

**KNOWLEDGE-BASED ECONOMY
SITUATIONAL ANALYSIS**

AND

**CAPE BRETON GROWTH FUND
STRATEGY**

Prepared by:



CONTENTS

Page(s)

EXECUTIVE SUMMARY	i-iv
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KNOWLEDGE-BASED ECONOMY SITUATIONAL ANALYSIS

1.0 Introduction	
1.1 The Growth Fund	1-2
1.2 Study Mandate	2-3
1.3 Methodology	4-6
2.0 Background of the Knowledge-Based Economy	
2.1 Overview	7-8
2.2 Clusters	8-10
2.3 Incubation	10-11
2.4 Analysis of the Knowledge-Based Economy in Other Regions	11-14
2.5 Economic Growth Model	15
3.0 Profile of the Knowledge-Based Economy in Cape Breton	
3.1 Infrastructure	16-20
3.2 Workforce	21-27
3.3 Industry & Entrepreneurship	27-32
3.4 Educational Institutions	32-37
3.5 Research and Development	37-41
3.6 Public and Private Investment	41-48
3.7 Indigenous Strengths	48-49
4.0 Industry Stakeholders Survey	50-58
5.0 Outlook for the Knowledge-Based Economy in Cape Breton	
5.1 Challenges for the Cape Breton Knowledge Economy	59
5.2 Key Success Factors	60
5.3 Global Outlook	61

CONTENTS

Page(s)

CAPE BRETON GROWTH FUND STRATEGY

6.0	Introduction (Phase II).....	62
7.0	Approach to Developing the Strategy.....	63
8.0	CBGF Strategy	
8.1	Overview.....	64-66
8.2	Invest in Infrastructure.....	67-70
8.3	Enable Sector Growth.....	71-80
8.4	Build a Culture of Innovation.....	81-86
8.5	Summary of Proposed Programming by CBGF.....	87
9.0	Conclusion.....	88

Appendix I Stakeholders Consulted

Appendix II Bibliography

Appendix III Knowledge-Based Companies in Cape Breton

EXECUTIVE SUMMARY

The Cape Breton Growth Fund (CBGF) has contracted MYRS Consulting and Deltaware Systems Inc. to prepare a two-phased report: a situational analysis of the Cape Breton knowledge-based sector and a strategy for deployment of the CBGF funds in the knowledge-based sector.

The methodology used to prepare this report was to interview stakeholders, to advertise and provide a web and paper-based questionnaire, and to review the literature in the field. The Background of the Knowledge-Based Economy, *Section 2.0* of the report, reviews the theoretical underpinnings of the knowledge-based sector and discusses such related topics as innovation, clustering, and incubation. There is also a brief analysis of the knowledge-based economy in other regions. According to the economic growth model utilized in this analysis, the economy can be broken down into a number of constituent parts: infrastructure, labour force, industry, education, research and development, investment, and indigenous strengths. The following table summarizes the major findings of the situational analysis in each category:

<i>Categories</i>	<i>Major Findings</i>
Infrastructure	<ul style="list-style-type: none">• Physical infrastructure is an issue because travel to and from major centres is difficult and costly.• The telecommunications infrastructure is good in the urban centres, where high speed Internet is available. In rural areas, however, connections are often dial-up and hamper rural development. While universal broadband connectivity would be ideal, it would also be very expensive. The Government of Canada is currently looking at an initiative to provide broadband service to all areas of the country by 2005.
Labour Force	<ul style="list-style-type: none">• While population has declined by 13% in the last 15 years, employment levels are increasing, due in part to the call centre presence in Cape Breton.• One of the factors that attracted the call centres was that the education level of the population is relatively high; moreover, the percentage of the population with high school and university education was higher in 2001 than in 1996.
Industry	<ul style="list-style-type: none">• There has been a significant decline in the number of knowledge-based start-ups in Cape Breton in the last five years.• Silicon Island was an important step forward for the knowledge-based sector in Cape Breton but appears to have lost its momentum and the Technology Advisory Group has fulfilled its original mandate.• There is little cohesion between businesses in the knowledge-based sector in Cape Breton.• The call centres have been instrumental in improving employment rates and general attitudes and in broadening the perspectives of a certain segment of the Cape Breton work force.
Education	<ul style="list-style-type: none">• There are a number of important factors that appear to be coalescing at University College of Cape Breton (UCCB), in particular the National Research Council (NRC) presence, the Applied Microelectronics Lab, and the appointment of an IT research chair.• UCCB is challenged by not having a graduate program thus making it difficult to generate a critical mass in the kind of intense research activity that would be required to develop a technology cluster.

<i>Categories</i>	<i>Major Findings</i>
R&D	<ul style="list-style-type: none"> Research and development activity in Cape Breton is largely performed by the university or its affiliates. However, the location of an NRC research lab in Cape Breton may leverage additional research in the region by government and the private sector and will aid in research commercialization.
Investment	<ul style="list-style-type: none"> There appear to be a number of programs, federally and provincially, available to assist companies in the knowledge-based sector. However, most programs seem to be focused on research and development rather than start-ups or growth companies.
Indigenous Strengths	<ul style="list-style-type: none"> Cape Breton has many indigenous strengths upon which to build a knowledge-based sector. These include dedicated workforce, good technology infrastructure, geographic proximity to major markets, relatively low cost of doing business, enviable lifestyle, availability of post-secondary education and training, and growing participation in research and development.

A summary of responses to the Industry Stakeholders Survey is provided in *Section 4.0* of the document. This summary includes an assessment of the tone of the responses to each question as well as excerpts of notable observations. The Situational Analysis concludes by contextualizing the knowledge-based sector in Cape Breton within a global environment and by reviewing challenges and key success factors for the Cape Breton knowledge economy.

The main focus of the Cape Breton Growth Fund Strategy for the Knowledge-Based Sector is to create an environment that encourages and enables entrepreneurial behaviour and commercial growth by building on existing or planned public sector research, strengthening industry-research linkages, expanding the existing education base, ameliorating coordination and programming mechanisms within government, and improving the innovation infrastructure. Increasing collaboration between firms, research institutions, educational institutions and government, and the formation of clusters and international alliances are paramount to the strategy. The strategy also attempts to address the challenges to rural areas of Cape Breton participating in the knowledge economy.

The Cape Breton Growth Fund Strategy for the Knowledge-Based Sector has been presented in three key action plans:

- 1) *Invest* in Infrastructure;
- 2) *Enable* Sector Growth; and
- 3) *Build* a Culture of Innovation.

Invest in Infrastructure

The National Research Council presence in Cape Breton is a key element to growing a sustainable knowledge-based sector in Cape Breton over the long term. The NRC will act as an anchor to the developing cluster and promote knowledge transfer to the Cape Breton academic and business communities. It is very important to leverage the NRC presence by co-locating all Cape Breton entities engaged in wireless technology, including those involved in research, education, and private enterprise. It is recommended, therefore, that an Innovation Centre be established that houses the NRC lab, the UCCB Applied Microelectronics Lab, and the NSCC Marconi wireless teaching lab. The Innovation Centre would also have facilities for companies, including start-ups, whose aim is to develop complementary technology.

Affordable, high-speed connectivity and access to timely information are vital for active participation in the knowledge-economy. As part of Canada's Innovation Strategy, the federal government has targeted providing broadband connectivity to all parts of the country by 2005. It is recommended that the CBGF actively liaise with the federal government to ensure Cape Breton Island's inclusion in the broadband implementation. In order to ensure easy access to information, the consulting team recommends the development of a Cape Breton portal that unifies access to government resources, including up-to-date statistical data, and provides a hub for comprehensive information about Cape Breton.

Enable Sector Growth

The region's small population base and geographic distance from major markets mean that proactive engagement in developing the knowledge-based sector is an absolute necessity. A key recommendation is the establishment of an economic development team that will promote Cape Breton business and seek export opportunities, provide technical advice for start-ups, and encourage distributed work. It will also interact with the community and act as a mechanism for the NRC to explore the needs and application possibilities for the private sector. Further, it is recommended that an advisory group be established that will work at a higher level to ensure the strategies of all key sector reports are implemented. It will also provide guidance and direction in pursuing economic development initiatives after the CBGF mandate has expired. In keeping with the need to actively anticipate future developments, two recommendations call for developing a strategic plan in the wireless sector and for conducting feasibility studies as to the commercial viability of prototypes.

An active small business sector that is open to new entrants is essential. There are recommendations designed to foster start-ups in the sector and to facilitate small firms partnering to pursue business as consortiums. It is also recognized that improved technology will create opportunities outside of Cape Breton. E-business capability needs to be developed as much as possible. Similarly, a model must be developed that will facilitate the development of distributed work.

The consulting team recognizes the success of investment in call centres operated by large multinationals, such as EDS and Stream, and recommends the active recruitment of new nationals and multinationals. Moreover, the presence of such companies in the region should be leveraged as much as possible to encourage them to diversify their operations. The consultants also recognize the difficulty small companies have in accessing venture capital. The Growth Fund has acted in this capacity in the past, and it is recommended that this strategy be continued.

Build a Culture of Innovation

The “new” economy is based on the concept that knowledge, learning, and innovation are essential elements for the creation and maintenance of wealth and competitive advantage. The major challenge faced by Cape Breton in fostering a culture of innovation is the recent transition from resource-based industries. In order to meet this challenge, it is imperative that Cape Breton proactively engage in programs offered through Canada’s Innovation Strategy. The development of innovation also requires the full participation of higher education as a supplier of qualified labour. Doctoral or Masters level graduates, in particular, are essential to narrowing the gap between research and its application in industry. Post-graduate programs at UCCB in disciplines related to the planned wireless and microelectronics research must be established if the research is to be efficiently conducted and commercialized.

Raising awareness about Cape Breton’s knowledge-based sector, both inside and outside the Island, is essential. Clearly, the school system is the most important place to begin this endeavour. It is recommended that a series of programs for both teachers and students be initiated to spark innovation and develop entrepreneurship. On a broader scale, the educational community in Cape Breton at all levels needs to develop a strategic plan for innovation. The national and international profile of Cape Breton as an innovative community can be promoted through an Innovation Summit, an annual conference that communicates a shared vision and facilitates the development of strategic alliances. Additionally, the recruitment of foreign students can raise international awareness about Cape Breton’s strengths and opportunities.

Sustainable economic growth in the Cape Breton knowledge-based sector can only come through strong leadership; funding support from government; private sector initiatives and investment; and linkages between education and research institutions and industry. In developing the “new” economy, stakeholders must be prepared to tolerate risk and be determined to stay the course.

KNOWLEDGE-BASED ECONOMY SITUATIONAL ANALYSIS

1.0 INTRODUCTION

Cape Breton has seemingly been plagued in recent decades with continuing problems of unemployment, under-employment, out-migration, economic decline of the traditional natural resource-based industries, difficulties in attracting new industries, declining tax bases, a decaying infrastructure, and a provincial economy dominated by Halifax.

However, *Cape Breton must not be defined by its challenges but lauded for its perseverance and admired for its strengths and future potential.* By moving away from its reliance on traditional industries, Cape Breton is anticipating significant growth possibilities in the areas of communications and information technology, tourism, oil and gas, environmental services, and cultural industries.

1.1 The Growth Fund

In January 1999, the Government of Canada announced its decision to phase-out the Cape Breton Development Corporation (DEVCO) Phalen mine and privatize its assets. To offset the economic impact of the DEVCO decision, the Government of Canada announced that it would provide a \$68 million economic growth fund (the Fund) to assist with the adjustment of the local economy through the promotion of sustainable, long-term economic development for Cape Breton Island (including the Mulgrave area). Shortly thereafter, the Province of Nova Scotia committed an additional \$12 million. A contribution agreement exists which details the terms and conditions under which the Corporation will invest the \$12 million.

In October 1999, the Government of Canada and the Province of Nova Scotia announced a public consultation process, which invited input from a wide cross-section of community stakeholders to review economic options and opportunities for Cape Breton in relation to the Fund. The Cape Breton Growth Fund (CBGF) was incorporated on August 25, 2000 in response to the Findings of the Panel of the Public Consultation Process as documented in their final report Growing the New Economy, April 2000 and discussions with the Province of Nova Scotia. The CBGF has been established specifically to deliver the Fund. The CBGF is as a wholly owned subsidiary of Enterprise Cape Breton Corporation (ECBC), a federal Crown corporation with a mandate for economic development on Cape Breton Island and the Mulgrave area. CBGF has its own Board of Directors and is required to report separately to Parliament.

In May of 2001, the closure of the only remaining DEVCO mine, Prince Colliery, was announced after unsuccessful attempts were made to sell the mine. At the time it was also announced that another \$18 million would be added to the amount allocated to the Cape Breton Growth Fund for economic development. The Corporation will cease to exist once all monies (including monies provided by the Province of Nova Scotia) are committed.

The CBGF priorities have been defined to include five designated sectors. Each sector has its own plans and priorities and will contribute to achieving the overall objectives of the Fund. Priority Sectors are:

- Knowledge-based;
- Oil and Gas;
- Tourism;
- Environmental Remediation; and
- Arts and Culture.

Strategic Initiatives may cross all priority sectors and will concentrate on strategic economic development opportunities in infrastructure and investment that lead to significant job creation in the short, medium, and long-term.

1.2 Study Mandate

The Cape Breton Growth Fund engaged MYRS Consulting Services and DeltaWare Systems Inc. to prepare a situational analysis of the knowledge-based economy in Cape Breton and to propose a strategy for the Cape Breton Growth Fund Corporation as a guide for developing the knowledge-based sector. This task is composed of two parts:

Phase I A Situational Analysis of the Knowledge-Based Economy on Cape Breton

The first step in the process involves the preparation of a situational analysis which defines the current state of affairs in the knowledge-based sector on Cape Breton Island including:

- The level and nature of business activity in the sector;
- The current state of labour market and labour market development issues in the sector;
- The transportation and technological issues facing the sector;
- The state of research and development activity in the sector;
- The programming (national, regional, provincial, and local) available to the sector;
- The state of capital markets and the ability of companies in the sector to access capital;
- The regulatory environment in which the sector operates;
- The strengths, weaknesses, opportunities and threats facing the sector;
- The state of readiness of Cape Breton Island relative to other jurisdictions to pursue opportunities in the knowledge-based sector; and
- The key issues facing the sector.

Phase II A Development Strategy for the Cape Breton Growth Fund Corporation as it relates to the Knowledge-Based Economy

The goal of Phase II of this undertaking is to produce a strategy that outlines interventions that the Cape Breton Growth Fund Corporation can take to assist in the development of the sector. The strategy will describe options and recommendations for initiatives and programming that could be established to support the development of the sector. The strategy will be developed in consultation with the Task Force and stakeholders in the knowledge-based sector.

1.3 Methodology

The methodology for both phases of this engagement is outlined in *Figure 1.1, Work plan Flowchart*. There are six general stages to the project, the first four of which are in Phase I. The detailed methodologies for each phase are presented in the following sections.

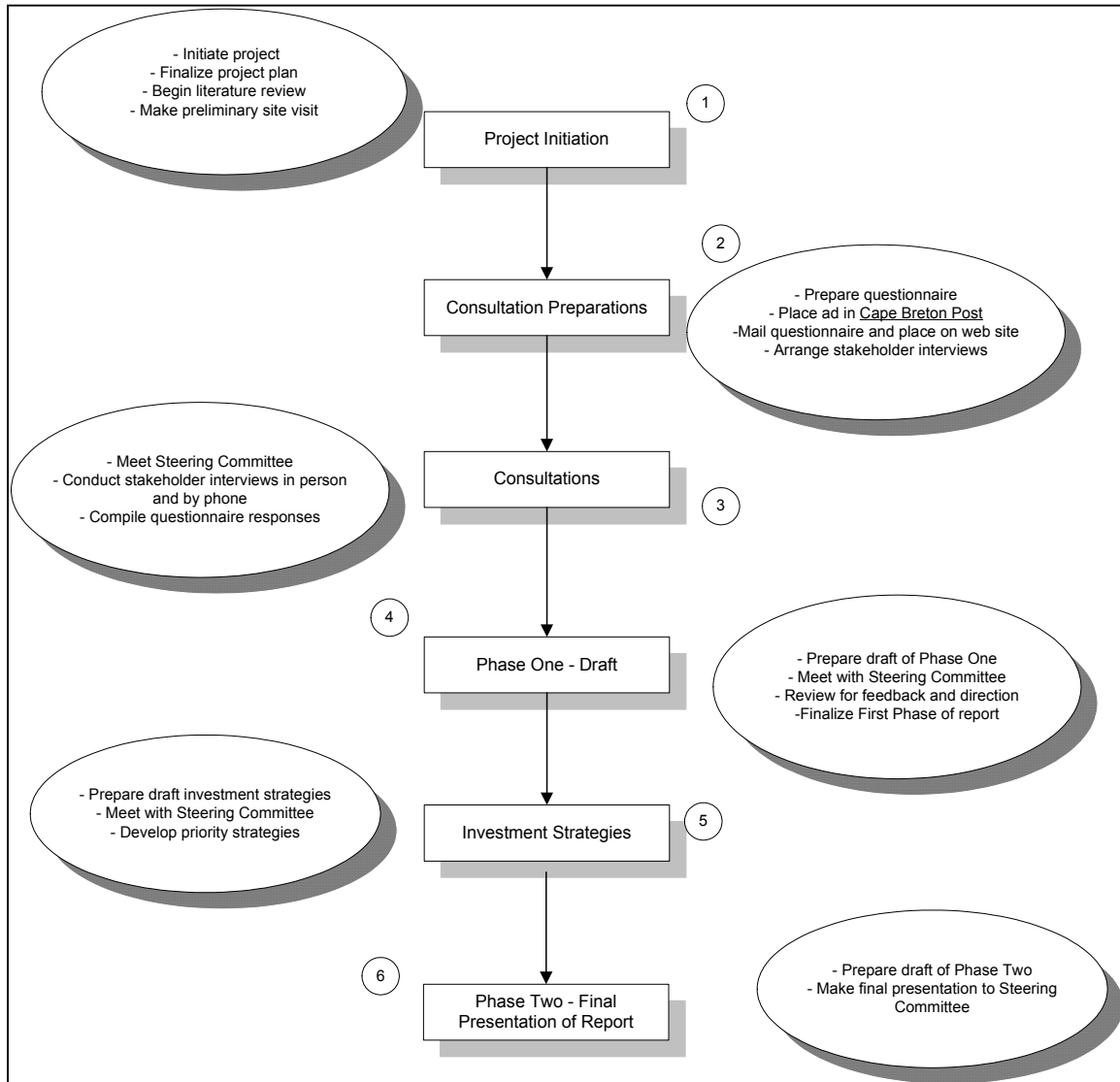


Figure 1.1, Work Plan Flowchart

1.3.1 Phase I Methodology

In preparing the situational assessment of the knowledge-based economy in Cape Breton (Phase I of the report), the consultants adhered to the following work plan:

Situational Analysis (Phase I) Methodology	
1.	Prepare a detailed information source list and make initial contacts with the Cape Breton Growth Fund staff to request copies of background information.
2.	Perform a detailed literature review of all reports prepared on the subject matter that the study team was able to obtain. Categorize the reports according to relevance and prepare brief summaries of each.
3.	Conduct a preliminary site visit to Cape Breton and tour various sites such as UCCB, NSCC Marconi Campus, and Stream and EDS Customer Interaction Centres.
4.	Hold preliminary meetings with Cape Breton Growth Fund staff and representatives from the Steering Committee.
5.	Prepare a draft questionnaire to be used to gather information from stakeholders.
6.	Submit draft questionnaire to Steering Committee for feedback on content.
7.	Prepare list of stakeholders and key interviewees with input from CBGF staff.
8.	Distribute questionnaire to individuals on contact list and prepare web-based questionnaire.
9.	Draft and place notices in the <u>Cape Breton Post</u> alerting the public to the existence of the web-based survey.
10.	Arrange stakeholder interviews, in collaboration with CBGF staff.
11.	Hold a meeting with the Steering Committee to discuss progress to date, plan for project completion, and hear general views of the Steering Committee members.
12.	Conduct numerous in-person and telephone interviews with a broad range of knowledge sector stakeholders.
13.	Review, and document questionnaire responses received by mail, fax, and e-mail.
14.	Conduct follow-up calls with stakeholders and survey respondents on issues that warrant further investigation.
15.	Prepare a draft situational analysis report.
16.	Meet to present draft report to Steering committee.
17.	Receive and incorporate comments from Steering Committee.
18.	Present final Situational Analysis report.

