where possible.**

Many foreign professionals are unable to navigate and conclude the Canadian certification process and, as a result, are underemployed with skills that are needed by New Brunswick businesses today.

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<sup>41</sup> New Brunswick Information Technology Council

### 5.3 Change the mindset of New Brunswickers to be innovative thinkers rather than passive learners

We must foster entrepreneurship, strengthen collaboration between industry and academia, and create a culture of innovation. To change the mindset of New Brunswickers, we must revise the education system to incorporate entrepreneurship, stimulate youth engagement, and guide businesses, aspiring entrepreneurs, students and graduates to think differently about innovation. As previously noted, innovation applies to both emerging and traditional industries and new or improved processes.

While New Brunswick businesses and community stakeholders are already innovating and have expressed support for a streamlined approach, it takes time to make fundamental changes to policies, regulations and mindset and to build a climate that will support new and existing ventures.

Some industries such as ICT realize rapid commercialization, while other industries require thought leadership, social innovation and long-term commitments to bring new or improved ideas to market. The Canadian market, as with the U.S. market, favours technology, with 46 per cent of the total investment commitments made to tech start-ups, with Internet and software companies leading the pack. Life sciences investments make up 23 per cent of the total.<sup>42</sup>

As detailed in Figure 9, inventions such as the radio, automatic transmission and xerography took 16 to 35 years to bring to the market, illustrating the need to invest today for innovations tomorrow.

**Figure 9**  
**Invention to Innovation<sup>43</sup>**

Invention to Innovation			
Item	Year of Invention	Year of Commercialization	Time Lag (years)
Radio	1887	1922	35
Insulin	1889	1922	33
Diesel-electric Locomotive	1895	1925	30
Tungsten carbide	1900	1930	30
Automatic transmission	1904	1939	35
Kodachrome	1910	1935/36	25
Nylon	1927	1939	12
Xerography	1934	1950-1955	16
Transistor	1940	1950	10

<sup>42</sup> Boslet, *Canadian VC Investing Climbs as Fundraising Lags*

<sup>43</sup> Mensch, 1979 (cited by Alexpoloulos and Choen, *Why Canada Falls Short*, 2009)

The investment of time required in today's economy to bring new or improved products to market is significantly lower than in the late 1800s and early 1900s. However, targeted strategies are required to accelerate commercialization.

As detailed in Figure 10, although the strategies and policies appropriate in new markets (new ventures) are generally quite different from those in established markets (incumbents), they are complementary because successful new markets, such as the smart phone as an example, eventually become established markets.<sup>44</sup>

**Figure 10**  
**Innovation Strategies – Incumbents versus new ventures<sup>45</sup>**

Innovation Strategies – Incumbents Versus New Ventures		
	Incumbents	New Ventures
Target Market	Existing markets – Incumbent firms tend to focus on existing markets and products. Some, but not all of the investment in innovation targets improvements in existing businesses.	New markets – New ventures are more likely to seek out new markets (those without an incumbent competitor), but even existing markets are new to the firm.
Style of Innovation	Incremental innovation – Existing products and markets create demands for incremental innovations, both in the products and in the associated processes (a small number of incumbents do manage to sustain more radical innovation strategies).	Radical innovation – Gaining entry to an existing market, or creating a new market, usually requires some form of radical innovation.
Allocation of Resources	Balanced priorities – Large businesses must allocate resources across multiple products and corporate priorities, with investments in innovation allocated in competition with many other demands.	Single priority – New entrants are much more likely to be focused on a single product or service.
Source of Funding	Internal funding – Incumbent firms are more likely to fund innovation from internally generated resources.	External funding – New ventures, usually with little or no sales revenue, are heavily dependent on external financing to support innovation and growth.
Management Incentive to innovate	Mixed incentives – Management bonuses (whether cash or equity) are generally spread across the multiple objectives of the firm.	Strong incentives – Equity and stock options typically provide key contributors with significant opportunities for wealth creation.

<sup>44</sup> Council of Canadian Academies, Innovation and Business Policy – *Why Canada Falls Short*, 2009

<sup>45</sup> Council of Canadian Academies, Innovation and Business Policy – *Why Canada Falls Short*, 2009

The following is a summary of recommendations to help change the mindset of New Brunswickers from passive learners to innovative thinkers.

**1. Incorporate entrepreneurship training in post-secondary education programming, including diploma, degree, graduate and post-graduate levels.**

The Technology Management and Entrepreneurship (TME) program at UNB is an example of a program that has been developed to respond to industry trends and market demands. It is recommended the innovation intermediary (see Section 5.4 recommendation #1) work in collaboration with the TME program and stakeholders identified in Appendix B leading entrepreneurship development to spearhead this initiative and streamline activities.

**2. Increase interaction with business schools and the private sector.**

“Successful innovation equates to a successful marriage of invention and commercialization, and that requires a free flow of information and technology among people and organizations.”<sup>46</sup> Consistent interaction with the business schools (including colleges and universities) and the private sector will ensure programming can be customized to respond to market demand and opportunities for partnerships can be proactively identified.

**3. Create more environments that facilitate “learning by doing,” such as increased participation for students in co-operative programs and closer ties between industry and education.**

Successful co-operative programs such as the University of Waterloo in Ontario have proven to be effective in increasing collaboration between industry and academia and equipping students with the knowledge and tools necessary upon graduation to secure gainful employment. The Waterloo program is a four-year degree over five years, providing a full year of transferable business experience upon completion of the degree.