The consultants reviewed a wide variety of current studies and reports, industry-specific articles and information pieces, and conducted numerous personal and telephone interviews. Information was gathered specifically on the topics identified in the mandate.

To ensure that all individuals with direct knowledge of the sector had input, the consultants mailed a questionnaire to key individuals and posted the questionnaire on their website, to be completed by anyone who did not receive a copy by mail. The public's attention was drawn to the web-based survey with a notice in the Cape Breton Post on four separate occasions.

Included in *Appendix I, Stakeholders Consulted*, is a list of individuals who were consulted during the preparation of this report. Numerous other individuals also had direct input in the report through their responses to the online survey. To respect their anonymity, the names of the respondents have not been included in this list. A complete list of the documents included in this review is provided in *Appendix II, Bibliography*.

1.3.2 Phase II Methodology

The proposed methodology for the preparation of a Strategic Plan for the Cape Breton Growth Fund with respect to the knowledge-based economy, Phase II of the project, includes the following items.

Strategic Plan (Phase II) Methodology
1. Further review of survey responses and information gathered in Phase I;
2. Follow-up calls with stakeholders, survey respondents, and interviewees;
3. Analysis of potential sector development initiatives;
4. Preparation of initiative summaries for Steering Committee review;
5. Meeting with Steering Committee to present long-list of initiatives;
6. Preparation of a draft strategy for the knowledge-based sector;
7. Discussions with, and incorporation of comments from, the Steering Committee; and
8. Presentation of final Strategy to the Steering Committee.

2.0 BACKGROUND OF THE KNOWLEDGE-BASED ECONOMY

The purpose of this section of the document is to provide an overview of the knowledge-based economy and to discuss several key components.

2.1 Overview

Over the last decade it has become evident that the global economy is one increasingly based on the ability to effectively produce and use knowledge. In order to maintain a competitive advantage in knowledge, individuals, companies, communities, regions, and nations have had to significantly increase their investment in training and education. Indeed, some observers, such as David Wolfe, argue that the so-called “new economy” should more properly be called “a learning economy” because of the transitory nature of knowledge.¹ By some estimates, ninety percent of human knowledge has been developed within the last ten years, a trend expected to continue unabated. As a result, the ability to innovate or to utilize knowledge in unpredictable and ingenious ways has become regarded as crucial to success in the knowledge-based economy.

E.C. Lee and H. Has have developed a system of classification that divides the Canadian economy into the three categories of high-knowledge, medium-knowledge, and low-knowledge based on the knowledge inherent in the production process of each industry. The high-knowledge sector includes a broad range of industries, including computers and related services, communications, biotechnology, health and social services, and education. The low-knowledge sector, on the other hand, takes in such primary industries as fishing, forestry, agriculture, and mining.² These classifications, however, do not recognize that the demarcation between the “old” and “new” economies, or between the high-knowledge and low-knowledge sectors, is becoming increasingly blurred.

Perhaps the main reason is the ubiquity and growing importance of Information and Communications Technology (ICT). Although ICT belongs to the high-knowledge sector, it has increasingly become a mandatory requirement for all types of business, as the Nordicity Group points out in Prospects for Growing Knowledge-Based Industrial Clusters in Atlantic Canada.³ In concert with innovative business models, ICT facilitates competitive advantage and economic growth. It is transformative for all types of enterprise, including those in the low-knowledge sector that are based on natural resources and physical assets. A fish processing business, for example, could be classified as an “old economy” business; however, the research, development, and eventual commercialization of new value-added products and the utilization of ICT to

¹ David Wolfe, “Social Capital and Cluster Development in Learning Regions,” Knowledge, Clusters, and Regional Innovation, Eds. J. Holbrook and David Wolfe. Montreal: McGill-Queen’s UP, 2002, 22.

² Atlantic Provinces Economic Council, IT and the Knowledge Economy in Atlantic Canada. Halifax, NS: ACOA, 1999, 6.

³ Nordicity Group Ltd. Prospects for Growing Knowledge-based Industrial Clusters in Atlantic Canada: Part 1: Concepts, Analysis and Recommendations. July 31, 1997. 26.

conduct business with new customers throughout the world are all business functions requiring expert “new economy” knowledge and skills. As one study points out:

“The one feature shared by all knowledge sectors is that they create their competitive advantage on their ability to generate ideas and innovations and successfully market these ideas and innovations to other sectors of the economy, including other knowledge sectors.”⁴

Despite the industry setbacks of last year, ICT is nearly 50% more important to the economy than it was at the end of 1996 when it accounted for 4% of economic activity.⁵ Such transformation is occurring because *technology is changing the manner in which virtually all businesses, institutions, and government entities conduct their affairs.* Whether it is called the new economy, the information age, or the technology revolution matters not; what does matter is that the following trends cannot be ignored:

- The economy and its marketplaces are now undeniably global;
- The Internet will continue to change the manner in which business is conducted and will continue to provide instant international market reach to all businesses;
- Knowledge and talent will continue to be the most valuable business resources (assets);
- The pace of change will continue to be rapid and turmoil in the marketplace will continue;
- Competition will continue to increase;
- The importance of education will continue to increase; and
- Entrepreneurial and innovative minds will seize opportunities and create wealth.

2.2 Clusters

Paradoxically in an age of globalization, the focus on knowledge and innovation as keys to growth has highlighted *regional* economic activity:

“Given the social nature of learning and innovation, ” notes David Wolfe, “these processes work best when the partners involved are close enough to one another to allow frequent interaction and easy, effective exchange of information. Innovative capabilities are sustained through the regional communities that share a common knowledge base.”⁶

⁴ APEC. *IT and the Knowledge Economy in Atlantic Canada*, 1999, 33.

⁵ David Crane, *The Toronto Star*, [qtd. in *ITAC 2001-2002 Annual Review*]

⁶ David Wolfe, 14.

Social capital is also particularly critical in this environment. Social capital is defined in two-parts: as the social and cultural similarities that bind individuals in a specific geographic region and as the network of interconnections of firms engaged in interrelated economic activities.

Certain areas within some regions have been particularly successful at developing economic growth. Such areas, known as a clusters, are defined by Michael Porter in The Competitive Advantage of Nations as “groups of interconnected firms, suppliers, related industries, and specialized institutions in particular fields that are present in particular locations.”⁷ Clusters have developed spontaneously in the past around an infrastructure that often includes a research laboratory, a university, and a network of firms engaged in similar activity. The challenge that confronts researchers is to determine if such a cluster is a unique phenomenon or whether there are general principles of cluster development that can be extrapolated and applied elsewhere. As David Wolfe observes: “Is the experience of cluster development found in Silicon Valley a unique phenomenon, as much of the recent writing on the subject suggests, or can the experience be generalized to other regions and locales, as a growing number of local governments and regional development agencies are trying to do?”⁸

A review of the literature indicates that there are several key ingredients, some or all of which must be present in order to grow a successful cluster. The ingredients include:

- Visionary political leadership;
- Community recognition and support of inherent strengths;
- Commitment to a clearly defined strategy
- Dynamic local champions;
- An abundance of entrepreneurial spirit;
- Sound business practices;
- Sufficient access to financing;
- Cohesive informal and formal social networks;
- Investment in continuous learning;
- Advanced educational and research institutions; and
- The determination to stay the course over the long term.

⁷ Michael Porter. The Competitive Advantage of Nations: With a New Introduction. New York: The Free Press, 1998, xii.

⁸ David Wolfe, 22.

A new conception of clustering has arisen with the increased capabilities of the Internet. Termed variously Community Informatics and Virtual Clustering, the idea is that the physical proximity required for clustering can be supplanted by virtual synchronous proximity. Virtual communities can be created in much the same way as physical ones, with the sole exception being that the participants may reside in different parts of the country or, indeed, of the globe. In “Flexible Networking, Information and Communications Technology and Local Economic Development,” Michael Gurstein argues that

“ICTs . . . give local communities and enterprises an historic opportunity to participate remotely but directly in the global economy as suppliers of specialty items and participants in production networks as information processors and suppliers.”⁹

2.3 Incubation

One strategy that has been used to grow technology-based SMEs is incubation. While successful incubation requires some of the same factors as clustering, such as networking and a strong entrepreneurial spirit, it occurs on a much smaller scale than clustering. According to Incubating Technology: Best Practices, “a technology incubator is a facility that aids the early-stage growth of technology-based companies by providing shared facilities such as space and office services, and business consulting assistance.”¹⁰ This report identifies four types of shared facilities incubators: university and college incubators, publicly sponsored incubators, private corporate for-profit incubators, and hybrid incubators. Among the best practices that the authors highlight are the following:

- 30,000 square feet of rental space at a minimum with room to expand;
- At least 10 in-residence members;
- Proximity to a university or research laboratory for access to technical facilities;
- High-tech building with telecommunications infrastructure;
- A selection committee that prescreens potential clients;
- An advisory committee of 5 or 6 experts for each tenant company;
- Networking between tenants and with industry;
- Funding for real estate already in place;
- Highly motivated and visionary manager;
- Focus on support programs rather than physical requirements; and
- Board of directors responsible for policy, not day-to-day operations.

The Logitech report suggests that a significant number of incubators fail within three to five years of opening: “The evidence . . . indicates that the haphazard creation of an incubator facility simply based on the belief that somehow incubators [are] a panacea for

⁹ Michael Gurstein. “Flexible Networking, Information and Communications Technology and Local Economic Development.” First Monday: Peer-Reviewed Journal on the Internet.

¹⁰ Logitech. Incubating Technology: Best Practices. 1997.

small business problems, and it will automatically cause local enterprises to spring-up is asking for trouble.”¹¹ It concludes that a rigorous situational analysis is crucial before a new incubator facility is built.

2.4 Analysis of the Knowledge-Based Economy in Other Regions

The Nordicity Group report published in 1997 identifies approximately 200 “sub-national regions and municipalities active in developing strategies to attract knowledge/technology based investment.”¹² These areas include ones in the United States, Canada, France, Germany, Italy, Spain, and Japan. Five years later, it would be safe to say that the number is far greater. A simple Internet search reveals a plethora of strategies to develop knowledge-based industries in almost every part of the globe. Most of these strategies are founded on the assumption that the key elements of innovation and clustering can be formalized and replicated.

In some cases, such as Silicon Valley, the essential components of clustering were already in existence and required little intervention. A world-class research institution, Stanford University, played a key role, as did the leadership and stability of a large anchor firm, Hewlett Packard, and a strong entrepreneurial spirit. Wolfe argues that much of the success of Silicon Valley is due to the social capital created through a rich network of interconnections that included research institutions, venture capitalists, federal government institutions, legal firms with specialized knowledge, and a highly mobile labour force.¹³ The success of the region has been instrumental in attracting further investment. For example, Lisa Mills and Shauna Brail in “New Media in the New Millennium: The Toronto Cluster in Transition” report that “more than one-third of all new media venture capital invested [in the U.S.] in the third quarter of 2000 was invested in Silicon Valley.”¹⁴

The success of Ireland’s economy over the last ten years when it has out-performed all European economies is often cited as an example worthy of emulation. However, it is worth noting that much of this success is due to governmental intervention and planning that goes back to the early 1970s, which has been sustained despite changes in the ruling party. Ireland’s success is accounted for by a number of factors, such as joining the European Union in 1973, lowering the corporate tax rate to a flat 10 percent, and investing in education. Enterprise Ireland, a quasi-governmental organization whose purpose is to direct investment in the economy, has made the growing of Irish-owned companies one of its principles. As recent as ten years ago, there was little indigenous

¹¹Logitech. Incubating Technology.

¹² Nordicity, 7.

¹³ Wolfe, 21.

¹⁴ Lisa Mills and Shauna Brail, “New Media in the New Millennium: The Toronto Cluster in Transition,” Knowledge, Clusters, and Regional Innovation, Eds. J. Holbrook and David Wolfe. Montreal: McGill-Queen’s UP, 2002, 145.

presence in the software industry; today, there are 500 companies that employ close to 15,000 high-end workers and generate billions of Euros.¹⁵ The Irish example, however, can be misleading in that Ireland is a country with the full range of legislative capabilities that accompany nationhood and not, like Cape Breton, a region within a Canadian province. Nevertheless, there are elements of the Irish experience, such as the focus on education, that are transferable to other less autonomous jurisdictions.

It is worth noting that in the cases of both Ireland and Silicon Valley it took decades for the rewards of investment in IT to be realized.

An example of government intervention in the IT industry that is closer to home is New Brunswick. When Frank McKenna came to power in 1987, he developed a comprehensive economic strategy; in the IT area, the plan was based upon NBTel's far-sighted development of a telecommunications infrastructure. In 1994, an IT report, Driving the Information Highway, was released that has been the New Brunswick blueprint for increasing growth in the sector. It called for a three-pronged approach: to provide the accessibility of modern IT to all citizens; to become the call centre capital of North America in order to establish critical mass in the sector; and to persuade large companies to do their IT work in the province. The plan has resulted in an increased labour participation rate, a strong call centre presence, increased public sector employment, and greater IT accessibility for New Brunswick citizens. The negative effects have been the lack of integration of IT with traditional industries, the increased entry difficulty of small local firms due to the presence of large IT firms, and the quality of jobs relative to others in the IT sector.¹⁶

Northern New Brunswick bears some similarities to Cape Breton. It is geographically remote from the province's large urban areas like Fredericton and St. John, and its economy has been based historically on natural resources. As part of the broader provincial initiative, the New Brunswick Community College (NBCC), which has sites in Bathurst, Edmundston, Campbellton, Miramichi, and Shippagan, was refocused to make students more entrepreneurial. As a course requirement, students in IT courses must seek customers for the products they develop so that graduates will already have some entrepreneurial experience when they complete their schooling. The province has also funded Miratech Inc., located in the CFB Chatham facilities in Miramichi and one of two incubation centres in the province. Miratech Inc. provides over 30,000-sq. ft in space and offers start-ups administrative and mentoring support. In the last five years, Miratech has developed a strong core of firms in multimedia and e-learning and during that period has become increasingly self-sustaining. It also has a strong link to NBCC-Miramachi, which has provided the majority of its tenants. Part of its success has been due to dynamic leadership. Its past CEO, Johannes Larsen, was named one of the top fifty CEOs

¹⁵ "Irish IT Success Story." The Hindu, April 8, 2000

¹⁶ Courvisanos, Jerry. "Investment in Innovation: An 'Instrumental Analysis' Based on the Tasmanian and New Brunswick Information Technology Strategies." 1997.

in the Atlantic Region in 2000. He has since left Miratech Inc. to join the National Research Council.

Al MacDonald of the Knowledge Industry Task Force of New Brunswick observes that there are three key elements that need to be changed if IT is to be the key to economic growth in New Brunswick but that are applicable elsewhere:

- The taxation model needs to be overhauled;
- The education curriculum must be changed to encourage entrepreneurship; and
- The laws [i.e. recognition of digital signatures], which he argues were based on an Industrial Revolution model, need to be changed to permit the full potential of IT to be released.¹⁷

Prince Edward Island, like Cape Breton, is relatively remote from large urban areas and its economy has traditionally been resource-based; however, due to its provincial status, it does have the advantage of being able to exercise regulatory control and to attract federal dollars as a provincial entity. For instance, as a result of its provincial status, PEI was allotted a \$4.5 million Smart Communities project, which is currently underway in Charlottetown. In 1997 the government established Technology PEI Inc., a Provincial Crown Corporation, whose purpose is to advance the growth and development of the technology sector in Prince Edward Island. It has six areas of focus: New Business Development; Film and New Media Development; Community and Primary Industry Initiatives; Labour Force Development; Special Projects; and Policy and Planning.

The Information Technology Association of Prince Edward Island (ITAP) is an industry association that was founded in 1997 with the purpose of providing leadership on issues that affect the growth and prosperity of ICT on Prince Edward Island. ITAP promotes the industry by working with government and informing the general public of the benefits of ICT. It plays an active role in the community and hosts an annual gala dinner as part of IT Week that attracts over 400 IT, business, and public service leaders from across the province.

The province's major post-secondary institutions both offer a number of technology-related courses. Holland College, the province's community college, has provided a business information technology course for the last twenty years that has turned out a large number of graduates. Until recently the University of Prince Edward Island offered a minor in computer science but within the last several years has been able to offer a major in the subject.

In 2000, the provincial government introduced Bridging Tradition and Technology, an economic development strategy for Prince Edward Island. This strategy is a comprehensive approach to economic development with the goal of bridging the Island's traditional industries with the potential created by IT and the "new" economy. As part of

¹⁷ "IT Throughout the Maritime Provinces." Maritime Information Technology Review, Fall 2001.

its strategy, the province has established a \$20 million information technology and innovation centre designed to help stimulate growth in the province's emerging IT industry. The 130,000 sq. ft. Atlantic Technology Centre (ATC), due to open in August 2002, will provide Prince Edward Island's IT community with a leading edge infrastructure. It is designed to attract new investment to the province, provide local IT companies with increased access to export markets, and generate employment opportunities for Islanders working in the knowledge economy. As part of the same strategy, the PEI government is constructing three Regional Information Technology (RIT) Centres in each of the three counties in the province. They will be on the same network as the ATC. The RITs are intended to promote entrepreneurial activity by providing communities across PEI with access to video-conferencing, incubation space, and e-services.

The examples of Ireland, New Brunswick, and Prince Edward Island indicate that a comprehensive strategy that is embraced by all stakeholders and followed steadfastly is essential for success.

2.5 Economic Growth Model

Research suggests that a successful knowledge-based economy must be built upon indigenous strengths in specific areas as illustrated in the outer circle of *Figure 2.1, Economic Growth Model*. Each component, however, must be at a certain state of development and must integrate with the other components through a comprehensive development strategy.

In the preparation of this report, the consultants used this model as the basis for their analysis of the knowledge-based sector in Cape Breton and its state of readiness.

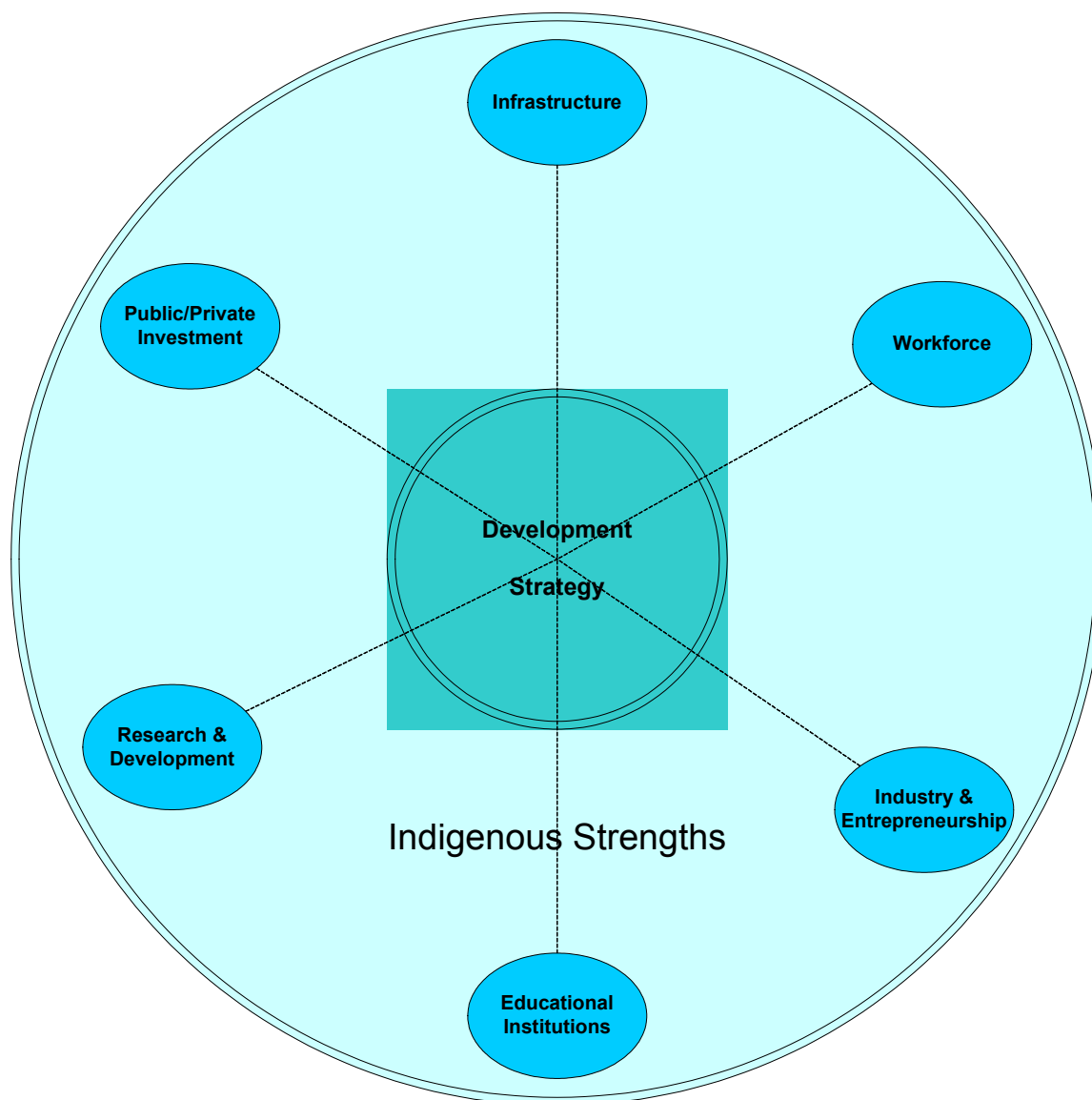


Figure 2.1, Economic Growth Model

3.0 PROFILE OF THE KNOWLEDGE-BASED ECONOMY IN CAPE BRETON

In this section of the report, the current situation in Cape Breton in regard to the knowledge-based sector is discussed. As noted in *Section 2.1, Overview* of the report, the knowledge-based sector embraces a wide variety of disparate industries. In order to provide focus, the knowledge-based economy in this study includes organizations engaged in the development, production, and commercialization of new technology, with emphasis on information and communications technology. Knowledge-based may also include the application of such new technology for the production of innovative results.

The knowledge-based sector in Cape Breton has to be understood within the context of the relative infancy of the industry worldwide and the challenges that are inherent in a local economy that until very recently has been resource-based. It is worth recalling that within just the last ten years there have been revolutionary changes in ICT. Developments in hardware—increased processing speeds, smaller microchips, and larger hard drives—have been accompanied by a gradual reduction in cost; advances in software development brought about by object-oriented programming have created an enormous increase in the number and scope of software programs. These developments, together with the rise of the Internet, have been pervasive and deeply influential, yet by all accounts they are just the beginning of changes that will transform human existence.

In this kind of unstable environment, there are inevitably failures, mergers, and successes, as there have been in Cape Breton. What should be recognized is that there have been more successes than failures. Cape Breton has experienced growth in its knowledge-based economy in the areas of educational technologies, multimedia, high-tech manufacturing, and software and system design. Several high profile call centres have located in the region and provided employment that has helped ease the closure of the mines. Employment growth on Cape Breton Island, moreover, was better in 2001 than both the provincial and national average. In 2001, employment on the Island was the highest of any year since 1988, and the participation rate was higher than any year since 1987. The upward trend appears to be continuing since the figures for May 2002 show a significant increase in the participation rate over the same period in 2001.¹⁸

In the following section, the knowledge-based sector in Cape Breton has been broken down into its various components: infrastructure, social capital, industry, education, research and development, public and private investment, all put in the context of Cape Breton's indigenous strengths.

3.1 Infrastructure

In terms of physical infrastructure, Cape Breton is somewhat disadvantaged by its distance from large urban areas. Although Cape Breton Regional Municipality (CBRM) is the largest municipal area in Nova Scotia outside of Halifax, a recent report indicated

¹⁸ Stewart, Wes. "Prospects Increase as Seasonal Employment Improves," *Cape Breton Post*, June 10, 2002.

that Halifax would benefit significantly from the development of oil and gas reserves. The fear in Cape Breton is that growth in Halifax will occur at least partially at the expense of Cape Breton. Cape Breton is approximately a four to five hour drive from Halifax. Sydney is serviced by daily Air Canada and Provincial Air flights to and from Halifax. Anyone traveling to Sydney must connect through Halifax, the timing of which can be an impediment to conducting business meetings.

Aliant is a major provider of the ICT infrastructure in Cape Breton. All transmission facilities on Cape Breton are digital as of 1998. The digital system is a reliable medium for information and transmission facilities in all parts of Cape Breton, including rural areas. As Figure 3.1, *Aliant Cape Breton Network Architecture*, indicates Cape Breton's major communities—Port Hawkesbury, Baddeck, Sydney—are linked to the national network with a fiber optical connection. There are also four areas where fiber will be laid in the near future. A line will be built on the west coast that connects Port Hawkesbury to Port Hood and Mabou. Another line will connect Baddeck to the main west coast fiber link. On the east coast, there will be new fiber connections built between Sydney and Louisbourg and from Dingwall to Ingonish.

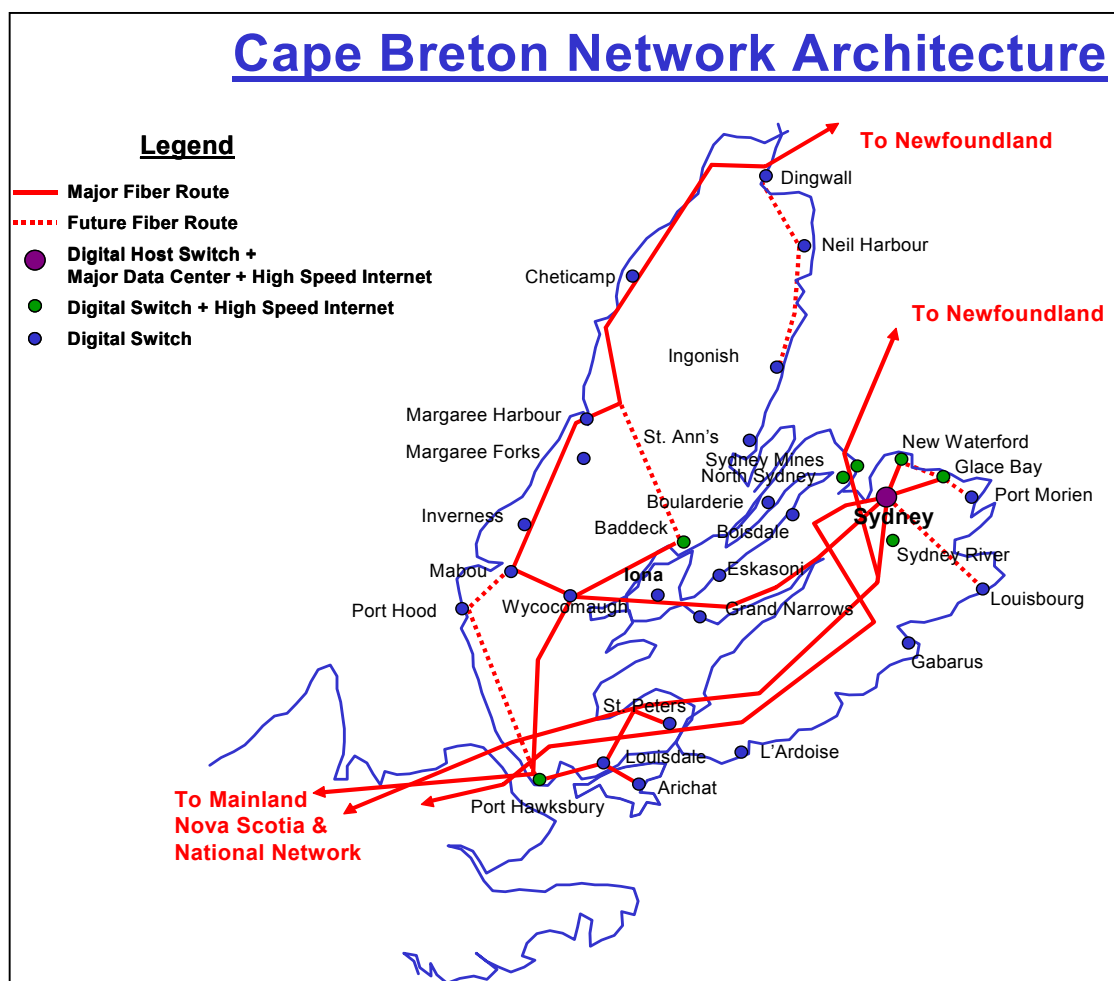


Figure 3.1, *Aliant Cape Breton Network Architecture*

Dial-up Internet access is available throughout the Island. High speed Internet is available from Aliant in Cape Breton Regional Municipality, Baddeck, and Port Hawkesbury. The high speed offered by Aliant is called Mpower. It uses ADSL (Asymmetric Digital Subscriber Line) technology that utilizes the existing phone line but allows the user to talk on the phone while using high speed Internet. The disadvantage is that the user must be within three kilometers of the phone company's switching station in order to have access to Mpower. This requirement means that high-speed access is unavailable in most rural areas of the Island. According to Aliant, the cost of providing universal high speed Internet access in Cape Breton is prohibitive; providing high speed for the final 20% of the population is more expensive than providing it for the initial 80%.

High-speed Internet access is also provided by cable companies. EastLink provides it in Sydney, Sydney Mines, Sydney Fork, Sydney River, and North Sydney. It uses a high bandwidth hybrid fiber/coaxial network that has a transfer rate of 5 MB per second. It should be noted that this rate is optimal and that most cable connections are considerably slower. Within the next year, EastLink anticipates constructing a fiber cable that will link this system to its other mainland Nova Scotia systems. Seaside cable is equipped to offer high speed Internet access in the Glace Bay and New Waterford areas. Other Internet Services Providers (ISPs) in the region include Auracom and Cape Breton Net (CBNet).

Cape Breton has a well-established network of Community Access Program (CAP) sites. According to Nova Scotia Access, there are 70 CAP sites in Cape Breton. The growth of CAP sites in the region has been rapid; as a result, Figure 3.2, *Cape Breton CAP sites*, captures some but not all of the CAP site locations in the region. The federal government has promised more funding for CAP sites across the country in the 2002 – 2003 fiscal year, so it is likely that this number will increase

Several groups, such as the Victoria County CAP Association, the CAP Society of Cape Breton County, which operates the Cape Breton County sites, and Atlantic Learning Innovations Network (ALIN) operate the CAP sites in the region. ALIN evolved out of the Strait East Nova Community Enterprise Network (SENCEN). It is a not-for-profit association that has as its goal the development of rural communities in Atlantic Canada using technological resources. It regards CAP sites as places where distributed work can occur, thus connecting individuals in rural areas to business operations elsewhere in the province, country, or world. Connectivity in the CAP sites is generally excellent with T1 lines installed in most places.

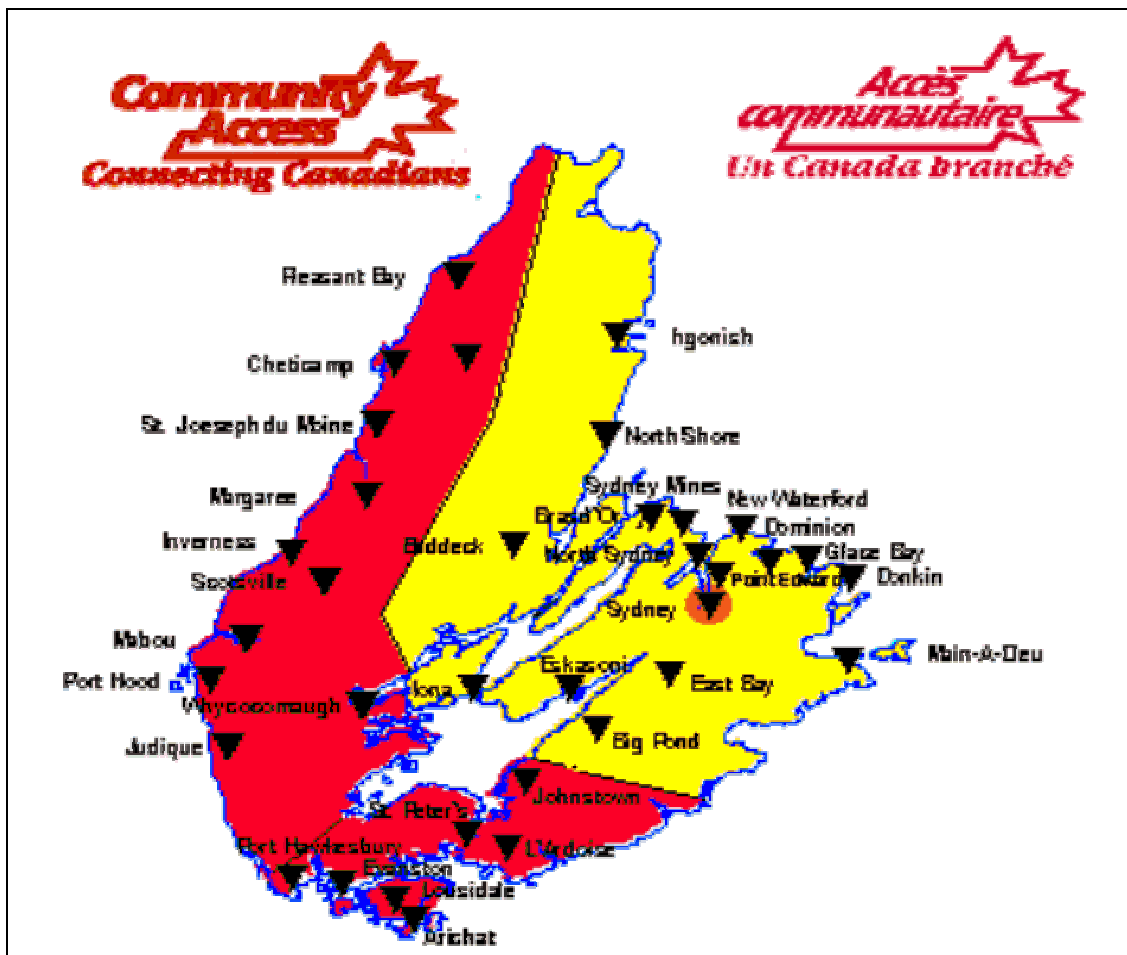


Figure 3.2, Cape Breton CAP sites

The discussion of infrastructure in Cape Breton should also include the National Research Council's Institute for Information Technology that is in the process of being established in the Technology Enterprise Centre at UCCB. The NRC lab will provide infrastructure and research platforms. UCCB is a member of the Atlantic Canada Organization of Research Networks (ACORN). ACORN-NS has proved to be the key enabler for several initiatives within Nova Scotia. The Rural University Network was established with joint federal/provincial funding to provide increased bandwidth to UCCB as well Acadia and St. Francis Xavier Universities. All three enjoy CA*net3 connectivity.

The actual broadband capacity for most areas of Cape Breton is in question since the definition of what constitutes high-speed broadband is open to some debate. Broadband generally refers to telecommunications in which a wide band of frequencies is available. Because a wide bandwidth of frequencies is available, information can be multiplexed and sent on many different frequencies or channels within the band concurrently, allowing for more information to be transmitted in a given amount of time. The generally

accepted definition is that broadband must be a minimum of 256 Kbps. The Report of the National Broadband Task Force, however, defines high-speed broadband at a much higher rate. It regards broadband “as a high-capacity, two-way link between end user and access network suppliers capable of supporting full-motion interactive video applications delivered to all Canadians on terms comparable to those available in urban markets by 2004. A minimum symmetrical speed of 1.5 megabits per second per individual user is currently required to support these applications.”¹⁹

If the connection is point-to-point, as is the case with such specialized networks as CA*net3, then full bandwidth can be employed. However, in all Internet connections, including broadband, data is broken down into packets and sent through a series of so-called hops to its destination. The connection is only as good as the slowest connection in the network, and that may well be a 28 Kps dial-up connection. This is an issue faced by all users of the Internet and will only be rectified by a universal increase in bandwidth.

Findings

- The distance from Halifax will remain a geographic reality of Cape Breton. Several interviewees cited the lack of direct air links to other major centres, such as Boston, Newark, and Toronto, as being a challenge.
- The current infrastructure in Cape Breton, especially in urban areas, is more than adequate for telephone needs, and it will undoubtedly improve with upgrades in service by both Aliant and EastLink. There is widespread dial-up connectivity to the Internet; however, broadband connectivity is another issue. A soon-to-be-released report, *Cape Breton Broadband Project Final Report*, was made available to the consultants in draft form. It argues that 70% of Cape Breton communities do not have access to broadband Internet (based on the Task Force definition noted above), that this represents 40% of the population, and that the communities do not have a profitable business case for a private provider alone to supply broadband. The report argues that broadband is not a technology issue, rather it is an issue of sustainable rural communities. Ron McNeil of UCCB corroborates this finding and estimates the cost of providing broadband to all rural areas of the region as being in the region of \$6.5 million.
- Infrastructure is not sufficient for doing e-commerce in rural areas because no cable or Dedicated Subscriber Lines (DSL) are available there. Tourist operators on dial-up connections are unable to offer a service that would allow potential clients to book rooms and services online and for them to be registered in real-time. Because of the amount of usage, the lines are often dropped in mid-transmission. At the moment, the web sites are really electronic billboards.
- The two major call centres, Stream and EDS, were both quite pleased with the connectivity for communications services.

¹⁹ Report of the National Broadband Task Force

3.2 Workforce

Human capital is an essential element of the knowledge-based economy. In all sectors of the economy, the knowledge content of jobs is rising and the introduction of new technology, products, and processes in the workplace is forcing people to continually upgrade skills and education. Organizations wishing to remain competitive locally or globally must invest in training and technology to maximize potential but also to retain the best individuals. The knowledge economy simply creates demand for better-educated workers and the jobs that demand the highest levels of knowledge are currently at the top of the employment growth charts.²⁰ It is important to note that Statistics Canada figures from the 2001 census are currently only available for population information. Other useful statistics on education levels, employment and so on will not be available until after this report has been completed.

3.2.1 Population and Employment

The high dependence on an abundant labour force that possesses a relatively high level of education and skill raises some concerns for Cape Breton in that it has a declining population base. The population of Cape Breton Island (Bras d'Or – Cape Breton and Sydney-Victoria electoral districts) in 1996 was 158,271. In 2001 the population declined to 147,454, a net decrease of 6.8% over a five-year period.²¹ Using the same rate of net out-migration, the population of Cape Breton at the next census in 2006 would be approximately 137,400, as illustrated in *Figure 3.3, Population of Cape Breton*. This forecast does not consider any other variables that may affect population movement such as new developments – oil and gas for instance - that may bring people into the area.

²⁰ Nova Scotia Knowledge Economy Report Card 2000, NovaKnowledge

²¹ Statistics Canada, 1996 and 2001 Census Data

Cape Breton Regional Municipality, the region's urban hub with the third largest metropolitan area in the Maritime Provinces and the second largest urban area in Nova Scotia, has shown a similar decline in population from 117,849 in 1996 to 109,330 in 2001, a reduction of 7.2%.²²

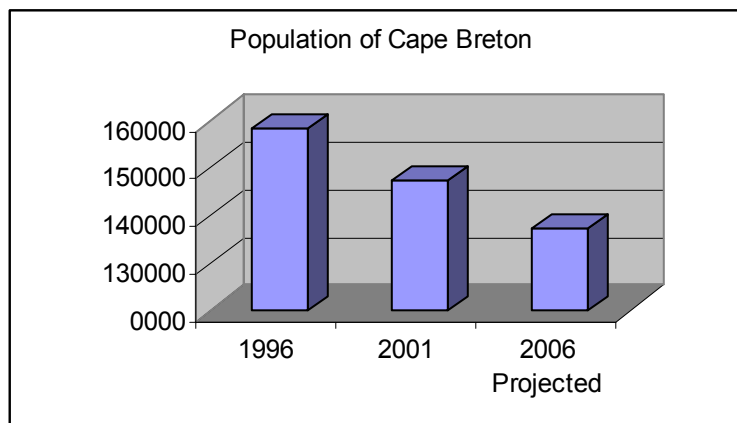


Figure 3.3, Population of Cape Breton

Canada Mortgage and Housing Corporation forecasts moderate economic growth and job creation for Nova Scotia in 2002 and 2003. CMHC predicts the Nova Scotia GDP to increase from approximately 2.4% in 2001 to 2.6% in 2002 and in excess of 3.6% in 2003. Job creation in the province has been projected to remain constant for 2002 but to increase to approximately 2.7% in 2003.²³

²² Cape Breton Regional Municipality, June 2002

²³ David McCulloch, Senior Market Analyst, Canada Mortgage and Housing Corporation

Figure 3.4, *Cape Breton Migration by Age Group*, illustrates the net effect of out-migration on the Cape Breton Regional Municipality by age group for the period 1995 to 2000. The most noticeable decrease was in the key range of 18 to 45 years of age. While the graphical information in the chart portrays the effects of migration to/from the CBRM, it is expected that this would be representative of Cape Breton Island as a whole since CBRM comprises approximately three-quarters of the population. The rest of the Cape Breton population resides in one of the smaller towns, such as Port Hawkesbury and Baddeck, or in rural areas.