**4. Develop a marketing campaign targeted to stakeholders, the public and targeted markets.**

It is recommended the marketing campaign be developed and implemented by the innovation intermediary (see Section 5.4 recommendation #1) once operational. The objectives of the marketing strategy are: to position New Brunswick as an innovative environment; create a culture of innovation; generate awareness of career opportunities in and from science, technology, engineering and math (STEM) fields; clarify available resources for businesses; quantify investment opportunities in New Brunswick companies; and facilitate a culture of entrepreneurship.

**5.4 Build an innovation ecosystem that supports access to ideas, people and capital**

We must strengthen the region’s R&D capacity; increase access to capital; enhance education and training capabilities; integrate technology policies into the overall economic development planning; and build the foundations for innovation in business with sound framework conditions. The climate necessary for new ventures is financing new ventures; commercializing university and college research; and supporting innovative clusters.

<sup>46</sup> Burke, *How to Build an Innovation Ecosystem*, 2011

The following is a summary of recommendations to build an innovation eco-system that supports access to ideas, people and capital:

**1. Establish an “arms-length” from government innovation intermediary that will be responsible for the ongoing oversight of the innovation strategy.**

The objective in establishing the intermediary is to streamline activities throughout the province; consolidate the co-ordination of existing organizations; create greater synergies; minimize regional competition; reduce redundancy; and provide consistent access to programs, services and expertise.

“An innovation intermediary can be defined as an organization at the centre of a region’s efforts to align local technologies, assets and resources in the spirit of collaboration to advance innovation.”<sup>47</sup> The intermediary will be responsible for spearheading the implementation of the overall strategy, collaborating with industry, government and academia; accelerating the growth of innovation-based entrepreneurship and economic development; aligning companies, assets and resources; and delivering programs and services as needed to industry.

**2. Establish three strategic centres of expertise in the areas of mobile computing, industrial design and rapid commercialization of products and services.**

A centre of expertise, whether virtual or physical, is defined as a centre that regroups experts from multiple disciplines to study complex and multidimensional problems in a team environment to create new knowledge and insights. Centres of expertise are intended to create value using research and innovation.<sup>48</sup>

Three centres of expertise are recommended to drive commercialization and foster increased transfer of knowledge within New Brunswick. The centres in mobile computing and industrial design will support the information technology, value-added wood, and industrial fabrication sectors, while the centre for rapid commercialization of products and services will support all priority sectors.

**3. Develop a five-year plan that will enable an increase in annual R&D investment from current New Brunswick gross expenditures on R&D (GERD) levels to an annual contribution that is 10 per cent greater than any other province in the Atlantic region. Target increased investments from industry, federal partners and the provincial government focused in the priority sectors.**

To respond to current market demands and proactively plan for long-term sustainable growth, it is recommended that a balance between traditional innovation and social innovation be a core element of increasing R&D capacity. It is recommended 50 per cent of new investments in R&D activities be targeted toward applied research in the priority sectors, and 50 per cent be targeted toward basic research in the areas of social and human science.

Federal programs such as NSERC, Social Sciences and Humanities Research Council of Canada (SSHRC), Canadian Institutes of Health Research (CIHR) and CFI are underused in the region. Lack of matching funds, competition among other Canadian jurisdictions and lack of industry collaboration are cited as several of the reasons. Research in social and human sciences, and focused efforts in

<sup>47</sup> Innovation America

<sup>48</sup> Van Horne, C.,J.-M. Frayret, & Poulin, D. 2006: *Creating Value with Innovation*

the priority sectors geared toward the commercialization of innovative products and services in collaboration with industry (along with the availability of matching investments), will automatically leverage any new investment made by the provincial government and the private sector.

- 4. Develop a five-year plan that will enable an increase in university investment from current New Brunswick levels to an annual contribution that is greater than or equal to Nova Scotia or the national average, whichever is greater.**

Access to additional funds for universities in the region will support the need for expanded capacity; investments in strategic knowledge and infrastructure; graduate and post-graduate scholarships; and industry liaison officers (ILO).

- 5. Develop a five-year plan that will increase the number of available seats in the community college system by 25 per cent, and/or facilitate the accommodation of 75 per cent of all those who apply to community college (note: 2011 levels – 12,000 applications for 8,000 available seats),<sup>49</sup> through traditional education or innovative practices, taking into account all relevant factors such as technological, partnership and infrastructure requirements to accommodate such capacity.**

Colleges are the largest suppliers of advanced adult training and education in Canada, with 2.5 million full and part-time students. Colleges are highly responsive to industrial and technological changes and are flexible in meeting the training requirements of local industry.<sup>50</sup>

The Canadian Federation for Independent Business reports that a ratio of six to one college/institute graduates over university graduates is required to fill shortages in advanced skills.<sup>51</sup> The colleges are now equipped with greater access to applied research funds, thanks to the College and Community Innovation Program (CCI), and other programs such as Colleges Community Innovation Program (CCIP), and CFI college industry fund administered through NSERC. The program provides \$48 million over five years for college-industry partnerships in applied research. Both the New Brunswick Community College (NBCC) and the Collège communautaire du Nouveau-Brunswick (CCNB) have received NSERC certification and are positioned to take advantage of this new program. It is important to note that progress has already been made with CCNB as the first college in Atlantic Canada to access applied research funds from this program, with \$2.3 million recently obtained by CCNB.