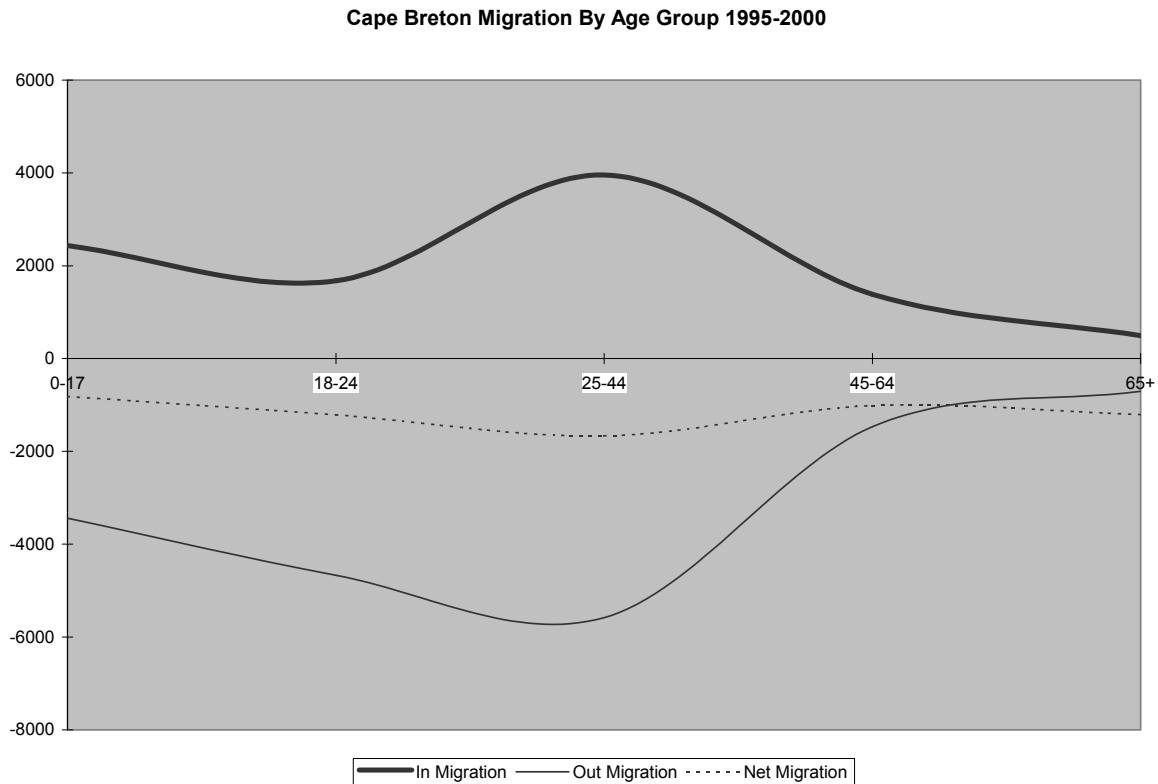


Figure 3.4, Cape Breton Migration by Age Group

Net employment and unemployment are perhaps of greater significance than population movement as economic development indicators. The following charts, Figure 3.4, *Cape Working Age Population*, and Figure 3.5, *Active Labour Force*, illustrate the steady decline in the working age population versus an increase in the active labour force.

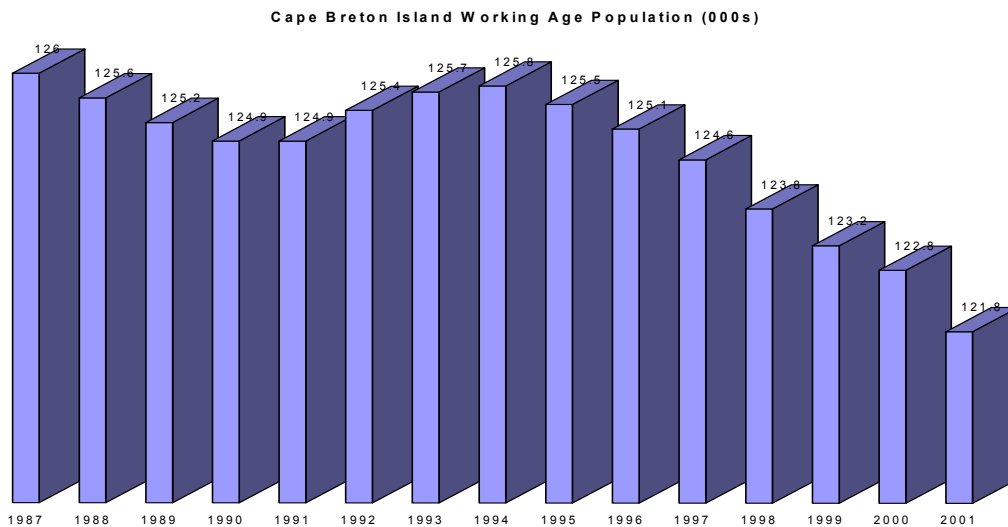


Figure 3.4, Cape Breton Working Age Population

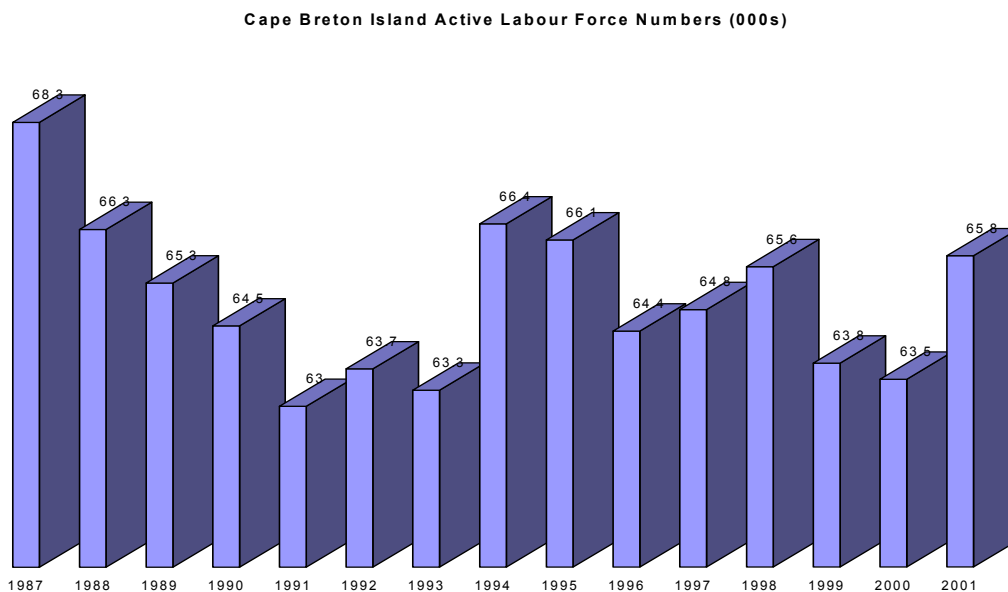


Figure 3.5, Cape Breton Island Active Labour Force

As a result of a decreasing population and available workforce coupled with an increase in the active labour force, the number of employed persons as a percentage of the available workforce is increasing. These opposing trends are creating a decreasing unemployment rate as depicted in Figure 3.6, *Cape Breton Island Employment Trends*.

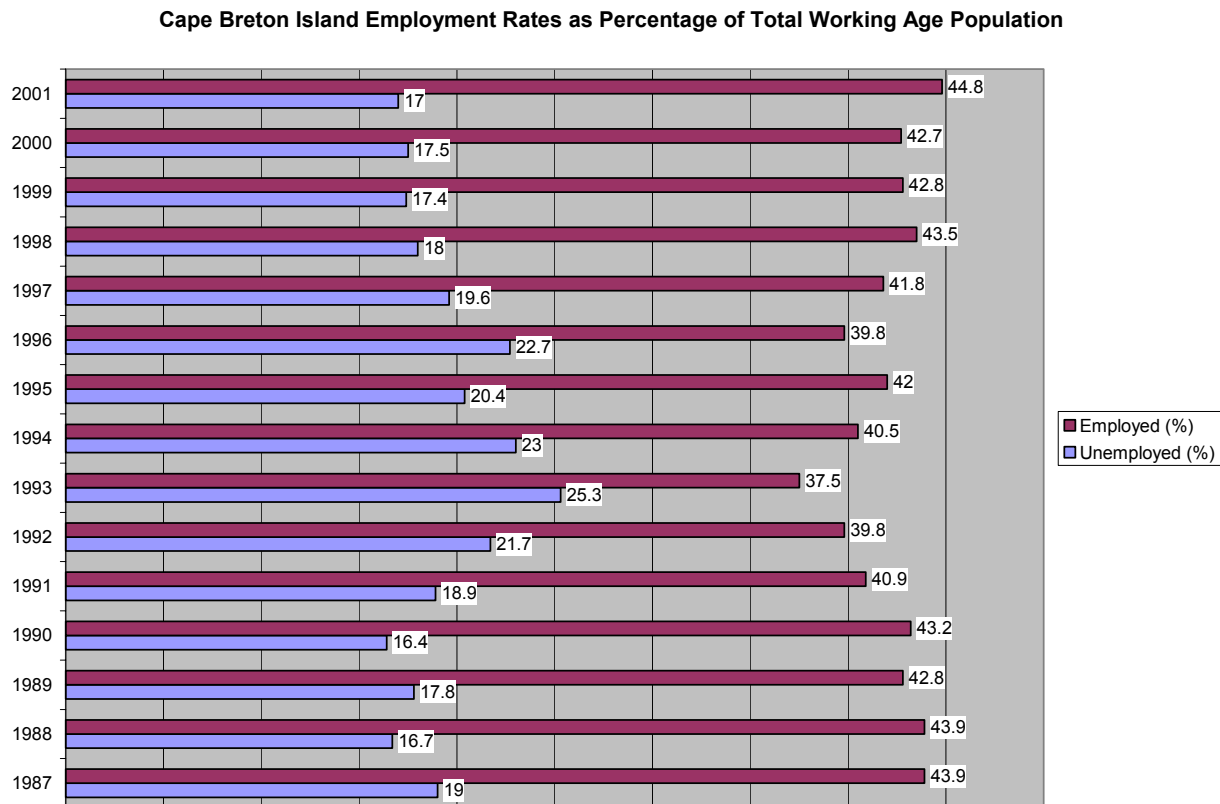


Figure 3.6, Cape Breton Island Employment Trends

Both the public and private sectors have important roles to play in addressing the issues of rising technology and educational demands and a declining workforce. On May 17, 2002 the Cape Breton Growth Fund announced that it would commit \$3.2 million to two programs focused on building expertise in the local community, The Knowledge-based Industrial Outreach Initiative and the Environmental Industries Human Resources Capacity Building Initiative. These programs are aimed at enhancing the level of skills within the Cape Breton labour force, helping to retain youth on Cape Breton Island and ensuring that Cape Breton companies can compete on a global scale in these sectors. These will be discussed further in *Section 3.6* of this report.

3.2.2 Education Levels

Residents of Cape Breton County are generally well educated in comparison to provincial and national populations, and it appears as though the education levels of Cape Breton County residents are dramatically increasing. Figure 3.7, *Cape Breton County Education Level Comparison*, demonstrates that there are far fewer individuals without a high school degree in 2001 than in 1996. It also shows there are significantly more university graduates in 2001 than in 1996. Readers are cautioned about the accuracy of this comparison, however, as differing sources were used to obtain the 2001 data (Cape Breton County Skills Inventory survey) and the 1996 data (census).²⁴ However, if this statistic can be confirmed, it marks a significant trend and a major element for the growth of the knowledge-based sector in Cape Breton.

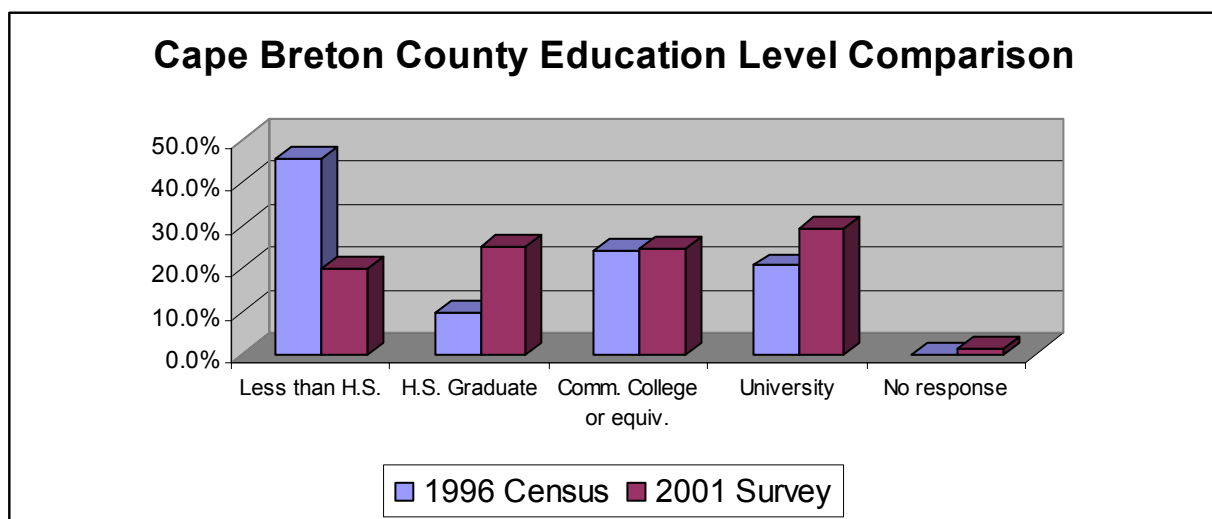


Figure 3.7, *Cape Breton County Education Level Comparison*

Cape Breton post-secondary educational institutions are forming strategic relationships with the private sector. Educational institutions are now working closely with industry to develop programs that meet the needs of companies. Private sector companies are also beginning to take new technologies, such as learning tools developed by Cape Breton companies, to publicly funded institutions.

At a meeting of Atlantic Premiers in Pictou in early June 2002, it was agreed that a strong united approach needed to be applied to a number of issues including strengthening labour market training and skills development. The Premiers' Action Plan established new goals for collaboration in post-secondary sector and labour market development. Regional priorities identified in the Action Plan include student financial assistance, student and labour mobility, and program accessibility through on-line learning.

²⁴ Cape Breton County Skills Inventory, Corporate Research Associates Inc., 2001

Findings

- The out migration of the population continues to be a problem that may be exacerbated by oil and gas development in Halifax.
- Continued call centre growth is contributing to increased employment in the region. This growth, coupled with declining population and labour force bases, is creating a reduction in unemployment.
- Cape Breton has a relatively highly educated population. This is beneficial in terms of attracting outside investment as has been demonstrated by the recent growth in the call centre industry. A relatively well educated labour force is also necessary in order to build a knowledge-based industry which typically requires a higher level of education than traditional sectors.
- It is encouraging that the youth of Cape Breton are recognizing the value of education.

3.3 Industry & Entrepreneurship

The industry profile has been broken down into several parts: background, key initiative, entrepreneurial growth companies, and call centres.

3.3.1 Background

In the decade between 1985 and 1995, there were approximately two-dozen start-ups in the Cape Breton knowledge-based sector. These entrepreneurial companies offered a range of new and innovative products and services, such as specialized multi-media, software, Internet browsers, educational media, computer animation, and document imaging. Since 1995, the sector in Cape Breton has lost its earlier impetus and direction; several small businesses have closed, others are struggling while a very few have made the transition from small start-up to mid-size business. It should be noted, however, that in a recent study, Benchmark Sectors First Quarter 2002 for ECBC, sixty-one percent of businesses surveyed in the ICT sector indicated that their profitability had increased over the past three years. Seventy-one percent stated that their profitability would increase in the next three years. The study also suggested that the business focus in the sector was gradually changing from an emphasis on local markets to export outside Atlantic Canada. Although only twenty-nine percent of ICT firms surveyed reported focusing on an export market, this figure is a nineteen percent increase over 2001.

“What is not clear,” according to the Technology Enterprise Centre Evaluation and Go Forward Plan prepared in 2000 for UCCB, “is the significant decline in technology and knowledge-based business start-ups. Commercial lenders report little or no new activity in the past several years. A leading local economic development agency reports five knowledge industry start-ups in the past four years.”²⁵

One factor that encouraged start-ups in the mid-1990s was ECBC’s Communications and Information Business Start-up Initiative (CIBSI) that is no longer in effect. It was one initiative under ECBC’s Technology and Innovation Unit Development Program, which was designed to “increase interest and knowledge of students in the area of science and technology and the application of technology through the development of projects.”²⁶ The purpose of the CIBSI program was to increase ICT industry start-ups in Cape Breton. Under its terms, assistance was provided in terms of mentoring and funding, which allowed salaries as an eligible expense.

The Technology Advisory Group (TAG) was an important catalyst in the early 1990s in getting the industry started in Cape Breton. TAG is composed of members from the IT industry, government, and education. It still meets on a regular basis to listen to presentations on current issues in the technology sector. TAG has no budget of its own, but has received funding from ECBC.

Findings

- At least two of the companies that received ECBC start-up funding, MediaSpark and Virtual Media Productions (VMP), are still in existence. Between them, they currently employ roughly 15 full-time staff and five part-time staff. When in full production, VMP employs upwards of 50 individuals.
- The profitability reports and the increasing focus on export markets in the Benchmark Sectors report are encouraging.
- It would appear that TAG has achieved its original objectives and may need to redefine its mandate for the future.

²⁵ The Technology Enterprise Centre Evaluation and Go Forward Plan.

²⁶ Enterprise Cape Breton Corporation Program Description

3.3.2 Key Initiative

In September of 1998, the Silicon Island Art and Innovation Centre, located in the former courthouse in Sydney, opened with fifteen tenants. The renovations to the building were carried out at a cost of almost \$4 million. According to the public announcement, "The project takes advantage of the inherent strengths of the growing Cape Breton multimedia sector. The centre will create new jobs, generate a number of small business ventures, increase exports and help to revitalize the downtown area."²⁷ The goal of Silicon Island was, according to its web site, "to cluster multimedia-based businesses and individuals under one roof" and firms with similar business focus. The multimedia sector in Cape Breton has been quite strong, based largely on McKenzie College's early initiatives in multimedia. According to Mediafusion, an association of multimedia firms, at its peak there were 44 member firms in the Cape Breton multimedia sector with a combined workforce of 100 people that generated over \$6 million in annual revenues. Although there are no statistics available, the consensus amongst those in the industry is that the sector has since declined.

Silicon Island, it should be noted, was not entirely made up of multimedia firms. As the list below indicates, the original tenants included multimedia, educational, web development, and architectural and consulting firms. Of the original fifteen tenants, at least nine are still operational but less than one-third are still located in the Silicon Island building.

Original Silicon Island Tenants		
1.	Trifos Design	Architectural/design firm.
2.	Media Spark	Makers of GoVenture, Entrepreneur simulation software.
3.	VMP Productions	Animation house.
4.	Folkus Atlantic	Focus on education videos and CD-ROMs
5.	Chatsubo Design	A web development firm specializing in music artist web sites and advanced online information systems.
6.	Center for Distance Education	Extension division of McKenzie College.
7.	Voyageur Productions	Multimedia, specializing in virtual technology.
8.	Portage Technologies	French multimedia producers, "L'Acadie" CD-ROM.
9.	EastWest Communications	Script writing and audio voice over work.
10.	Celtic Impressions	High-resolution digital photography.
11.	CBNet	To provide Cape Bretoners with affordable Internet links, both cable and telco.
12.	Crew Productions	Video services, like business promotional videos.
13.	ADI Nolan-Davis	Branch of multi-dimensional companies under one umbrella, do consulting, engineering.
14.	Zeppelin Signs	Computer-designed signs and digital printing.

²⁷ Press Release, Economic Development/tourism--Courthouse to Multimedia Mall, September 12, 1997

Original Silicon Island Tenants		
15.	McKenzie College	Private college specializing in computer-related technology programs, in particular multimedia.

A feasibility study for a second stage of Silicon Island was conducted in 1999. It found that the existing businesses would require 30,000-sq. ft. more by 2001. Additionally, it found that eight start-ups might require incubation services that could be accommodated by Silicon Island. The report also mentioned the possibility that off-Island firms would be attracted to an enlarged space. If these new businesses emerged, it was forecast that an additional 40,000-sq. ft. would be required. This prediction proved to be overly sanguine. Silicon Island was taken over by KnowledgeHouse, a company specializing in educational services. This company is no longer operating Silicon Island.

Findings

- Silicon Island was important as a symbolic step forward. It illustrated that Cape Breton could realistically develop an indigenous multimedia sector.
- Silicon Island lost its impetus due to a number of factors such as the failure of Knowledgehouse and the failure to follow through on a well-defined plan. It is important to note that more than half of the original companies are still in existence.

3.3.3 Entrepreneurial Growth Companies

There are a number of entrepreneurial growth companies in the knowledge-based sector in Cape Breton. Such a company either began in the knowledge-based sector in Cape Breton or is a locally owned private company active in the sector. There is still a core of multimedia businesses, such as Folkus Atlantic, Virtual Media Productions, Mediaspark, and several others. There is also a range of other knowledge-based companies with varying business focuses, such as Techlink (gaming), Dynagen (microprocessor generator controls), Advanced Glazing (greenhouse insulation applications), Atlantic Geomatics Research Inc. (enterprise resource planning systems), and a number of others.

There are some important signs that entrepreneurship is developing in all sectors of the Cape Breton economy. The Metro Cape Breton Junior Chamber was initiated early in 2002 and has already hosted the Junior Chamber Atlantic Convention for 2002. Industrial Cape Breton Board of Trade has recently changed its name to the Cape Breton Chamber of Commerce, which brings it in line with similar organizations of local business people throughout North America.

Findings

- While there are some similarities between businesses, there appears to be little cohesion between the entrepreneurial growth companies in the knowledge-based sector.

- Without sufficient numbers of companies, economically sustainable clustering is difficult to achieve.

3.3.4 Call Centres

Following the lead of New Brunswick, Cape Breton has encouraged a number of call centres to locate in the region. These companies are attracted to the region for a number of reasons, in particular the relatively high educational capabilities of the residents as well as their loyalty and reluctance to move elsewhere in search of work. There are six customer service centres that have been established in Cape Breton. They currently employ roughly 3,000 people.

The call centres can be divided between those taking inbound calls and those making outbound calls. The former are providing support for clients' products while the latter are soliciting clients' products and services. The turnover rate for inbound tele-service centres is 20-30% per year (in CBRM it is 20%); however, for outbound centres turnover is 30-60% annually because of the rejection associated with making cold calls.

Most training is done through in-house programs. Some contracts require only a day of training while others, such as those supporting computer hardware, can be up to three weeks. The NSCC campuses in Sydney and Port Hawkesbury have been involved in employability training for Stream and for EDS. Since most of the training is proprietary to the individual companies, there is little opportunity for this training to be expanded. The two largest call centres are operated by EDS Canada and Stream International. There are at least four other smaller call centres including ICT Group, Ron Weber and Associates Tele-services, Upsource, and Hospitality Marketing Concepts.

EDS Canada: EDS opened its first call centre, or customer interaction centre as they prefer them to be called, in September 2000 in Sydney. It currently employs roughly 900 people and has recently won a contract to support Hewlett Packard. EDS is also in the process of opening another centre in Port Hawkesbury that will employ 300 people. EDS recently announced it would employ 600 additional employees (300 at each site), which would bring its total employee figures on Cape Breton to 1,500 workers, making it the largest private sector employer on the Island. The Sydney site is EDS's showcase customer interaction centre in Canada.

Stream International: Stream announced it was coming to Cape Breton in August 2001 and, demonstrating a highly aggressive attitude, began taking calls in October 2001, well ahead of schedule. Stream currently has roughly 900 employees and has the potential for up to 1,400. They currently provide support for several Internet providers. Stream, a subsidiary of Solectron Corporation, has roughly 20,000 employees worldwide.

Although the call centres have become a major employer in Cape Breton, a study prepared in the fall of 2000 suggests that the employment density rate is far from satisfied, in fact, it is the lowest in the region. This indicates excess capacity for further

growth. Cape Breton Regional Municipality Labour Force Assessment with Respect to Tele-Service Occupations divides call centre employment into three categories: customer service providers, technical support, and tele-service centre support. It states that the requirements for such work are communication skills, computer skills, employability skills, and a customer service background.

During the study period, there were 1,100 employed in call centres and 4,770 workers with the appropriate skills available from the unemployed and involuntary part-time workers. It projected needs to the end of 2008 and found that there would be 1,735 call centre workers by that time. This estimate, however, is clearly overly conservative since, as noted above, there are already approximately 3,000 workers in this sector. ECBC is currently engaged in a study to update this report and determine if any changes are required.

Findings

- Clearly, call centres are a key part of the solution to providing employment and bringing wealth to the region. EDS argues that from August 2000 when they opened to the present, \$21 million in payroll and benefits has been spent in the region. EDS also argues that there are a number of spin-off businesses, such as fast food outlets and vending machine companies, that have sprung up as a consequence of their presence. The EDS figures indicate that there is at least one such job for every three EDS employees. It is reasonable to assume that the jobs created by the call centres do create additional employment opportunities outside of direct employment: however, determination of the exact ratio would require further investigation.
- Despite the requirement for fairly highly educated workers, the call centres do not provide high-level knowledge transfer for their employees.
- Call centres have been instrumental in improving the general attitudes and outlook of a certain segment of the Cape Breton community. They have also given their employees an international perspective due to daily contact with people all over the world.

3.4 Educational Institutions

This section describes the activities of the Cape Breton educational institutions in the knowledge-based sector. These institutions are the K-12 public education system, University College of Cape Breton, the two Nova Scotia Community College (NSCC) campuses, the two College de l'Acadie campuses, the Canadian Coast Guard College, McKenzie College, and the Island Career Academy.

3.4.1 K – 12 System

There are two school boards in Cape Breton: the Cape Breton-Victoria Regional School Board and the Strait Regional School Board. Between them, they provide educational services for over 20% of Nova Scotia's elementary and secondary students. The Cape Breton-Victoria School Board has over 80 schools and the Strait School Board has close to 30. Declining enrolment is an issue faced by both boards. The Strait Regional School Board, for instance, this year has dipped under 10,000 students for the first time. By 2007, it is anticipated that there will be fewer than 7,000. Faced with the challenges of servicing a largely rural population, the Strait Regional Board has been a leader in introducing technology into the school system. They have established a highly respected distance education program that provides students in small schools with the opportunity to take advanced courses in subjects such as calculus. Currently, they offer sixteen such courses.

The Nova Scotia government's efforts to increase technology in the schools, including those in Cape Breton, were twofold: the Information Economy Initiative (IEI) and the construction of new technologically advanced schools. The IEI was a three year program launched in 1998 worth \$64.1 million. Its purpose was to provide hardware, software, technical support, and professional development for schools, universities, and communities across the province. The construction of new technologically advanced schools in Nova Scotia was undertaken as part of an extensive P3 program. The program was cancelled in 1999. A number of these schools were built in Cape Breton.

These two initiatives have resulted in a somewhat inconsistent educational deployment of technology across the province, including the two schools boards in Cape Breton. Through IEI, computer clusters were placed in every high school and junior high school in Nova Scotia, but due to monetary restraints they were only placed in certain classrooms. As a consequence, it is still possible for students to graduate with little or no exposure to technology. Moreover, some teachers are still not committed to the benefits of computers and as a result have not integrated them into their teaching although the Strait Board is attempting to alleviate the problem through in-servicing. The inconsistency is particularly evident at the elementary level in the difference between older schools and those built under the P3 program and seems especially apparent in the Cape Breton-Victoria Board. Older schools may have a common lab and a computer in each class and possibly Internet connections. The P3 schools have high-speed computer clusters in every classroom, all of them connected to the Internet, along with large monitors and/or retractable display screens. They also have LCD projectors and smart boards.

3.4.2 University College of Cape Breton

UCCB has responded to the emergence of Information Technology with a number of different strategies that are designed to encourage research in the sector, develop economic ties with the Cape Breton community, and provide an educated workforce. ECBC and UCCB signed a Memorandum of Understanding (MOU) in 1990 with the goal of stimulating and promoting economic development in Cape Breton, particularly in technology, applied research, and development of entrepreneurship. The MOU was renewed in 1996 in a modified form designed to encourage a wider range of projects in terms of topic, size, and duration of funding. The 1996 MOU has since expired.

Technology Enterprise Centre: The opening of the Technology Enterprise Centre (TEC) in 1998 is one example of this diversified approach. TEC is Atlantic Canada's first university-based technology incubation facility. Its mission statement is "to provide access to the technical resources of the University College, to nurture entrepreneurs in technology-based businesses, to foster their growth, to attract new technology-based enterprises to Cape Breton and to encourage technology transfer. A report prepared for TEC by KPMG Consulting in early 2001 found that, despite having full tenancy, it was losing approximately \$80,000 per year. On the other hand, at the time of writing it provided annual incremental household income of almost \$2 million and equivalent employment of 63 full-time jobs. Several of the companies, in particular the Environmental Services Lab, have been quite successful and are expanding.

KPMG offered several reasons for TEC's lack of success as an incubator:

- Since the mid-1990s there have been almost no technology start-ups in Cape Breton looking for incubation services;
- TEC was unable to follow all best practices noted in Logitech's study, in particular its size was less than half of the recommended 30,000-sq. ft.

KMPG suggested that UCCB attempt to negotiate extended agreements with funding partners; if the agreements could not be extended, UCCB should cut back support services and convert the building to a non-incubation space. However, KMPG argues that based on the "significantly enhanced services and enterprise focus" of the Department of Economic and Technological Innovation and the links with government labs, such as the NRC lab, UCCB make a case for building an expanded incubation centre that was a minimum of 30,000-sq. ft.

In February 2001, CBGF convened a meeting with private and public sector groups to discuss a new incubation centre known as Silicon II. The proposal called for a "business incubation and acceleration support service integrated on site with the NSCC - Marconi and UCCB campuses and operated in partnership with private and public interests." Dan White & Associates prepared a study in October 2001 that found in order for such a project to go ahead the demand for new candidates should be proven, the centre's

viability should be demonstrated, and a full financing plan should be put in place. These criteria have not been met according to those interviewed for this report.

Department of Economic and Technological Innovation (DETI): The Department of Economic and Technological Innovation at UCCB was formed “to facilitate the transfer of innovation knowledge from the University College to the Cape Breton Community for the purposes of economic diversification and commercialization.” The Department is comprised of a Dean and Managing Director responsible for the CAD/CAM Centre, GIS/GPS Centre, Technology Enterprise Centre, Centre of Excellence in Offshore Petroleum, Centre of Excellence in Information Technology, and the Centre of Environmental Research.

IT Innovation Centre (ITIC): ITIC is of particular interest since its purpose is “to support and assist growth in the Information Technology sector of the knowledge economy.” According to the ITIC web site, this “goal will be realized through reaching the following sub-goals: improving the core of IT infrastructure at UCCB, program development, training, testing and workshop activities, development of dual-role facilities that permit access and use by IT firms, development of technical advisory and support services, improving line access capacity to support cluster development, and community access programs.” As part of this initiative, DETI has established an Applied Microelectronics Laboratory as part of ITIC that will perform R&D in embedded devices and services. ITIC also provides multimedia and video-conferencing services.

UCCB Courses: UCCB has developed several courses designed to meet industry needs for skilled IT workers. It offers a four-year degree, the Bachelor of Technology (Information); a three year diploma, Computer Information Systems Technology, and a one-year Computer Science transfer to either Daltech or Acadia.

Other Initiatives: UCCB has partnered with Aliant in a research initiative to study virtual clustering. The NRC lab and the Industrial Research Assistance Program (IRAP) internships, discussed under the *Government Programming and Support* section of this report, are highly significant steps forward. In addition, UCCB has won four Social Sciences and Humanities Research Council (SSHRC) chairs, one of which will be in IT.

Findings

- There are a number of important factors that appear to be coalescing at UCCB, in particular the NRC presence, the establishment of the Applied Microelectronics Lab, and IT research chairs.
- UCCB is challenged by not having a graduate program thus making it difficult to generate a critical mass in the kind of intense research activity that would be required to develop a technology cluster. While UCCB cannot offer graduate programs without the approval of the Maritime Provinces Higher Education Commission (MPHEC), alternatives are being investigated. The National Research Council

(NRC), for instance, has proposed using members of their own staff as adjunct professors as a transitional measure.

It is the consultants' understanding that part of UCCB's agreement with NRC calls for the establishment of a graduate program that corresponds to the NRC research focus. According to IRAP, it is anticipated that Daltech and UCCB will develop a joint MSc in Information Technology within the next year.

- TEC did not meet the best practices of an incubator. Not only was the space too small, but the mix of companies was too heterogeneous and entrance and exit regulations were not sufficiently rigorous. While the temptation of a new incubation centre that meets best practices is attractive, it is important to remember that there are virtually no start-ups to take advantage of its services.

3.4.3 Nova Scotia Community College (NSCC)

NSCC Marconi Campus offers four different IT programs: database management, system networking, Internet programming, and programming. In May of 2002, it was announced that NSCC Marconi would offer the Information Technology Diploma. Students will develop skills in the installation and trouble-shooting of hardware and software, in both networked and stand-alone environments. The course will also enable them to remain current with emerging Internet technologies. NSCC Marconi Campus has a leading edge wireless teaching lab. The College has partnered with Advanced Training & Services Ltd. to offer a 51-week, \$22,500 course in wireless technology that uses the lab's facilities. Marconi's campus also includes a mock call centre. In August of 2001, Marconi was involved in pre-training staff for Stream before its start-up. NSCC Strait Area Campus's strength lies in its nautical training that uses advanced technology such as a port simulator and a dynamic positioning system.

Findings

- There is a Memorandum of Agreement between UCCB and NSCC regarding joint programs, but it is mostly inactive. However, NSCC Marconi and UCCB are currently working together to offer foreign students courses in the oil and gas sector. This kind of cooperation helps prevent duplication of effort and creates a unified approach to education.

3.4.4 Other Institutions

Located in Sydney, the Canadian Coast Guard College offers marine-related courses and is one of the most modern and well-equipped such colleges in the world. McKenzie College provides multimedia training in Sydney and at campuses located throughout the Atlantic Provinces. Island Career Academy located in Sydney provides students with business-related courses. The College de l'Acadie, with campuses in Petit de Grat and Saint Joseph-du-Moine, offers vocational and technical courses for French-speaking students.

3.5 Research and Development

3.5.1 The Federal Research Agenda

Cape Breton's growing participation in research and development coincides with the Government of Canada's national innovation strategy, "*Achieving Excellence – Investing in People, Knowledge, and Opportunity.*" This strategy is a blueprint for building a stronger, more competitive economy. The paper proposes goals, targets, and federal priorities for the next decade in four key areas: Knowledge Performance, Skills, Innovation, and Strengthening Communities. In terms of knowledge performance or research and development commercialization, the goals of the federal government as outlined in the ten-year strategy are:

- a) Vastly increase public and private investments in knowledge infrastructure to *improve Canada's R&D performance*; and
- b) Ensure that a growing number of firms benefit from the *commercial application of knowledge*.

National targets for 2010 are for Canada to rank among the top five countries in the world in R&D performance, to double the Federal Government's current investments in R&D, to rank among world leaders in private sector sales of new innovations, and to raise venture capital investments per capita to U.S. levels.

The Federal Government proposes to achieve these targets through the following initiatives:

1. *Addressing key challenges for university research* by supporting the indirect costs of university research, contributing to the indirect costs of federally supported research, leveraging the commercialization potential of publicly funded research, supporting academic institutions in identifying intellectual property with commercial potential, and increasing support to the granting councils to enable them to award more research grants;
2. *Renewing the Government of Canada's capacity* to respond to emerging public policy, stewardship and economic challenges and opportunities in Science and Technology; and

3. *Encouraging innovation and commercialization* of knowledge in the private sector by providing incentives for the commercialization of world-first innovations, and increasing incentives to SMEs to adopt and develop leading-edge innovations through increased support of IRAP. The Federal Government also promises to increase the supply of venture capital in Canada through the Business Development Bank of Canada (BDC). The BDC will pool assets of various partners, invest the proceeds in smaller, specialized venture capital funds, and manage the portfolio on behalf of its limited partners.

Findings

- The Federal Government focus on innovation and their commitment to building capacity for research and development is a very positive sign for the knowledge-based sector. The NRC Atlantic initiative is evidence of the Government of Canada's commitment to the innovation agenda.

3.5.2 The Atlantic Canada Perspective

Spending on research and development is one common measure of a region's capacity for innovation and success in the knowledge economy. The Atlantic Provinces Economic Council issued the following statistics in 2002 relating to the level of research and development activity in Atlantic Canada.²⁸

- In 1999 R&D spending in Atlantic Canada was \$656 million, less than four percent of Canada's total.
- In 1999 the private sector in Atlantic Canada performed only 17% of the total R&D in the region as compared to 58% performed by the private sector at the national level.
- The dominant role in research activities in Atlantic Canada is held by the universities, which accounted for 59% of the region's R&D.
- The Federal Government remained an active partner in R&D initiatives in the Region in 1999 accounting for more than 23% of R&D performed.

These statistics do not specifically identify the levels of research and development activity in Cape Breton. However, it is assumed that the percentages for Cape Breton would be no better than the Atlantic Canadian average in terms of the percentage of R&D performed by the private sector compared to that performed by the university and Federal Government agencies. Although these statistics do not indicate a strong R&D presence in the region, the situation is improving in Cape Breton.

²⁸ Atlantic Provinces Economic Council, *Atlantic Report*, Winter 2002 edition, Vol. 36, No. 4, page 1.

Findings

- Clearly R&D spending in Atlantic Canada is far below the national average. The majority of the R&D spending in the region is by government and learning institutions.

3.5.3 Research and Development Activity in Cape Breton

The major government agencies and other organizations active in the support and conduct of research and development on Cape Breton Island are the NRC and UCCB:

NRC Institute for Information Technology at UCCB

The NRC promotes the development of globally competitive innovation clusters in communities by working in partnership with other government departments at federal, provincial and municipal levels, universities and the private sector.

Drawing on this model, NRC has committed to significant new investments in Atlantic Canada, including Cape Breton, over the next three years to expand its existing facilities and begin development of new community innovation clusters. The new investments are part of the federal government's Atlantic Canada Investment Partnership, which targets specific economic development and investment incentives for the region.

The NRC cluster strategies focus on linking existing local strengths and opportunities in emerging sectors to its core R&D capacities. NRC will help move the blueprints to reality through R&D, knowledge and information sharing, research facilities, and other local infrastructure development. NRC's research institutes act as central hubs for technology cluster growth.

NRC investment on Cape Breton Island will capitalize on the growing significance of information technology in the area, particularly in the wireless technology arena. The University College of Cape Breton (UCCB) has been designated by the province as a Centre of Excellence for IT, has a federally funded Chair in the Management of Technological Change, and houses the first microelectronics lab in Atlantic Canada. This will be a very symbiotic relationship that will hopefully aid in the ultimate commercialization of the research, to the benefit of other Cape Breton sectors. Training will also be a key component of the NRC lab in that it will provide a practical setting for graduate studies and supervision.