- 6. Facilitate greater collaboration between industry and academia to stimulate greater levels of private sector sponsored research and development activities.**

It is recommended that each university and division of the community college system (CCNB and NBCC) in the province receive sufficient funding to support the addition of one to three additional ILOs (based on university research capacity and student population – assigned from funds from Section 5.4 recommendation #4) to build collaborative relationships and exploit opportunities for increased industry and academia partnerships in research and development activities.

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<sup>49</sup> Department of Post-Secondary Education Training and Labour

<sup>50</sup> Association of Canadian Community Colleges, 2011

<sup>51</sup> Association of Canadian Community Colleges, *Accelerating Innovation, Competitiveness and Prosperity, 2010-2011*

**7. Leverage existing provincial associations, educational institutions, business networks and research institutes to drive the local and provincial economy.**

In a 2009 report, the Organization for Economic Co-operation and Development (OECD) named leveraging assets as a key principal that is instrumental in success for development agencies in tackling the recession. "Assets and private capital are key to reinvestment markets and agencies can help to leverage them towards local economic development goals."<sup>52</sup> As in nature's ecosystems, no single actor in an innovation system functions in isolation. If one member is weak, everyone suffers.<sup>53</sup>

Governments facing budgetary challenges may leverage assets as part of shared service strategies to offset the costs of offering services. For example, "governments can sell or barter their services, expertise, equipment, facilities, and technologies to other public and non-profit entities, reducing the cost for everyone."<sup>54</sup> Success in these kinds of strategies is dependent on leveraging relationships.

The primary stakeholders required in the innovation ecosystem where leverage opportunities can be realized are detailed in Appendix B.

**8. Develop a plan that facilitates greater investment for venture capital, angel investments and other early stage and SEED funding for small and medium enterprises (SMEs).**

A robust capital environment is essential in building an innovation-based economic development ecosystem. A review of the existing policies and regulatory system pertaining to venture capital, angel investors and other early stage investors for SMEs is recommended.

**9. Establish a high-risk, minimum process fund to support and leverage early stage and SEED funding of less than \$50,000.**

Administered through the NBIF, it is recommended a new fund be established for early-stage innovations to maximize the number of start-up companies in the province and encourage risk-taking, entrepreneurship and innovation.

**10. Establish a venture capital network with outside venture capital firms (national and international).**

Co-ordinated through the NBIF, it is recommended a venture capital network be established and nurtured to promote New Brunswick as culture of innovation with investment ready to flow.

**11. Improve and expand upon articulation agreements with a focus on priority sectors.**

An increase in articulation agreements (focused on the priority sectors), and the transfer and recognition of credits between colleges and universities will strengthen collaboration between

<sup>52</sup> IOECD, *Recession, Recovery and Reinvestment: the role of economic leadership in a global crisis*, 2009

<sup>53</sup> Burke, *How to Build an Innovation Ecosystem*, 2011

<sup>54</sup> Frank Benest, Next Generation Advisors, Principal Mark Danaj, Debra Figone, and Kim Walesh, City of San Jose, "What's the Future of Local Government? A White Paper Intended To Provoke a Needed Conversation," (2011) Retrieved from: <http://old.transformgov.org/bigideas/sanjosepaper.pdf>

universities and colleges, and bridge the gap between industry needs and program delivery. (Note: portal for transferability of credits between colleges and universities has been launched).<sup>55</sup>

“Creating a culture where scientists are encouraged to think about the practical application of their work and are equipped with the necessary resources to pursue entrepreneurial endeavours is critical to building an innovation ecosystem.”<sup>56</sup>

An increase in international student and professor exchange opportunities can be realized by establishing a priority list of partner countries and institutions and building complimentary support programming. Some partnerships have been established with universities and colleges in New Brunswick and are recommended to be expanded upon.

**12. Develop a promotional strategy within the post-secondary education institutions and the K-12 system to bring greater awareness of career opportunities in STEM and the need for domestic and international student engagement.**

A variety of educational programs are underway internationally to promote and incorporate STEM curricula into educational settings with the objective of teaching the skills necessary to innovate. It is recommended the promotional strategy be developed and implemented by the innovation intermediary (see Section 5.4 recommendation #1) once operational. Additionally, collaboration with the NBITC and other organizations that are engaged in education outreach activities is recommended to leverage existing activities, streamline efforts and maximize outcomes.

**13. Enhance K-12 school system by including entrepreneurship training and placing a greater emphasis on STEM education. Replicate and augment activities conducted during “Science Week” through Science East and other partners as part of the overall school curriculum.**

The French Academy of Sciences has used a program intended to produce the skills necessary for innovation since 1996. The program, *la main à la pâte*, is introduced to children in pre-school and continued into middle school to encourage inquiry-based science education. The program is based on the following three principles: 1) science education is meant for all students, 2) a focus on young students, as neural connections are developed at a young age and curiosity among young children is naturally high, and 3) a strong emphasis is put on the relationship between science and language.<sup>57</sup>

**14. Develop a talent attraction strategy geared toward the U.S. market to capitalize on the U.S. economy and stability of the Canadian and New Brunswick economies.**

Pre-tax business profit in Canada as a percentage of GDP has exceeded that of the U.S. in most years since 1961.<sup>58</sup> A stable Canadian and New Brunswick economy is a competitive advantage that can be used to fill the gap of talent attraction and generate new opportunities for the region.