The NRC lab for wireless technology research will be an extremely important catalyst for additional research initiatives and educational programs in the area. It will also benefit the university's ability to fill its federally funded Research Chairs. It is expected that the new lab will house 7 – 8 full time research staff. The work will be primarily on low-level wireless technologies and real-time embedded systems with broad application for industry. The biomedical, environmental, security and manufacturing industries will be the major receptors for the technology.

UCCB and the Information Technology Innovation Centre (ITIC)

ITIC, the goals of which are described in *Section 3.4.1* of this report, is a centre for network computing expertise that takes the form of a partnership among UCCB, InNOVAcorp, the NRC, ECBC, and the private sector. ITIC has recently established an Applied Microelectronics Laboratory within the UCCB campus. The focus of this lab is on embedded intelligence devices, embedded systems software development, embedded operating systems, and embedded device networking and communications. This laboratory will serve as a useful tool for applied research and academic learning in the specification, development, testing, and configuration of enabling technologies and their applications in industry. The Applied Microelectronics Lab will conduct research activity in collaboration with local industry, which will focus on developing embedded intelligent devices, Internet appliances, broadband wireless devices, and microelectronic devices.

The Applied Microelectronics Lab was designed to integrate with the wireless research being done by NRC. It has the capacity to perform the technology transfer engineering needed to implement the NRC programs on a stand-alone microcomputer chip. The Applied Microelectronics Lab is concerned with issues such as power consumption, miniaturization, and wireless chip development whereas the NRC lab is primarily developing wireless network configuration software. Innovative applications of embedded communications algorithms will produce an intelligent device that can be addressed via the Internet or via wireless networks.²⁹

The powerful workstations used in the Applied Microelectronics Lab will provide a support platform to other research activities of the Science and Technology unit of UCCB. However, the software used by the Applied Microelectronics Lab carries a licensing restriction in that it may only be used for pre-production research and development.

For the Lab or ITIC to commercialize any research, they must partner with private industry or in some instances, UCCB.

The Applied Microelectronics Laboratory, ITIC, NRC and ECBC are presently assisting in the development of a wireless sports scoring system in partnership with a private company, Forever Sports. The system is currently being tested at Lingan Golf Course.

²⁹ UCCB Department of Economic and Technological Innovation Proposal; “Canada Foundation for Innovation New Opportunities Fund, Project: Microelectronics Laboratory”, April 7, 2000

It is estimated that there are currently 10-12 individuals actively conducting funded research at UCCB and its affiliates. Though this number may appear small, it is a significant improvement over the past five years when there was no funded research being performed. According to Ron MacNeil, Director of ITIC, UCCB was ranked by Maclean's Magazine as the #1 general access university in Canada in terms of the amount of funded research being performed on a per faculty member basis.

Findings

- Research and development activity in Cape Breton is largely performed by the university or its affiliates. However, the location of an NRC research lab in Cape Breton may leverage additional research in the region by government and the private sector and will aid in research commercialization. The Benchmark Sectors First Quarter 2002 for ECBC indicated that in the ICT sector R&D costs were only 5.2 percent of gross revenues.
- Research and development activity in Cape Breton has increased over the last five years and with the establishment of the NRC lab and the awarding of the SSHRC research chairs to UCCB, R&D will increase significantly in the future.

3.6 Public and Private Investment

This section examines the availability of funding and other assistance available to businesses engaged in the knowledge-based sector of Cape Breton from the federal and provincial governments and private sources. Assistance in this regard includes non-monetary forms of support such as mentoring.

3.6.1 Government Programming and Support

Federal Programs Supporting Research and Development: In 2001–02, federal expenditures on science and technology are estimated at \$7.4 billion. The federal government has expanded its funding for research and infrastructure development in support of the knowledge economy. Some of the key initiatives include:

- The Canadian Foundation for Innovation (CFI);
- The Canadian Institute for Health Research (CIHR);
- The Natural Sciences and Engineering Research Council of Canada (NSERC);
- The Social Sciences and Humanities Research Council (SSHRC); and
- The Canada Research Chairs (CRC).

Major funding sources for research and knowledge infrastructure include:

- The National Research Council (NRC);
- The Atlantic Canada Opportunities Fund (ACOA);

- Industry Canada through Technology Partnerships Canada (TPC), CANARIE Advanced Network Applications Services and Technologies, and Genome Atlantic

The primary government support of the knowledge-based sector in Cape Breton is from agencies such as Enterprise Cape Breton Corporation (ECBC) and the Cape Breton Growth Fund (CBGF), NRC through the IRAP program, and the Provincial Government of Nova Scotia. The Cape Breton County Economic Authority (CBCEDA) and the Strait Highlands Regional Development Agency (SHRDA) also play an important role in stimulating the economies of their respective areas.

1) Enterprise Cape Breton Corporation: ECBC delivers various programs that provide direct assistance to business, and entities that provide support to business, with the objective of effecting positive long-term economic impact on Cape Breton Island and the Mulgrave area. Each project is assessed against three basic criteria: viability/sustainability, need, and net economic impact on the region.

ECBC Assistance	
New Technology & Knowledge-Based	<ul style="list-style-type: none"> • Repayable assistance of up to 50% of the eligible capital costs of new establishments, expansion or modernization for businesses in new technology and knowledge-based industries.
Innovation Assistance	<ul style="list-style-type: none"> • Provisionally repayable assistance to businesses up to 75% of the costs of undertaking approved innovation projects.
Marketing Assistance	<ul style="list-style-type: none"> • Repayable assistance to businesses up to 75% of the costs of undertaking approved marketing activities,.
Studies Assistance	<ul style="list-style-type: none"> • Repayable assistance up to 75% of the costs of undertaking a business plan, a feasibility study, investigation of licensing opportunities, conduct of a venture capital search, a technology transfer search, best practices study or mentoring services to improve business skills.
Investment Prospecting & Trade Mission/Show Participation	<ul style="list-style-type: none"> • Financial assistance to businesses to participate in trade missions to help them to develop external markets for their products and services or find investment.
Infrastructure Assistance	<ul style="list-style-type: none"> • Repayable contributions to businesses and business groups up to 50%, up to maximum of \$500,000, of the eligible capital costs to develop the business infrastructure necessary to create long-term sustainable employment.

2) The Cape Breton Growth Fund: CBGF typically funds projects that have the following characteristics:

- Ability to leverage other sources of funding, (private and/or public);
- Incremental to existing programs - the project has sought assistance from other sources so that the Fund is used as a source of last resort; that is, existing federal and provincial programs must be used first where possible; and
- Long-term sustainable growth, job creation, and incremental economic benefits for Cape Breton Island and/or the Mulgrave area.

Since its inception, the CBGF made a number of financial contributions to economic development in Cape Breton such as a repayable contribution to UpSource Inc. in the amount of \$475,000 for the establishment of a customer contact centre in North Sydney. The venture was estimated to create approximately 70 jobs.

In 2001, the CBGF provided a contribution of \$10 million to Stream International Inc. for the establishment of a 900-person Customer Interaction Centre in Glace Bay. Human Resources Development Canada also contributed approximately \$2 million, and the Province of Nova Scotia provided assistance in the form of a loan guarantee.

In March 2000, ECBC and the CBGF provided approximately \$13 million in assistance to EDS Canada for the establishment of a customer interaction centre in Sydney. The following year, an additional \$4.5 million was provided to the same company for the establishment of a centre in Port Hawkesbury. In March 2002, EDS announced the signing of a major contract that would bring an additional 300 jobs to each centre for a total of approximately 1500 employed by this company in the Cape Breton region.

New Cape Breton Growth Fund Programs: The CBGF announced in May of this year that it is committing \$3.2 million to two programs:

- The Knowledge-based Industrial Outreach Initiative undertaken in partnership with NRC-IRAP, UCCB and the private sector; and
- The Environmental Industries Human Resources Capacity Building Initiative, a partnership among the CBGF, the Canadian Council for Human Resources in the Environment Industry and the private sector.

These programs are designed to enhance the level of skills within the Cape Breton labour force, help retain youth on the Island, and ensure that Cape Breton companies can compete on a global scale in these sectors.

Recently, the CBGF has indicated that it has the ability, and is prepared to provide growth capital for Cape Breton companies in the form of equity financing.

3) **NRC and the Industrial Research Assistance Program:** IRAP is a service of Canada's National Research Council. IRAP helps small and medium-sized firms create and adopt innovative technologies. IRAP also helps small or medium-sized technology-related firms access expertise in the business end of innovation, such as marketing, financing, and production, through the Canadian Technology Network (CTN).

4) **Provincial Government:** The primary business investment and economic development stimulation vehicles of the Provincial Government are:

Nova Scotia Business Inc. (NSBI): NSBI is an organization led by the private-sector that directs the province's business development initiatives. Its mandate is to encourage and promote business activity in order to add sustainable, value-added growth to the Nova Scotia economy. NSBI has four main areas of business: business attraction; trade promotion; business retention and expansion; and lending and finance. In the latter case, it provides financial products and services to help Nova Scotia companies expand and to attract investment.

- **Nova Scotia Tax Incentives:**

Nova Scotia Tax Incentives	
Small Business Deduction	For businesses whose net taxable business income is \$200,000; reduces the federal corporate income tax rate from 28% to 12%.
Investment Tax Credits	Investment tax credit of 10% of capital costs available for new manufacturing and processing equipment.
Equity Tax Credit	An <u>individual</u> income tax credit equivalent to 30% of an eligible equity investment up to \$30,000.
Prospectus Tax Credit	A non-refundable corporate income tax credit equivalent to 35% of prospectus costs up to \$100,000.
Manufacturing and Processing	A 30% investment tax credit (ITC) for qualified investment in manufacturing and processing.
Nova Scotia New Business Rate	Elimination of the provincial tax rate for the first three fiscal periods on the first \$200,000 of annual taxable income.
R&D Incentive and Tax Advantages	Incentive deductions include the immediate and full write-off for most costs, plus 20% to 48% tax credits.

According to Ernst & Young, Nova Scotia has the best R&D incentives in Canada. In fact, Nova Scotia offers Canada's lowest after tax cost for Research & Development.

5) **InNOVAcorp:** InNOVAcorp focuses on three areas to help knowledge-based business:

- *Business Incubation* includes flexible leasing arrangements, a professional image for the company, shared administrative support staff, shared office equipment, and meeting space;

- *Investment* in commercially viable technology developed in Nova Scotia, through the InNOVAcorp venture capital fund. Investments between \$200,000 and \$500,000 are available to qualified applicants; and
- *Mentoring* for new or entrepreneurial growth businesses to help them make better business decisions by learning from the experiences and expertise of others.

6) Other Regional Development Agencies: Cape Breton has two regional development agencies (RDA's) that are active in the promotion of their respective areas within Cape Breton: the Cape Breton County Economic Development Authority (CBCEDA) and the Strait-Highlands Regional Development Agency. The Cape Breton County Economic Development Authority (CBCEDA) is the larger of the two and has made proposals on a number of key economic areas, including the knowledge-based sector.

Findings

- There appear to be a number of programs, federally and provincially, available to assist companies in the knowledge-based sector. However, the provincial support in terms of tax incentives is not as beneficial to a start-up company that typically needs capital and has no taxable income in the first few years of operation.
- Much of the funding available seems to be directed toward research & development rather than business start-ups.

3.6.2 Private Investment

The availability of private investment in Cape Breton is sparse. Some firms have been able to attract venture capital investment, others have had to rely on investment from personal sources. The Gap Equity Network Association (GENA) was formed as an association of entrepreneurs who have experienced first hand the challenges of growing a business in the knowledge-based sector. The GENA group has created a web site to advocate their views.³⁰

According to the GENA web site, “One of the major obstacles to growth for knowledge-based businesses in Cape Breton is a lack of access to capital in the form of equity investment. There are a number of reasons for this situation. One is the stage of maturity of this sector - most of the companies are "gap-stage" - they have outgrown "love money" and government R&D/start-up programs, yet are still too small to access traditional venture capital. This is a problem for early-stage technology companies Canada-wide, and threatens both our local knowledge-based economy as well as our entire nation's ability to gain a foothold in many sectors of the new economy.”

The problem of lack of access to capital for early-stage knowledge-based companies is particularly acute in Cape Breton. Here, the rapid loss of the “old economy” adds to a lack of confidence. And, because Cape Breton lacks an entrepreneurial investment culture, there are few individual angel investors, who typically provide smaller amounts of financing than venture capitalists. GENA identifies a number of investment inhibitors that contribute to the gap between start-up funding and venture capital:

- **Location & Distance of the investment** - investors prefer to invest close to home;
- **Knowledge Level** - Investors tend to invest in businesses and markets in which they have some level of previous knowledge and experience;
- **Relationships** - Investment decisions are often relationship driven. The closer the relationship between the investor and the potential investee, the greater the chance that a transaction will take place; and
- **Dollar Amount** - Venture capitalists rarely consider investments that require less than half a million dollars.

³⁰ <http://www.seascape.ns.ca/~gena/aboutGENA.php>

Typically, the void between start-up and venture capital is filled by angel investment. A study of angel investment in the Atlantic Region by Ellen Farrell suggested that approximately 91% of angel investors have made only one to two investments. The study also indicated that the average size for first investments by angel investors was \$74,695 but that 45% were in the \$10,000 to \$30,000 range. Seventeen percent of the investments were in the \$100,000 to \$200,000 range, the remainder being less than \$100,000.³¹ Of the investments cited by the angel investors included in the study, 56% took their investment in the form of equity and 28% used a combination of debt and equity. Only 15% invested exclusively in the form of debt. In her report, Ms. Farrell recommends education for entrepreneurs on how to sell a business plan beyond the banks and government.

“Government could increase the use of venture capital in Atlantic Canada, at little or no cost to itself, without embarking on yet another government subsidy program”, concludes an Atlantic Institute of Market Studies (AIMS) paper on venture capital. The study recommends immediate rethinking of government subsidy programs, which suppress the use of venture capital, and reform of the region's securities regulations, which have made it more difficult and expensive for entrepreneurs to obtain investment capital. Government financing does not come with the management expertise venture investors bring to a young company; it changes the incentive structure for both workers and managers, and companies often have to restructure their planning to fit into government programs. Reforms also need to be structured to remove impediments to the use of private capital in the region.

As well, the fractured and difficult securities regulations in the region increase the cost of capital. Each of the four provinces has its own, very different, regulatory regime, thus splitting up an already small market. The AIMS paper recommends that the four provinces quickly move to create a common regulatory regime, one that opens the door to listing by the typically small companies in Atlantic Canada. "Governments could increase the use of venture capital at almost no cost by reforming securities regulations -- and that's a lot more cost effective than pumping \$20 million of government money into a venture capital pool," says Fred McMahon, AIMS Senior Policy Analyst. If a venture capital fund is established, it must operate as a private sector entity, using market-based criteria, and be managed independently of political considerations.³²

³¹ Informal Venture Capital Investment in Atlantic Canada: A Representative View of ‘Angels’, A Report Submitted to Atlantic Canada Opportunities Agency by A. Ellen Farrell, Saint Mary’s University, Halifax.

³² Atlantic Institute for Market Studies, “Venture Capital in Atlantic Canada: Asking the Right Questions”, Fred McMahon, AIMS Senior Policy Analyst and Dane Rowlands, Professor of Economics at Carlton University.

Findings

- It should be noted that venture capitalists, judging by the American experience, tend to focus their investments on a small number of large urban areas. Between 1995 and 1999, ninety percent of all American-based venture capital was invested in the top twenty-five urban areas in the United States. This tendency poses challenges to Canadian companies trying to attract American venture capital. For instance, the Toronto multimedia industry has an estimated total output of \$1 billion, but multimedia firms seeking American venture capital have been asked to relocate as a condition of funding. While there is no available geographical analysis of venture capital in Canada, it appears likely that it follows a similar trend towards large urban areas, thus making it more difficult for smaller regions like Cape Breton to access.³³

3.7 Indigenous Strengths

Cape Breton and, more specifically, its knowledge-based sector possess significant strengths upon which to build a new economy. In *Figure 2.1, Economic Growth Model*, indigenous strengths are those factors within each of the key components that give Cape Breton or any economy its competitive advantage.

- **Dedicated Workforce:** It is common knowledge in Canada and the United States, with the arrival of major multi-nationals such as EDS and Stream, that Cape Breton has an abundance of skilled, educated workers who possess a high degree of corporate loyalty and a very strong work ethic.
- **Technology Infrastructure:** Cape Breton has a very good technology infrastructure, at least in the main urban areas such as the Cape Breton Regional municipality and the Port Hawkesbury/Mulgrave areas. Infrastructure was an important factor in the location of both Stream and EDS in Cape Breton.
- **Geographic location:** Although previously in this report the location of Cape Breton is cited as an impediment to growth due to the cost and difficulty of business travel, Cape Breton does offer close access to many of the key markets in North America and Europe. Being situated on the East Coast, Cape Breton is close to major urban centers such as New York City and Boston, and it is closer to Canadian centers such as Halifax, Montreal and Toronto than its western counterparts of Calgary and Vancouver. This is especially important when time zones are a factor in conducting business in a global economy. Cape Breton is also strategically located in close proximity to Atlantic Canada's budding offshore oil and gas industry.

³³ Lisa Mills and Shauna Brail, 145.

- **Cost of Doing Business:** A study conducted by KPMG in 2001 entitled “Competitive Alternatives Study: Comparing Business Costs in North America, Europe and Japan” examined the costs of doing business in 86 cities, including the Cape Breton Regional Municipality, in relation to the U.S. The study noted “CBRM had a cost index that was 15.5% lower than that of the average U.S. city”.
- **Lifestyle:** With close-knit communities, a strong sense of culture and history, remarkable natural beauty, low crime rate, and a relatively low cost of living, Cape Breton provides an outstanding quality of life that continually draws people to the region and lures its former emigrants back. Cape Breton is a hotbed of musical talent, has an abundance of recreational activity, and a new, highly innovative regional health care complex.
- **Education:** Fundamental to any growth community is a strong grounding in education. Cape Breton has a number of excellent post-secondary training organizations. Each of these learning institutions have proven that they have the adaptability and the desire to meet the needs and challenges of industry by proactively initiating or modifying programs as required.
- **Research and Development:** The establishment of a research lab by NRC in Cape Breton to collaborate with the Information Technology Innovation Centre and the Applied Microelectronics Lab at UCCB promises to significantly increase the scope and profile of research being performed in Cape Breton. This recognition will benefit the Cape Breton economy by involving highly skilled individuals, providing technical solutions to industry problems, and creating economic development opportunities for partnering companies, agencies, or institutions. UCCB has recently been awarded four research chairs in the fields of Information Technology, Biodiversity, Business, and Social Sciences. This will undoubtedly raise the national profile of UCCB and Cape Breton as a setting to conduct advanced research.

4.0 INDUSTRY STAKEHOLDERS SURVEY

It was important for the purposes of this study to gather input from individuals who:

- Currently participate in Cape Breton's knowledge-based economy;
- Have previously participated in Cape Breton's knowledge-based economy;
- Have direct knowledge, interest, experience and/or training in the sector.

In order to encourage and solicit views from a wide segment of the targeted population, a questionnaire was developed and distributed.

Approximately 30 surveys were mailed directly to key individuals in the industry during the last week of May 2002. These individuals were chosen by the consultant based on discussions held with representatives of the Cape Breton Growth Fund and by research of publications containing business and other listings related to this sector.

A newspaper advertisement was placed in the Cape Breton Post on May 29, June 1, June 8 and June 15, which invited Cape Breton residents and businesses to visit the web site and complete the questionnaire on-line. If individuals did not have access to this method they were asked to contact the consultants to arrange an alternate method of receiving the survey.

A number of studies have been conducted in this sector recently and several respondents expressed a sense of frustration because they are not seeing results. Individuals who have responded to previous studies may no longer be motivated to participate in a process they see as frustrating and ineffective.

The survey was designed to be qualitative in nature in order to receive a broad perspective of the respondents' views. While the resulting data can be hard to present in quantitative form, it is insightful and useful in illustrating common themes, concerns and directions.

In the following table, each question is listed and is followed by a brief summary of the responses for that question. Data from both methods of survey delivery, mail and web-based, are included.

Survey Questions and Response Summaries

1. *What are the major factors that hinder growth of knowledge-based industry in Cape Breton?*

The factor mentioned by nearly all the respondents was that of the need for real equity financing and funding assistance, especially for the smaller player in the sector: “...*the one and only key factor that MUST be addressed FIRST AND FOREMOST is lack of access to equity financing—more specifically, smart money.*” It was felt that there is a lack of strategic planning and focus on the part of government (at all levels) to advance the knowledge-based economy in Cape Breton and there is great danger in thinking that the knowledge-based economy is exclusively about IT. Also, the perception of Cape Breton as a depressed area that is mainly industrial, unionized, with a lack of skilled workers still lingers.

2. *The knowledge-based economy in Cape Breton has seen some definite growth in recent years. What do you feel were the major drivers or factors that enabled this growth?*

A number of respondents questioned whether there has indeed been growth in recent years. Others felt that government and institutional initiatives led by UCCB, NSCC, CBCEDA, ECBC, NRC, TAG, Silicon Island, and so on have been instrumental and that government/education/private partnerships should continue: “*NRC’s locally managed IRAP program has taken development risks and has been patient with the inevitable failures.*” It was also noted that the persistence of individual entrepreneurs who are determined to develop their business and remain in Cape Breton couldn’t be overlooked.

3. *In 1999 APEC’s IT and the Knowledge Economy in Atlantic Canada identified a shortage of skilled IT workers as a major impediment to the growth of the knowledge-based sector in Atlantic Canada. In your view is this still a significant weakness? If yes, do you have any suggestions, which should be included in this strategy to address this concern?*

Most respondents believed that there was still a shortage of skilled IT workers particularly at the senior management or Master’s degree level. Suggestions for addressing the problem included:

- Providing financial incentive programs for individuals that pursue training in the field. The cost of a university education and resulting student loans is prohibitive.
- Providing financial incentive programs or quality of life incentives for skilled individuals who relocate to Cape Breton.
- Providing financial support to SMEs that invest in training their employees.
- Arranging job internships with local companies.
- Offering both more general and more customized training options.
- Helping small and medium sized companies establish mentoring relationships with individuals and companies that have experience and knowledge in the field.

Some respondents felt that the problem was not in producing skilled workers (training is available at UCCB, NSCC and other facilities), but in retaining these skilled individuals after graduation: “*The smarts will move with the right balance of work, stability and money. Financing, Financing, Financing, for small KB companies.*”

Survey Questions and Response Summaries

4. *Do you feel that the IT infrastructure in Cape Breton is adequate to enable the growth of the knowledge-based sector? If no, what do you feel is lacking and what would you recommend to address the deficiency?*

Some respondents suggested that the very definition and focus of IT infrastructure is flawed. As one respondent wrote:

“It's easy to conjure up many possibilities as long as it's understood that IT is an enabling tool, . . . Although it provides the platform for the knowledge-based economy, all other industries are impacted. For example, tourism, culture and heritage could accurately be considered as knowledge-based industries. I believe that as a policy thrust, future IT development on Cape Breton should be geared to existing strengths/industries and emerging technologies . . . Aiming at the life sciences, which includes environmental sciences, at its present stage of development seems to me to be a much more coherent knowledge-based development focus.”

Slightly more than half of the respondents felt that the IT infrastructure is inadequate and the following improvements were recommended:

- Better, faster Internet and telecommunication links at a more reasonable cost;
- An industrial IT park maybe between UCCB and the airport;
- Broadband connectivity in rural areas to integrate IT into tourism/cultural sectors; and.
- More bandwidth and redundancy.

The respondents who expressed the view that the present infrastructure is adequate felt that the development of other business infrastructure, such as access to specialized business services and reasonably priced air travel, is much more crucial.

5. *Do you feel that the general infrastructure for the knowledge-based sector such as incubation space, research facilities etc. are sufficient or appropriate to foster the growth of the sector? What changes or additions to this existing infrastructure would you recommend?*

The majority of respondents felt that general infrastructure is not sufficient to foster growth. Silicon Island and UCCB's Technology Enterprise Centre are attempts but not true incubation facilities. They are office space without enough tenants to fill them. A successful incubation facility or technology park would offer more in the way of facilitation, partnership promotion, and access to research. Some respondents said that too much emphasis was placed on Silicon Island and a better approach would be to have an infrastructure that supports ventures throughout Cape Breton. One respondent suggested:

“. . . We tend to forget that in order to work in a knowledge-based economy - we require computer systems and equipment and manufacture/assembly is another aspect that we are overlooking. We tend to think that the knowledge-based economy is solely focused on development - what about producing products for export. . . Lets assemble hard disk drives or flat panel monitors or computer motherboards, like they do in the Philippines or Mexico or Ireland and export the finished products. It would provide steady employment for skilled labour

Survey Questions and Response Summaries

and that in turn would lead to spin-offs such as research and product development thereby supporting the local universities and training institutions and so expanding the IT knowledge-based sector of the economy.”

6. *What does Cape Breton have to offer that may provide it with a competitive advantage over other potential locations for knowledge-based industry?*

Most respondents felt that Cape Breton has a lot of intrinsic values: lower costs of operation; lower costs of living; a distinctive culture that values art and music; political stability a global sense; and a hardworking, labour force with low turnover rates; that should be of value when promoting Cape Breton as a place to live and do business. It was noted that Cape Breton does a lot of things well (tourism/culture, education, fishing, and so on), and it is a mistake to treat the knowledge sector as a sector onto itself. The most benefits will come from integrating it with other sectors. However, some respondents were adamant that at this point in time Cape Breton has no competitive advantages. As an indication of the sense of frustration some of the respondents were feeling, one person wrote: “. . . it is now clear that these benefits *WILL NEVER* overcome the challenges. Since 2000 I would not advise anyone to start a knowledge-based company in Cape Breton (or most of Atlantic Canada for that matter).”

7. *During the process of preparing this strategy we will evaluate a wide range of initiatives and projects. To assist us in this evaluation process we ask that you review the following evaluation criteria, identify only the three most important, and rank them in order of priority from 1 to 3 with 1 being the most important.*

- *Projects/initiatives that have export potential/import replacement potential.*
- *Projects/initiatives that attract/leverage private sector investment.*
- *Projects/initiatives that match existing local labour skills.*
- *Projects/initiatives that improve education and skill levels.*
- *Projects/initiatives that have value-added potential for established industry.*
- *Projects/initiatives with the most job creation potential.*
- *Projects/initiatives led by educational institutions and/or publicly funded research entities.*
- *Other (specify)*
- *Comments:*

The following 4 criteria were mentioned most often with numbers 1 and 2 receiving the same number of #1 rankings; number 3 receiving the most #2 rankings and number 4 receiving the most #3 rankings.

1. *Projects/initiatives that have export potential/import replacement potential.*
2. *Projects/initiatives which attract/leverage private sector investment.*

Survey Questions and Response Summaries

3. Technology infrastructure to facilitate economic growth.

4. Basic, essential infrastructure such as transportation.

8. *Bearing in mind the rankings allocated in part 5, please indicate which types of knowledge-based entities—i.e. software development, service support centres—you believe to have the highest potential for successful future development in Cape Breton.*

Many respondents felt that there is potential in the field of software development particularly with niche products, proprietary products, and educational and entertainment programs. There was also the view that software is not the way to go because most software development takes place where hardware production is already established and Cape Breton can't compete with these centers.

There was greater agreement on call centers, which are viewed as contributing marginally to sector development. Service support centres provide low paying, low-technology positions and take workers away from more vibrant sectors, such as tourism and hospitality. As branch plants of off-Island companies, they are the first to leave when a new low wage/high employment area offers inducements.

Local companies that export their products and services will offer the highest potential for successful long-term development. Inducements to off-Island companies should never be greater than those offered to existing Cape Breton firms. Sector development will be fostered by focusing on areas such as environmental remediation, tele-health, virtual clustering, scientific research, real innovation and hard-nosed engineering and by integrating technology into existing sectors.

9. *Give examples of specific strategic projects/initiatives you believe should/could be undertaken in the knowledge-based sector in Cape Breton.*

A sample of responses to this question includes:

- *Upgrade of communication lines;*
- *Provide access to equity financing;*
- *“ I draw a blank. We have been denied funding for projects so much that you lose your creativity;”*
- *Develop content;*
- *Assess opportunities presented by existing projects/initiatives (e.g. Sydney Tar Ponds clean-up) and develop the knowledge-based technologies that will be needed in the solution;*
- *Match existing successful non-tech management skills with new IT players to reduce some of the non-tech business risks;*
- *Find a way to encourage private investment, from local, national, and international investors in locally based ventures;*

Survey Questions and Response Summaries

- *Develop new education/learning media, e-commerce solutions, server farms, wireless technology;*
- *Improve roads;*
- *Provide employment tax breaks for companies in IT;*
- *Support trade mission/sales/marketing;*
- *Provide a large government contract to be undertaken by a joint venture of small CB companies to build credibility and experience;*
- *Continue to utilize the NRC to identify trends and resultant development opportunities;*
- *Support travel support especially with the airline industry;*
- *Work to build clusters;*
- *Build technology park;*
- *Build conference facilities;*
- *Seek out computer manufacturing; and*
- *Build a long-term vision, not get rich quick schemes.*

10. Identify any ways or means, other than direct financial support by way of loans or grants, that government could encourage and support knowledge-based economic development projects/initiatives in Cape Breton.

The paramount concern of all respondents was for government to put in place an effective strategy, administered consistently, that reflects and supports local private sector and community-led initiatives. Any number of initiatives could be undertaken, as the list below illustrates, but what the respondents seem to want most from government for the knowledge-based sector in Cape Breton is a clear focus that will result in a plan for action. Some direct quotes in response to this question are as follows:

- *'Direct decision makers to stop assuming that putting money into the Halifax area by setting up offices there to service Atlantic Canada will actually result in anything happening beyond the Halifax airport. ... Declare Cape Breton an IT experimental growth area';*
- *"Investment incentives, R&D credits, employment credits, energy cost supplements, transport cost incentives, etc. A lot can be done without direct grants and loans";*
- *"Internet and communications links for the small player at reasonable cost";*
- *"Exert influence on airline/courier companies to improve levels of service";*
- *'Set aside a portion of existing government contract work to support fledgling CB IT companies';*
- *'Ensure government departments and agencies have permanent staff who understand the unique problems/concerns of the IT industry and who can then act as a resource for local players';*
- *'The GAP strategy'; and*
- *"Marketing and promotion".*

11. Identify some innovative ways to encourage greater private sector involvement in knowledge-based economic development in Cape Breton.

Survey Questions and Response Summaries

Government can encourage greater private sector involvement through action. Set the rules for administering the Growth Fund and make sure the rules foster locally driven enterprise. Government can provide assistance through matching programs, tax incentives, risk reduction, etc. As one individual wrote:

“Create success, one at a time, but comprehensively. We need a Cape Breton Inc. with a plan and a mechanism to carry it out. It needs to involve Cape Bretoners and fire the politics out the window. It needs to be in business to make a profit and to show the way.”

Other examples given for ways in which government could stimulate private sector investment include:

- Reduce red tape in accessing government programs;
- Look for private investors from outside the region;
- Encourage established local companies to invest in start-ups and in providing the start-up with sound business advice;
- Link local IT companies with larger scale projects and businesses;
- Declare Cape Breton an e-business tax free zone;
- Educate the public as to what the knowledge-based economy is, what it can do for local businesses and institutions and create an awareness of the potential in future development;
- Use a broad definition of the knowledge-based economy and involve stakeholders throughout Cape Breton;
- Access technical expertise for firms;
- Promote the idea of private sector scholarships in IT areas at UCCB; and
- Fund participation for CB firms in local, national, and international trade shows.

12. There are a number of emerging high knowledge sectors, such as biotechnology, aquaculture, environmental technology, ocean technology, and pharmaceutical and medical products, that may offer significant opportunity for economic growth and job creation. How can Cape Breton participate more actively in these emerging high knowledge sectors?

Many respondents saw merit in pursuing opportunities in emerging high-knowledge but recommended a careful selection process.

“Pick a few and focus the attention on them. Ensure that the basic infrastructure is in place to support the emerging sector. For example in biotech there are very limited physical and human resources available right now which limit the development opportunity.”

Respondents noted that the types of skills associated with these sectors are often available only within a small radius of a research center. If UCCB were to provide this role, it would need significant investment in staffing and infrastructure to increase its R&D capabilities to an appropriate level. One respondent cautioned: *“When choosing emerging sectors select those that*

Survey Questions and Response Summaries

have a natural affinity or relationship to existing capacities and competencies in Cape Breton.” A bioscience incubation center, including tax breaks for tenants meeting export targets, was also discussed as a possibility.

13. What do you feel are the challenges and opportunities of exporting products or services in the knowledge-based sector to other provinces or countries?

Respondents identified many more challenges than opportunities when exporting products or services from the knowledge-based sector. Some felt it was a moot point if changes to the status quo are not implemented in the very near future. An eroding transportation infrastructure, including freight and air travel schedules and costs, and the distance from markets were identified as concerns, as were:

- *Achieving a critical mass of knowledge-based companies;*
- *Accessing capital and business expertise;*
- *Attracting and keeping human resources;*
- *Reducing expensive and lengthy lead times getting a product from development to export market readiness;*
- *Developing better alliances and networks within the Canadian and international business communities;*
- *Changing the image of Cape Breton; and*
- *Recruiting the upper management strata that has been depleted in Cape Breton by years of dependence on outside management.*

Most respondents feel that opportunities for exporting exist and, in fact, are abundant. To achieve export capacity the following suggestions were given:

- *Seek export market for technical support, storage services, and distributive work;*
- *Foster joint developmental/economic ventures by the industry;*
- *Expand the potential of key resources such as UCCB;*
- *Diversify since IT is just one component of a strong local economy. Associated manufacturing/assembly businesses offer significant opportunities for export; and*
- *Focus on niche products and markets, e.g. UCCB to export unique programs to other universities and colleges.*

Additional Information

This section was used by the respondents to reiterate the points they believed to be most crucial to ensuring Cape Breton's future participation in a knowledge-based economy. In summary, they felt government support is important and necessary but program changes are needed to allow for the growth and expansion of the SMEs, since it would be these companies that will build the knowledge and knowledge export sector. One individual observed what was also heard by the consultants in several personal interviews:

"... The Growth Fund may be the last opportunity to secure our place in a transitioning economy ..."

5.0 OUTLOOK FOR THE KNOWLEDGE-BASED ECONOMY IN CAPE BRETON

5.1 Challenges

Cape Breton faces challenges similar to those of other small regions in the world. These challenges include a high dependence on external trade, remoteness from world markets, high per capita cost of infrastructure, low population scattered in rural areas, declining population, and comparatively low income levels. There are, however, certain challenges that are specific to or more prevalent in Cape Breton's economy. These include:

- **Business Leadership:** Previous studies have noted a shortage of individuals with middle to upper management skills and export management expertise in Cape Breton;
- **Declining Start-ups:** There has been a marked decline in the number of start-ups in Cape Breton in the past five years. Many of the companies that exist in Cape Breton today were begun during IT boom of the mid to late 90's;
- **Difficulty in Accessing Start-up and Early Stage Financing:** Cape Breton entrepreneurs and SMEs have been experiencing difficulty in obtaining adequate, flexible financing for start-ups and early stage companies wishing to expand. There are few investors on Cape Breton Island who have the risk tolerance for the knowledge-based sector and few in other areas who are willing to invest outside of their home region. Venture capital investors typically require a larger capital base and proven sales record than most Cape Breton companies have achieved to date;
- **Changing Economic Drivers:** The traditional industrial sectors have provided the foundation of Cape Breton's economy for generations. For decades, economic growth has been generated by the sale of commodity resources. Future economic growth derived from natural resources will require the application of new technologies, and public investment in research, knowledge, and skills development. Capital investment will be required to develop new uses, products, research, and business models capable of accessing new markets;
- **Difficulty in Creating Effective Clusters:** The region's small, somewhat remote, and widely dispersed population does not easily lend itself to the development of new knowledge industries, which rely on the cross-stimulation of skills and ideas;
- **Lack of Graduate Programs at UCCB:** Although the general level of education is comparable to or better than other regions, there is very little presence of post-graduate study occurring at the university in areas such as Computer Science; and
- **Lack of Control Over Its Regulatory Environment:** Cape Breton, being a region within a province, does not have the legislative capacity to effect change that might stimulate growth in certain industries. Likewise, securities regulations in Atlantic Canada are restrictive for SMEs wishing to obtain financing on the open market.

5.2 Key Success Factors

Certain factors will be essential to the success of the Cape Breton Growth Fund achieving its strategic objectives related to the economic development of the knowledge-based economy in Cape Breton. These factors include:

- A clearly articulated plan with well-defined goals and strategies that the majority of stakeholders support;
- A comprehensive market strategy for promoting the sector and informing potential partners/investors of Cape Breton's strengths and positioning the industry in the North American and global marketplace;
- The leveraging of private sector investment by government programming;
- The development of world-class infrastructure, accessible to the entire region;
- The attraction of external knowledge-based companies to the region;
- Research and development activity that ultimately leads to commercialization;
- The fostering of an attitude of innovation in the region;
- The formation of partnerships between the public, education, and business sectors;
- Technical and financial Government support of start-up companies;
- Strategic alliances with globally positioned companies by combining local innovation and high-quality production with foreign expertise, market access, and capital; and
- An educated, highly skilled, local workforce and effective recruitment and retention policies.

The new economy offers enormous opportunities for economic development. At the same time, however, it penalizes those who are not equipped to compete, whether they are individuals, business, or institutions. For the individual, higher education is an advantage in securing high-income, full-time positions. In the knowledge-based economy, employability is increasingly contingent upon specific technical expertise, training in an intellectual discipline, and general communications and problem-solving skills of the type provided by a university education.

Sustainable economic growth can only come through strong leadership and funding support from government, private sector initiatives and investment, a considerable tolerance for risk, and the determination to stay the course.

5.3 Global Outlook

Much has been made of the so-called Tech Wreck that in the last year has impacted the Internet companies and telecommunication providers and suppliers. In Canada, the Nortel example is often cited as proof of a decline in the fortunes of the knowledge-based sector. In fact, nothing could be further from the truth. Despite the recent downturn, ICT's contribution to Canada's GDP has grown by 50% over where it was in 1997. There have been job losses, but again if put in the context of the last five years, the ICT workforce is larger by 148,000 jobs than it was in 1997.³⁴ A Human Resources Development Canada study of the IT market estimated that 38,000 new IT jobs would be created in Ontario alone in 2002.

The reason for this renewed growth is that ICT has become central to the operation of both public and private enterprise. The Government of Canada, for instance, has committed to have all government information and services on-line by 2004. The United States federal government has increased its IT budget by over \$10 billion between 2000 and 2002. Moreover, businesses of all kinds recognize that, as BusinessWeek points out, "IT is the firm's central nervous system."³⁵

This investment in ICT means that a wealth of opportunity exists for those knowledge-based companies that are most innovative and visionary. As one respondent to the questionnaire acutely observed,

"The most benefits will come from integrating [ICT] with other sectors."

In other words, knowledge and innovation can take place in any industry including those in the "old" economy based on commodity resources. True economic development will be achieved when the knowledge-based sector is utilized to increase the profitability and global competitiveness of all other sectors. Despite some challenges, Cape Breton is well placed to look to the future and to take advantage of the rich opportunities available in the global marketplace.

³⁴ ITAC 2001-2002 Annual Review.

³⁵ "Why the Future Looks Promising", BusinessWeek Online, November 15, 1999

CAPE BRETON GROWTH FUND STRATEGY

6.0 INTRODUCTION (PHASE II)

As part of the information gathering process for this report, the consulting team has read a significant number of reports previously prepared on this topic for the Cape Breton region and for various other regions. In many of these previous studies, a number of recurring, general recommendations have been identified; these recommendations include developing infrastructure, investing more in research and development, increasing education levels, and following best practices for technology incubation.

In preparing the strategy, an effort has been made to avoid giving generalized suggestions wherever possible and instead provide explicit, measurable recommendations. These recommendations, moreover, are consistent with the strategic objectives of the Cape Breton Growth Fund, which are as follows:

Export Trade - To generate real economic wealth and sustainable business development, Cape Breton Island businesses must be able to export their goods and services.