<sup>55</sup> New Brunswick Department of Post-Secondary Education Training and Labour

<sup>56</sup> Council of Canadian Academies, *Innovation and Business Policy –Why Canada Falls Short*, 2009

<sup>57</sup> OECD, *Education for Innovation: The Role of Arts and Stem Education*, 2011

<sup>58</sup> Council of Canadian Academies, *Innovation and Business Policy –Why Canada Falls Short*, 2009

## 5.5 Improve local, regional, national and international collaboration between industry, academia and government

We must strengthen collaboration between industry, government and academia; make intellectual property accessible to industry; expand mentorship programming; and build regional, national and international partnerships.

“A system truly poised to innovate is one in which the barriers between organizations and individuals are broken down, where collaboration happens across disciplines and sectors and where a diverse, democratized culture supports risk taking, tolerates failure and celebrates success.”<sup>59</sup>

Collaboration is a key element of innovation. As noted in a ministerial report on its innovation strategy, the OECD states, “Innovation rarely occurs in isolation; it is a highly interactive process of collaboration across a growing and diverse network of stakeholders, institutions and users.”<sup>60</sup> The report suggests that the combination of the economic downturn and challenges of “declining populations and... diminishing returns from labour inputs and investment capital” requires future growth to come from innovation-based productivity.<sup>61</sup> This leads to the conclusion that if jurisdictions are to have economic growth, they must collaborate with stakeholders to spur innovation.

The following is a summary of recommendations to achieve this objective:

1. **Establish a global IP exchange (local, regional and national) that includes the development of a cataloguing system of academic IP where information can be shared in other markets, objectives are reviewed annually, and opportunities are explored for cross-IP collaboration.**

Other jurisdictions, such as Finland have a catalogue system detailing all available IP that is accessible domestically and internationally. The ease of access to such information accelerates commercialization, reduces duplication of research activities, creates a competitive advantage, and maximizes overall productivity.

2. **Develop and expand mentorship recruitment and engagement process to provide greater access to the necessary support for businesses to sustain and expand their operation.**

As detailed in Appendix B, organizations such as 21Inc, propel ICT, Wallace McCain Institute (WMI), TECH South East, the New Brunswick Business Council (NBBC), and the Pond Deshpande Centre (PDC) provide leadership and entrepreneurship development and/or access to mentors in targeted fields of expertise based on the need of its members and participants. It is recommended the innovation intermediary collaborate with these organizations (and others where applicable and appropriate) to streamline mentorship programming to ensure consistent services are accessible throughout the region.

<sup>59</sup> Burke, *How to Build an Innovation Ecosystem*, 2011

<sup>60</sup> OECD, “Ministerial report on the OECD Innovation Strategy: Innovation to strengthen growth and address global and social challenges,” (2010), Retrieved from: <http://www.oecd.org/dataoecd/51/28/45326349.pdf>

<sup>61</sup> OECD, 2010

**3. Strengthen provincial collaboration with the federal government to align investment and innovation strategies for priority sectors with federal programs.**

As detailed in Appendix B, government departments, programs and agencies identified as potential stakeholders in the innovation ecosystem for New Brunswick include: ACOA, Canadian Forestry Services, Centre of Excellence for Commercialization and Research, Science and Technology, Fisheries and Oceans, International Science and Technology Partnership (administered through DFAIT), NRC, NRC-IRAP, NSERC and the Potato Research Facility.

**4. Establish international collaboration partnerships with regions such as Finland, Australia and Israel.**

The Massachusetts-Israeli Innovation Partnership is a concrete example of what collaboration can mean in an innovation strategy context. The partnership is “a formal collaboration between the State of Israel and the Commonwealth of Massachusetts to encourage and support innovation and entrepreneurship between Massachusetts’ and Israel’s life sciences, clean energy and technology sectors.”<sup>62</sup> The partnership is designed to help companies in both jurisdictions “accelerate development cycles, promote mutually beneficial business-to-business co-operation to enhance opportunities for marketplace success and expand their global reach. It proposes a flexible framework of parallel funding for each participating company, having its R&D expenses supported by its own state according to its respective laws, regulations, rules and procedures.”<sup>63</sup>

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<sup>62</sup> Massachusetts-Israel Innovation Partnership

<sup>63</sup> Massachusetts-Israel Innovation Partnership

## Appendix A: Exemplary Jurisdictions

Several jurisdictions have been explored to gain a greater understanding of best practices, emerging trends, funding priorities and potential policy adaptation by New Brunswick. Consideration was given to regions that provide insight on provincial, national, North American and international strategies. For the purpose of this report, information was gathered for: Canada-Ontario-Toronto, Finland-Helsinki, United States-Massachusetts-Boston, Australia-Victoria-Melbourne, and Israel-Tel Aviv.

### Canada-Ontario-Toronto

#### Canada

The Government of Canada laid out a plan to increase productivity through innovation in 2007. The pillars of its plan included fostering entrepreneurship, increasing the knowledge base and attracting, and keeping skilled workers in the country. The report outlining these initiatives, *Mobilizing Science and Technology to Canada's Advantage*, states, "For Canadians to continue to enjoy a high quality of life and standard of living, we must improve our productivity and competitiveness through innovation."<sup>64</sup>

In 2011 there was a renewed call for innovation support in Canada. The report, called *Innovation Canada: a Call to Action*, focused on the following as priorities:

- Creating of an Industrial Research and Innovation Council (IRIC) to deliver the federal government's business innovation programs.
- Simplifying the tax credit system used to support small- and medium-sized businesses.
- Making business innovation one of the core objectives of procurement
- Transforming the institutes of the National Research Council (NRC) into a series of large-scale, collaborative centres involving business, universities and the provinces.
- Helping high-growth innovative firms access the risk capital they need through the BDC.
- Establishing a clear federal voice for innovation and work with the provinces to improve co-ordination<sup>65</sup>

#### Ontario

The Province of Ontario has its Ministry of Economic Development and Innovation to spearhead innovation initiatives. Its mandate is to "grow new industries, new jobs and prosperous communities."<sup>66</sup> The ministry has funding programs to support this mandate; in addition, the Ontario Network of Excellence (ONE) "works directly with entrepreneurs, academia and businesses to build globally focused, investor-ready companies." ONE helps local innovative talent build globally focused, investor-ready companies; launch new products and services to the global marketplace; and provide better access to Ontario's world-class researchers and research infrastructure to bridge the gap between discovery and market-ready products.<sup>67</sup>

<sup>64</sup> Industry Canada, *Mobilizing Science and Technology to Canada's Advantage*

<sup>65</sup> Government of Canada, *Innovation Canada: A Call to Action*

<sup>66</sup> Ontario Ministry of Economic Development and Innovation

<sup>67</sup> Ontario Ministry of Research and Innovation, ONE Network

A priority of the Ontario government has been to build strategic infrastructure that supports the growth and development of knowledge-based economies with a focus on the establishment of research, innovation and commercialization centres (RICs) such as Communitech, TechAlliance and MaRS.

## Toronto

Toronto ranked 10th in the international *City innovation classifications and rankings of 2011*.<sup>68</sup> According to the index, Toronto is a “Nexus” city and moved up two spots from its 12th place in 2010.<sup>69</sup> Toronto is the home of the MaRS Discovery District, a public-private partnership that “provides resources — people, programs, physical facilities, funding and networks — to ensure that critical innovation happens.”<sup>70</sup> These resources are designed to “stimulate, identify and harness great ideas, nurture their development and guide the transformation of those ideas into reality.” In operation since 2005, MaRS plays a lead co-ordination role as part of the innovation intermediary among the provincial regional innovation centres.

## Finland – Helsinki

### Finland

Finland is known globally for its dedication to innovation. In fact, “in international studies, the Finnish innovation system ranks as one of the best in the world and is considered to function effectively.”<sup>71</sup> The country is renewing its innovation policies to ensure its continued relevance. In the renewal process “government will pay particular attention to policies concerning education, research and technology, emphasizing the significance of business, design and organizational innovations alongside technical ones.”

Private and public funding for R&D in Finland has been very strong. “According to a preliminary estimate by Statistics Finland, the total spending on research and development exceeded EUR 6 billion in 2007, accounting for some 3.9 per cent of gross domestic product,” just shy of the four per cent target established nearly 20 years ago.<sup>72</sup> It is important to note, industry is the dominant performer of R&D, responsible for 71 per cent of the national total.

Like New Brunswick and much of Canada, Finland’s economy has historically been driven by the natural resources sectors with a strong export orientation. Over the years, a variety of domestic and external factors forced Finland to transition from its traditional industries toward new, knowledge-based industries and related support systems.

The contemporary Finnish innovation-based economic development strategy strikes a balance between social and economic development. Their economic development efforts are connected to other developments in society and the environment as well as to increasing the well-being of the population. This integrated approach is complemented by a deeply rooted commitment to education and a pervasive culture of innovation across Finnish society. The approach is based on strongly-organized local and regional innovation systems, capitalizing on local assets and opportunities. It is also aligned with the overall national strategic objectives and priority industry sectors.

<sup>68</sup> Innovative Cities: *City Innovation Classifications and Rankings 2011*

<sup>69</sup> Innovative Cities: *Innovative Cities Indexes*

<sup>70</sup> MaRS Discovery District

<sup>71</sup> Government of Finland: *Government’s Communication on Finland’s National Innovation Strategy*

<sup>72</sup> Statistics Finland, 2011

Innovation intermediary organizations (such as Culminatium in the Greater Helsinki region) are found throughout the country. They connect the resources and capacities of local education and research institutions and government policies and programs with the needs and aspirations of industry. An emphasis on entrepreneurship and a philosophy of nurturing “born global” companies is central to Finland’s national strategy.

## Helsinki

Helsinki ranked 42nd in the international *City innovation classifications and rankings* of 2011.<sup>73</sup>

In 2009, the Finnish government merged three of Helsinki’s universities: Helsinki University of Technology, Helsinki School of Economics and the University of Arts and Design in Helsinki. “At first called Innovation University – sparking some debate about its relationship to the industrial sector – the new institution has been named Aalto University, after the legendary Finnish architect and designer, Alvar Aalto.”<sup>74</sup> The move was one step in the country’s innovation renewal – attempting to create multidisciplinary post-secondary education institutions.

## The United States – Massachusetts – Boston

### The United States

The United States has multiple city centres known for excellence in innovation, including San Francisco, New York and Boston. However, the focus on fostering innovation is now spreading across the U.S. with recent events such as Congress passing the new *America Invents Act*. The act is designed to update the U.S. “patent system to encourage innovation, job creation and economic growth.”<sup>75</sup> The U.S. also relies on its national Economic Development Agency to promote innovation clusters, which are “geographic concentrations of competing, complementary, or interdependent firms and industries that do business with each other and/or have common needs for talent, technology, and infrastructure.”<sup>76</sup> Examples of such clusters include:

- North Carolina’s Research Triangle;
- the insurance and finance markets in Hartford, Conn.;
- Hollywood’s film industry;
- Carpets in Dalton, Ga.;
- Tourism in south Florida; and
- Technology along Route 128 in Massachusetts and in Silicon Valley, Calif.

### Massachusetts

There is also innovation support at the state level. For example, the Massachusetts Technology Collaborative (MTC) is a “public economic development agency that fosters a more favorable environment for the formation, retention, and expansion of technology-related enterprises in

<sup>73</sup> Innovative Cities, *City Innovation Classifications and Rankings*

<sup>74</sup> “The New Aalto University in Helsinki Merges Business, Technology and Design,” *Seed Magazine*

<sup>75</sup> United States House of Representatives Committee on the Judiciary, *America Invents Act*, 2011

<sup>76</sup> Economic Development Agency: *Research and Tools*

Massachusetts.”<sup>77</sup> MTC has divisions to fulfil its mandate, including the John Adams Innovation Institute, the Massachusetts e-Health Institute and the Massachusetts Broadband Institute, all of which foster collaboration among “leaders from industry, government, and academia to advance technology-based solutions that improve the healthcare system, expand high-speed Internet access, and strengthen regional economies.”<sup>78</sup>

## **Boston**

Boston is one of the U.S. cities that stood out in 2011. It ranked first in the international *City innovation classifications and rankings* of 2011 due to its connections with Harvard and the Massachusetts Institute of Technology, businesses and start-up and arts networks.<sup>79</sup> Also, Massachusetts ranked third in the 2011 *Top 10 States for Technology and Innovation* by CNBC based on its support for innovation based on metrics, including the number of patents issued to their residents, the dollar value of federal health and science research grants and deployment of broadband services.<sup>80</sup> Earning distinctions such as these did not happen overnight. A survey conducted in 2004 found that about 70 per cent of senior executives in Boston “cited innovation as a top priority and said they plan to hike R&D spending.”<sup>81</sup>

## **Australia – Victoria – Melbourne**

### **Australia**

Australia’s government has a department dedicated to innovation, industry, science and research. The department consists of divisions including manufacturing, research and corporate. The department’s mandate is to develop “a national innovation system that drives knowledge creation, cutting edge science and research, international competitiveness and greater productivity. The department is committed to developing policies and delivering programs, in partnership with stakeholders, to provide lasting economic benefits ensuring Australia’s competitive future.”<sup>82</sup>

Since 2002, the Australian Innovation Festival has also been working to support and promote innovation and entrepreneurship.<sup>83</sup> This organization applies the following key objectives to current and future projects:

- demonstrate the value of research, development and commercialization;
- profile Australia’s intellectual capital;
- reinforce the innovation and entrepreneurial process from idea to market;
- facilitate networking between innovators and investors; and
- collaborate nationally and with each Australian state and territory.<sup>84</sup>

<sup>77</sup> Massachusetts Technology Cooperative: *Annual Report*

<sup>78</sup> Massachusetts Technology Cooperative: *Annual Report*

<sup>79</sup> Innovative Cities: *City Innovation Classifications and Rankings*

<sup>80</sup> CNBC, *Top Ten States for Technology and Innovation*

<sup>81</sup> Engardio, *Scouring the Planet for Brainiacs*

<sup>82</sup> Australian Government Department of Innovation, Industry, Science and Research

<sup>83</sup> Australian Innovation

<sup>84</sup> Australian Innovation

In addition, the Australian Institute of Commercialization works nationally “with entrepreneurs, businesses, research organizations and governments to convert ideas or intellectual property into successful business outcomes.”<sup>85</sup>

## Victoria

The State of Victoria has a department dedicated to business and innovation. Its purpose is to “grow Victoria’s diverse and vibrant economy by supporting pro-business policies and programs and the development of innovative industries.”<sup>86</sup> This department has undertaken trade missions to foster international collaboration and has taken steps to facilitate investment and restructure procurement to the benefit of SMEs.

## Melbourne

Melbourne ranked 17th in the *City innovation classifications and rankings* of 2011, three places higher than its previous spot in 2010. Melbourne’s not-for-profit organization INNOVIC is focused on inventions and innovations to aid its efforts. It offers services, free seminars and innovation resources to help businesses achieve commercialization.<sup>87</sup>

## Israel-Tel Aviv

### Israel

Israel is a high-tech hub and a start-up nation.<sup>88</sup> Government, the military and aspects of the nation’s culture have been heralded as factors in its success. Government became involved in spurring innovation in Israel as early as 1993. It created the Yozma program, a fund “set up to invest in local venture capital funds that would channel money into new technology firms.”

A report reveals the country’s compulsory military service also sustains Israel’s innovation track record due to training in the fields of “computer security, cryptography, communications and electronic warfare.” Often after service is completed, the skills learned are re-purposed by Israelis to create new technology-based businesses.

Evidence of this trend can be seen in the volume of start-ups headquartered in Israel.

“Israel currently has almost 4,000 active technology start-ups – more than any other country outside the United States, according to Israel Venture Capital Research Centre. Israel is a world leader in terms of research and development spending as a percentage of the economy; it is top in both the number of start-ups and engineers as a proportion of the population; and it is first in per-capita venture capital investment.”<sup>89</sup>

A commentary article published in *The New York Times* says Israel has “the strongest recovery story” in all of Europe, the Middle East and Africa after the recession because it “used the crisis to solidify the

<sup>85</sup> Australian Institute for Commercialization

<sup>86</sup> Department of Business, Innovation and Skills: Policies

<sup>87</sup> INNOVIC

<sup>88</sup> Moskvitch, How Israel turned itself into a high-tech hub

<sup>89</sup> Moskvitch, “How Israel turned itself into a high-tech hub,” BBC, 2011

economy's long-term future by investing in research and development and infrastructure, raising some consumption taxes, promising to cut other taxes in the medium to long term."<sup>90</sup>

However, Israel's status as a high-tech hub is up for debate. Author and senior editor of TechCrunch Sarah Lacy says Israel is not the hub it once was. "Somehow, as Israel developed more of the ingredients that academics would consider crucial to high-growth company formation, returns from those start-ups have plummeted." Lacy also says venture capital is slowly and quietly pulling out of the country and will continue to do so until its next "home run."<sup>91</sup>

## Tel Aviv

Tel Aviv was ranked 46th in the international *City innovation classifications and rankings* of 2011.<sup>92</sup> According to the index, Tel Aviv was among other "global hub cities" rising in the ranks, such as Bordeaux, Vancouver, Budapest, Orlando and Shenzhen."

The international press considers Tel Aviv an economic sweetheart, gushing about its impressive achievements. For example, a commentary in *The New York Times* had this to say about: "Tel Aviv has become one of the world's foremost entrepreneurial hot spots. Israel has more high-tech start-ups per capita than any other nation on Earth, by far. It leads the world in civilian research-and-development spending per capita. It ranks second behind the U.S. in the number of companies listed on the Nasdaq. Israel, with seven million people, attracts as much venture capital as France and Germany combined."<sup>93</sup>

Tel Aviv's municipal government, Yafo Municipality, says Israel's innovation success is concentrated in the city. "The city is the business hub of a country which boasts the highest VC investments per capita (2.5 times that of the USA, 30 times that of Europe) and more start-ups established annually than any European country. Almost all the venture capital and most of the country's early stage start-ups are concentrated within the metropolis."<sup>94</sup>

The following stats come from Tel Aviv – Yafo Municipality:

- One of every seven Israelis works in Tel Aviv-Yafo (374,000 people);
- 44,500 people work in the commercial and service sectors in the city. The yearly revenue of these sectors was 175,000,000,000 shekels (\$46,000,000,000);
- 55 per cent of all bankers in Israel work in the city; and
- 50,000 businesses are registered in Tel Aviv-Yafo, including 6,500 factories and industrial business.<sup>95</sup>

<sup>90</sup> Brooks, "The Tel Aviv Cluster," *The New York Times*, 2010

<sup>91</sup> Lagorio, "What ever happened to Start-up Nation?," *Inc.*, 2011

<sup>92</sup> Innovative Cities, *City Innovation Classifications and Rankings, 2011*

<sup>93</sup> Brooks, "The Tel Aviv Cluster," *The New York Times*, 2010

<sup>94</sup> Oren, Tel Aviv-Yafo – An International Centre of Innovation

<sup>95</sup> Tel Aviv-Yafo Municipality

Innovation Trends and Funding Priorities		
Jurisdiction	Trends	Funding Priority
Canada-Ontario-Toronto	<ul style="list-style-type: none"> <li>Building public/private partnerships</li> <li>Strengthening private-sector commitment to science and technology, or fostering the entrepreneurial advantage</li> <li>Strengthening the knowledge-base, or the knowledge advantage</li> <li>Making Canada a magnet for talent, or focusing on the people advantage</li> <li>Facilitating provincial co-ordination</li> <li>Facilitating academic collaboration</li> <li>Creating regional innovation centres (RICs)</li> <li>Creating sector innovation centres (SICs)</li> </ul>	<p>Canada: agriculture and agri-science, space technologies, automotive and transportation technologies, aerospace, biotechnologies, bio-diagnostics, hydraulics, chemical process, fuel cell innovation and bio fuels, marine biosciences, micro-structural sciences, construction, nanotechnology and molecular science</p> <p>Ontario: water innovation, biopharmaceuticals, green technology, health Technology, emerging technologies and cancer and life sciences</p>
Finland-Helsinki	<ul style="list-style-type: none"> <li>Redefining innovation</li> <li>Creating centres of advancement</li> <li>Revising IP policies</li> <li>Enhancing training and education</li> <li>Increasing financing in R&amp;D</li> <li>Fostering international collaboration</li> </ul>	<p>Municipal – aimed at addressing the increasing number of retiring baby boomers and an ageing population and how it will impact the shortage of labour in the municipal sector and the change and growth of services needed</p> <p>Energy – production and more efficient use</p> <p>Mechanical industry – for Finnish machinery companies to react quickly to the change in the market</p> <p>Landmarks – new perspectives and promoting innovative activities</p> <p>Public leadership and management – address the welfare expenditures</p> <p>Health care – speedy access to care</p> <p>Food and nutrition – developing health-promoting concepts and supporting the growth of small and medium enterprises</p> <p>Environment – develop technology that reduces the load on the environment</p> <p>Russia – international ties and partnerships</p> <p>India – international ties and partnerships</p> <p>Innovation – ensure the innovation environment continues to maintain its high standard</p>

Innovation Trends and Funding Priorities		
Jurisdiction	Trends	Funding Priority
United States- Massachusetts- Boston	<ul style="list-style-type: none"> <li>Fostering collaboration with academia</li> <li>Fostering international collaboration</li> <li>Investment public/private funds</li> <li>Promoting e-Health investment</li> <li>Support broadband technology</li> </ul>	<ul style="list-style-type: none"> <li>The Massachusetts-Israeli Innovation Partnership focused on funding innovation in three sectors: life sciences, clean energy and technology</li> <li>Woods Hole Oceanographic Institution for Ocean Observing Infrastructure</li> <li>E-Health Institute</li> <li>Broadband Institute</li> </ul>
Australia- Victoria- Melbourne	<ul style="list-style-type: none"> <li>Increasing opportunities for industry</li> <li>Creating tax incentives for research and development</li> <li>Facilitating investment and infrastructure spending</li> <li>Fostering international collaboration</li> <li>Providing services</li> </ul>	<ul style="list-style-type: none"> <li>Funding (\$148 million) to create new co-operative research centres for technology to combat animal and plant pests in the agricultural sector, development of greener fuels and vehicles in automotive industry, improvement of efficiency and effectiveness of urban water systems</li> <li>Funding for export activities and international collaboration to increase the value and volume of Victorian food and beverage exports through promotion and trade missions</li> <li>Collaboration with academia for funding for green-chemistry to leverage significant Commonwealth funds</li> </ul>
Israel-Tel Aviv	<ul style="list-style-type: none"> <li>Policy development in creating human capital, developing education, generating knowledge beyond R&amp;D, innovation through partnerships, programs and incubators, public awareness, competition, policies, intellectual property rights and taxation</li> <li>Fostering international collaboration</li> <li>Providing high-tech training</li> <li>Increasing access to venture capital</li> </ul>	<ul style="list-style-type: none"> <li>Wireless communication</li> <li>Biological pest control</li> <li>Atomic Clock and GNSS</li> </ul>

## Appendix B: Primary Stakeholders in Innovation Eco-System

**Please note:** this list is intended to be demonstrative, not inclusive. Stakeholders within the innovation ecosystem will include but not be limited to the organizations listed below. As the strategy evolves and additional centres of expertise are explored in the priority sectors, additional stakeholders, where applicable and appropriate, will be identified and engaged.

Primary Stakeholders in Innovation Eco-System		
Stakeholder	Sector	Role
21Inc.	All	Leadership development
ACOA	All	Federal partner, leverage investments through federal programming
Atlantic Cancer Research Institute	Biotechnology	Build research capacity
AURP Canada	IT, Biotechnology	National collaboration
BioAtlantech	Biotechnology	Commercialization
Canadian Commercialization Consortium	All	Commercialization, national collaboration
Canadian Manufacturers and Exporters (national and provincial division)	All	Regional and national collaboration
Canadian Forestry Services	Value-added wood	Build applied research capacity, leverage federal programming
CCNB	All	Build education, entrepreneurship and applied research capacity
CECR	All	Leverage federal funds for centres of expertise
Chambers of commerce	All	Local and regional collaboration
Federal Department of Science and Technology	All	National collaboration, federal partner, leverage federal programming
First Angel Network	All	Build access to capital
Federal Department of Fisheries and Oceans	Value-added food	National collaboration
Future NB	All	Industry, government and academia collaboration
Growth Works Atlantic	All	Build access to capital
Hugh John Flemming Forestry Complex	Value-added wood	Local and regional collaboration
International Commercialization Alliance	All	International collaboration, potential to access leverage funds

Primary Stakeholders in Innovation Eco-System		
Stakeholder	Sector	Role
i-Canada	IT	National collaboration
International Science and Technology Partnership Program	IT, biotechnology	National collaboration, federal partner, leverage federal programming
Knowledge Park Acceleration Centre	All	Commercialization, potential hub lead
Mount Allison University	All	Build education capacity and social innovation research capacity
Municipalities	All	Local collaboration, leverage municipal programming
NB Aerospace and Defence Association	Aerospace and Defence, IT	Military procurement opportunities, advanced learning/defence modernization
NB Business Council	All	Mentorship and entrepreneurship
NB Forest Products Association	Value-added wood	Centre of expertise in industrial design
NB Health Research Foundation	Biotechnology	Build research capacity, leverage federal programming
New Brunswick Securities Commission	All	Access to capital, regulatory system enhancement
NBCC	All	Build education, entrepreneurship and applied research capacity
NBIF	All	Build access to capital for commercialization and applied research
NBIT Council	IT	Centres of expertise
NRC – Institute	All	Build research capacity, industry collaboration
NRC – IRAP	All	Federal programming capacity
NSERC	All	Federal programming capacity
Pond Deshpande Centre	All	Entrepreneurship and social innovation development
Potato Research Facility	Biotechnology, value-added food	Build applied research capacity, access to federal programming
propel ICT	IT	Replicate mentorship programming, potential hub lead

Primary Stakeholders in Innovation Eco-System		
Stakeholder	Sector	Role
New Brunswick Research and Development Council	All	Research capacity
Saint Thomas University	All	Build education and social innovation research capacity
Springboard Atlantic	All	Build research capacity, leverage federal programming
Technology Management and Entrepreneurship Program	All	Support the growth and development of entrepreneurs, build education capacity
TECH South East	All	Replicate programming, potential hub lead
TECNA	All	International collaboration
Technology Venture Corp.	IT	Build access to capital
Tucker Park (Saint John)	Biotechnology	Build research capacity
UNB	All	Build education, research capacity and commercialization output
Université de Moncton	All	Build education, research capacity and commercialization output
Wallace McCain Institute	All	Entrepreneurship development