Industrial Benefits – It is important to ensure that Cape Breton Island labour and businesses enjoy the economic benefits of emerging industries.

Research/Commercialization – Innovation will be fostered by investments in infrastructure that will meet the needs of industry and strengthen the linkages between researchers, training institutions, and the private sector.

Access to Capital - Ready access to inexpensive and flexible capital will assist Cape Breton businesses, particularly those in the knowledge-based sector.

Direct Investment – In addition to the wealth generated through the exports of local enterprise, the relocation of complementary businesses to Cape Breton needs to be encouraged and facilitated.

Infrastructure - Infrastructure development that generates direct and indirect employment for Cape Breton Island must be stressed. This emphasis will increase trade and community economic development and allow businesses to transact their affairs efficiently and competitively.

Public Consultation – The findings of the public consultation panel indicate the expectation of engaging stakeholders in the process of economic development.

Although there are several key recommendations in the strategy, the consulting team has made an effort to diversify the action plans in order to address both urban and rural needs in the knowledge-based sector and to build a sustainable industry in the region. The investment period considered by the consultants begins in 2003 and runs for five years. Certain recommendations call for capital expenditures within that period while others require the funding of operating costs for the full five years.

7.0 APPROACH TO DEVELOPING THE STRATEGY

Given the backdrop of tight government funding and a recessionary economy, it is perhaps more important than ever that an economic development strategy be practical, realistic, and action-oriented. It is also critical to the success of the proposed economic development strategy that it is developed, refined, and accepted within Cape Breton Island. The consultants' approach, therefore, was to seek a high level of input, guidance, and support from individuals, businesses, and community groups with the objective of developing a practical and realistic strategy consistent with Cape Breton's attributes and aspirations; in short, it is intended as a development strategy over which the region and its citizens will take ownership.

The opinions and viewpoints of the private sector, community economic development groups, municipalities, and relevant federal and provincial government officials are integral to the preparation of a regional economic development strategy. To ensure that all parties with an interest in the Cape Breton knowledge-based sector were aware of the study and had an opportunity to be heard, the following steps were taken:

- An information package containing a questionnaire was circulated to obtain basic information and viewpoints from interested parties;
- Public notices were placed in the Cape Breton Post to solicit input through completion of the questionnaire by various means including written responses, on-line submissions, telephone interviews and private meetings; and
- The consultants solicited input from a variety of individuals, community groups, businesspersons, and government personnel who were believed to be able to provide valuable insight and direction in the preparation of a knowledge-based economic development strategy for the region. A conscious effort was made by the consultants to ensure that input was received from most geographic areas within the region.

The approach taken in the formation of the strategy for the knowledge-based sector of Cape Breton was to ensure that all areas of the sector, geographically and economically, had fair consideration. For this reason, the strategy, rather than being particularly focused on one or two programs, has been positioned to incorporate each of the fundamental components of the economic development process. Programming funds may be allocated to a relatively broad range of disparate initiatives with a common, long-term objective. To do this effectively requires a strategy that is clear, concise, and most importantly, endorsed by the majority of stakeholders.

8.0 CBGF STRATEGY

8.1 Overview

Strategies and public policies on innovation and economic development rely on a high level of economic and social stability to succeed. All of the strategy areas must be interconnected and must not conflict with government policy. Public investment in infrastructure, education, human resources, research and development, and business support can help to create an environment conducive to entrepreneurship and innovation and private sector activity. Any public spending in the knowledge-based economy, however, must not be geared solely towards the accumulation of physical assets, stable firms, and well-established industries. The CBGF must be prepared to supply some funds for investment in more risky, innovative undertakings.

In addition to its core strengths in areas such as a loyal, educated, workforce, Cape Breton has a number of mature sectors. The knowledge-based sector should be examined in conjunction with the other existing sectors such as fishing, tourism, oil and gas, and environmental remediation. The main focus of the knowledge based sector cannot be self-serving if it intends to be sustainable in the long-term.

Demand for the knowledge-based sector should be based on a pull strategy, in that the participants in the knowledge-based sector must first identify the needs of the other sectors and then attempt to develop solutions to fill those needs rather than creating knowledge and then looking for a market. Solutions may be derived from partnerships between the Cape Breton Growth Fund, other public sector bodies, local educational or research institutions, and the private sector

The recommendations included in this report are focused on the need to increase exports of products and services from the sector, the inherent benefits of attracting external investment to the region, and the absolute necessity for government dollars to leverage private sector investment. The strategy stresses the importance of research and development to a growth sector and the need to commercialize that R&D to ensure the long-term sustainability of the sector. Finally, the strategy considers amendments to the existing educational framework, an essential component in the successful implementation of an economic development strategy.

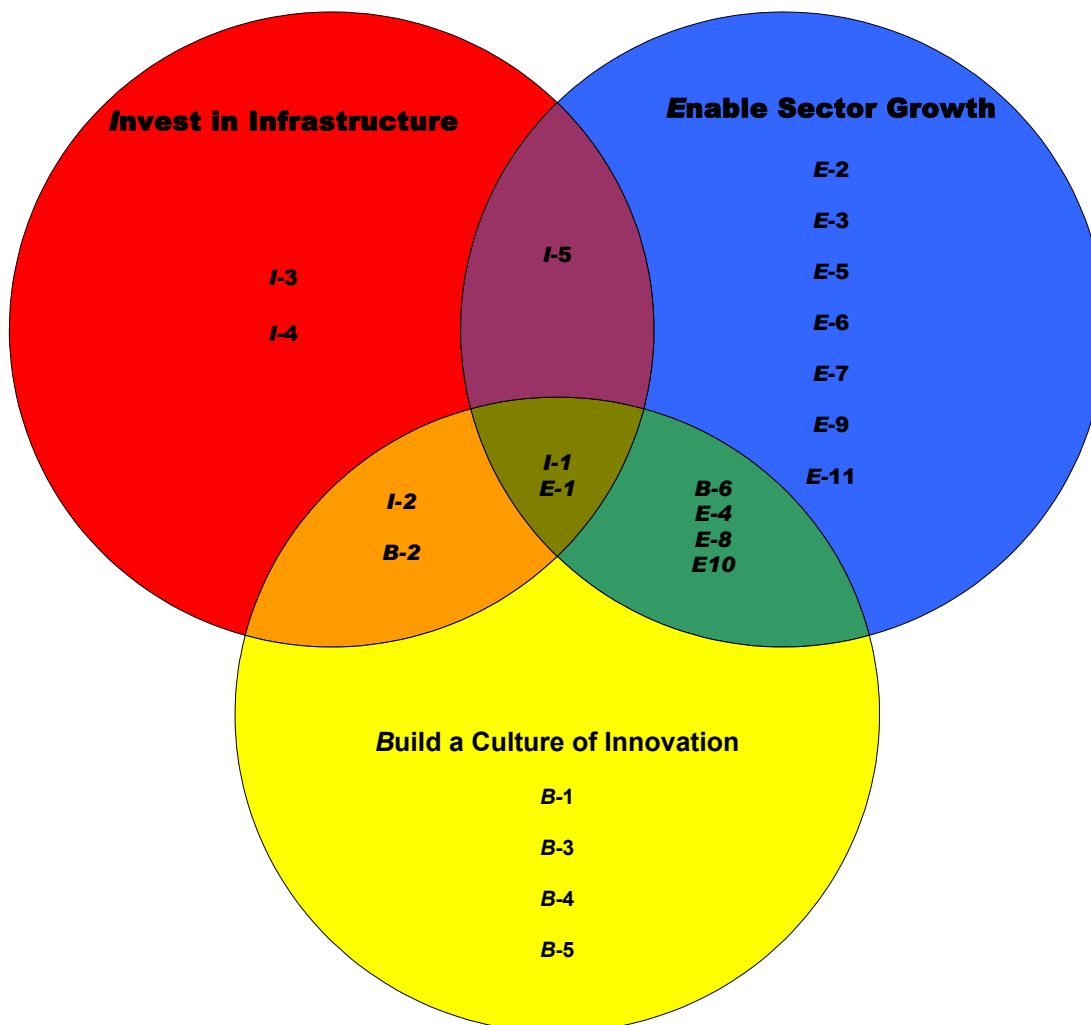
The Strategy

The main focus of the CBGF strategy is to create an environment that encourages and enables entrepreneurial behaviour and commercial growth by building on existing or planned public sector research, building industry-research linkages, expanding the existing education base, improving coordination and programming mechanisms within government, and strengthening the innovation infrastructure. Increasing collaboration between firms, research institutions, educational institutions and government, and the formation of clusters and international alliances are paramount to the strategy. The strategy also attempts to address the challenges to rural areas of Cape Breton participating in the knowledge economy.

The CBGF strategy for economic development in the knowledge-based sector has therefore been presented in three key action plans:

- 4) Invest in Infrastructure;
- 5) Enable Sector Growth; and
- 6) Build a Culture of Innovation.

Strategy for Growth and Sustainability of the Cape Breton Knowledge-based Sector



This diagram is intended to graphically illustrate the *three strategic action plans* of the Cape Breton Growth Fund strategy for development of the knowledge-based sector. Within each action plan, there are a series of recommendations numbered consecutively according to their particular area of focus.

Each of the individual recommendations has been numbered according to its primary directive (i.e. Recommendations relevant to *Invest in Infrastructure* have been labeled #I-1 through #I-5, those that are intended to *Enable Sector Growth* have been labeled #E-1 through #E-11, and those recommendations designed to *Build on the Culture of Innovation* are numbered #B-1 through #B6.) The estimated costs of each action plan are summarized in a table in the concluding section, Summary of Proposed Programming by CBGF.

Certain recommendations may impact more than one strategic action area as is evident from the positioning of each initiative within the overall strategy.

8.2 Invest in Infrastructure

As noted in the situational analysis phase of this report, the infrastructure challenges faced by Cape Breton in the knowledge-based sector are twofold: lack of significant presence for the industry in the region and remote location. The *Invest in Infrastructure* recommendations are designed to address both of these points. In terms of building infrastructure, there are two federal government initiatives that are extremely important to Cape Breton. They are the NRC clustering program and Canada's Innovation Strategy.

The NRC initiative is to establish new community innovation clusters in the Atlantic region as part of the Atlantic Canada Investment Partnership. These innovation clusters are based on the principle of co-location of an NRC research lab with university resources and the private sector in order to facilitate the commercialization of research and development. The NRC has successfully encouraged the development of globally competitive innovation clusters in several communities by following this principle and by working in partnership with other government departments at federal, provincial, and municipal levels. Successful examples of this model include Saskatoon's Agricultural Biotechnology Cluster and Montreal's Biopharmaceutical Cluster. Cape Breton has already been selected as a site for developing an NRC innovation cluster. After a series of consultations with the community, the NRC has selected wireless technology as its research focus and is in the process of establishing a presence in Cape Breton.

Canada's Innovation Strategy is a multi-faceted plan intended to develop a culture of innovation in Canada. It will be discussed in greater depth in the *Build a Culture of Innovation* section of this report. However, it is worth noting here that at the community level, the Innovation Strategy has three major targets:

- By 2010, develop at least 10 internationally recognized technology clusters;
- By 2010, significantly improve the innovation performance of communities across Canada; and
- By 2005, ensure that high-speed broadband access is widely available to Canadian communities.

In order to build a sustainable knowledge-based sector in Cape Breton, it is crucial that both of these initiatives be leveraged as fully as possible.

Recommendation #I-1: Establish an Innovation Centre.

The National Research Council presence in Cape Breton is a key element to growing a sustainable knowledge-based sector in Cape Breton over the long term. The NRC will act as an anchor to the developing cluster and promote knowledge transfer to the Cape Breton university and business communities. It is very important to leverage the NRC presence by co-locating all Cape Breton entities engaged in wireless technology, including those involved in research, education, and private enterprise. It is recommended, therefore, that an Innovation Centre be established that houses the NRC

lab, the UCCB Applied Microelectronics Lab, and the NSCC Marconi wireless teaching lab. The Innovation Centre would also have facilities for companies, including start-ups, whose aim is to develop complementary technology; an example of such a firm is Forever Sports, which is currently developing a golf application that employs wireless technology.

The consulting team understands that Silicon Island may be acquired by ECBC in the near future. This site already contains at least some of the infrastructure necessary for co-locating knowledge-based entities. Moreover, its location in downtown Sydney and its profile in Cape Breton would promote the synergy considered to be a prerequisite of clustering. Ideally, therefore, the Innovation Centre should be located in close proximity to, but separate and distinct from, the Silicon Island building.

The Innovation Centre could be a completely wireless facility where research could be put into practice. It should include appropriate technology facilities such as the shielded room required by NRC, high-end video conferencing, and a lecture theatre. Any start-ups that occur as a result of the Innovation Centre should be encouraged to locate in the same building. Ultimately, the goal is to incubate wireless technology start-ups; however, it is essential that the process is monitored closely and the incubation facility be carefully planned to ensure that best practices are followed, including entry and exit rules and regulations and a board that supervises operations. Silicon Island, which would be part of this complex, must have a tenancy plan that clearly articulates the objectives for the space. It is recommended that Silicon Island be devoted to firms with a particular focus in the knowledge-based sector. Recommendation #E-1 suggests that an economic development team be employed. These officers should be housed in the Innovation Center. One of the team should also manage the Innovation Centre and Silicon Island.

The Innovation Centre would be a legacy project that would be permanent evidence of Cape Breton's commitment to the knowledge-based sector and increase the visibility of the NRC in Cape Breton. The Innovation Centre would also help to revitalize the downtown Sydney core and establish a presence there for both UCCB and Marconi College. The consultants, however, recognize that there may be insuperable obstacles surrounding the co-location of the NRC, the UCCB Microelectronics Lab, and the Marconi Wireless Lab on this site. If the Innovation Centre must be located elsewhere, co-location of the three entities would still be highly advantageous.

Key Points

- Construct an Innovation Centre with a focus on wireless technology.
- Develop a tenancy plan for the Innovation Centre that clearly articulates the objectives for the space.
- House the economic development team in the Innovation Centre.

Recommendation #I-2: Combine UCCB's Applied Microelectronics Lab, the NRC research lab, and Marconi College's wireless teaching facility.

This recommendation has been outlined under Invest in Infrastructure, Recommendation #I-1, Establish an Innovation Centre. It is anticipated that there will be significant logistical costs required in order to accomplish this goal. Funds must be designated to ensure a smooth and effective transition. Some logistical costs may include the moving, purchasing, and retooling of equipment and leasehold improvements.

Recommendation #I-3: Acquire broadband through Canada's Innovation Strategy.

For both economic and social reasons, broadband connectivity is vital to the sustainability of the rural areas of Cape Breton. As part of Canada's Innovation Strategy, the federal government has targeted providing broadband connectivity to all parts of the country by 2005. It is recommended that one of the initial tasks of the economic development team will be to liaise with the federal government to ensure Cape Breton Island's inclusion in the broadband implementation. The team should also research ways that broadband can be brought to Cape Breton as soon as possible, perhaps by having the Island designated as a test site for Innovation Strategy broadband implementation.

Recommendation #I-4: Construct a Cape Breton portal.

Currently, it is time consuming and sometimes difficult to find information on programs and services of the various federal, provincial, and municipal government agencies. To address this issue, it is recommended that a Cape Breton portal be constructed that unifies access to government information and resources. The portal concept could be expanded to provide a focus for all activities in Cape Breton, including social events, news, weather, local sports, and so on. It might also encourage people to use Smart services, such as paying taxes and water bills online and it could house a knowledge sector jobs registry.

The information it provides must be timely, and allowance has to be made for resources to update the portal regularly. There are several sites that might be used as models: the central Alberta portal (<http://www.mycommunityinformation.com>), Aliant's Atlantic Canada portal (<http://www.atlanticzone.ca/>), and the San Antonio community portal (<http://www.sanantonio.gov/>).

The role of the CBGF would be to ensure the portal is properly planned, designed and constructed and would then turn over responsibility for ongoing maintenance of the portal to another government agency. Consideration should be given to distributing the work of designing, creating, and maintaining the portal to a company outside of the Cape Breton Regional Municipality as a way of encouraging business in the less populated areas of Cape Breton Island.

Recommendation #I-5: Gather relevant and timely statistics and make them accessible on the Cape Breton portal.

It is important that baseline statistics be gathered and maintained regarding all aspects of the knowledge-based sector. Such statistics would allow up-to-the-minute monitoring and evaluation of the sector.

It is also important that these statistics be made available to the broader public, the business community in particular. It is recommended that an online database be developed to store this statistical data. This database should be accessible from the portal discussed in Recommendation #I-4 and be searchable by companies looking to invest in Cape Breton.

8.3 Enable Sector Growth

The situational analysis conducted in phase one indicates that there are a number of challenges Cape Breton faces in building a knowledge-based sector. In the *Enable Sector Growth* section of the CBGF Strategy, the consulting team recommends a diversity of initiatives to address these challenges in building the knowledge-based sector. Significant changes in culture, attitudes, and approaches to innovation and commercialization will be required for growth of a knowledge-based economy that either capitalizes on existing natural resources or supports new industry sectors.

Government agencies can stimulate business creation by fostering a culture of innovation and enterprise in which entrepreneurs are given the skills, encouragement, and support to put their ideas into practice. Government at all levels can maintain a stable economic environment and minimize the burden of regulation. Regional Development Agencies can take the lead in bringing together public and private sector bodies to improve cohesion of services for start-ups at the regional and municipal levels. They can also share their knowledge of best practices with new entrepreneurs and encourage the use of external advice.

The importance of export growth for a developing region or a region undergoing a period of economic renewal cannot be overemphasized. Export earnings replace or improve traditional skills and technology, and increase overall foreign exchange revenues. It is estimated that 87 percent of Canada's exporters are SMEs. They are responsible for about 6 percent of the dollar value of Canadian exports. In 2001, total Canadian exports of goods and services amounted to \$471 billion, representing 43 percent of Canada's gross domestic product.³⁶ Export promotion also serves to create employment opportunities and increase rural income.

The local economy of Cape Breton does not have sufficient critical mass to support a true knowledge-based economy in isolation. To be successful, the knowledge economy *must* export a significant portion of its product a) to other sectors within the Cape Breton economy and b) to companies outside of the region, nationally and/or internationally. The study prepared for ECBC in January 2002, Benchmark Sectors First Quarter 2002, indicated that only 29% of knowledge-based sector firms in Cape Breton directed efforts towards export markets. Significantly raising this percentage needs to be a sector-wide goal.

³⁶ Export Development Corporation website, www.edc.ca

Recommendation #E-1: Employ a team to explore and to procure commercial and research opportunities for the Cape Breton knowledge-based sector and private sector application possibilities with existing R&D.

A dedicated, suitably qualified business development team of at least three individuals should be employed with primary responsibility to proactively explore commercial business opportunities, including those in rural areas of Cape Breton. One member of the team would act as manager of the Innovation Centre. The business development team will also have responsibility for

- Identifying ways to match research and commercial activity by meeting with local business leaders and determining possible applications for existing research;
- Assisting in writing proposals for, and in pursuing research and development funding for the region;
- Acting as a liaison between the private sector and private and public funding organizations;
- Matching knowledge-based companies with strategic partners within Cape Breton and outside the region;
- Exploring and promoting distributed work opportunities with particular emphasis on the rural regions of Cape Breton;
- Encouraging increased export business by existing Cape Breton firms by seeking foreign trade opportunities and facilitating or attending trade missions; and
- Promoting Cape Breton's inclusion in the broadband initiative of Canada's Innovation Strategy by maintaining close contact with federal government agencies responsible for the roll-out of the national innovation agenda.

Consideration should be given to making this team entrepreneurial in their approach, in that they would be rewarded financially for positive economic results from their efforts.

Examples of specific opportunities that may be explored by the business development team include setting up Application Service Providers (ASP's) in Cape Breton, acting as web-hosts for businesses and organizations, and facilitating off-site storage and backup of data. While these specific commercial initiatives do not form part of our recommendation, they have been identified as potential growth areas and are presented here for illustrative purposes. These initiatives are relatively capital intensive and might best be performed by existing private sector companies in Cape Breton such as EDS Canada Inc. or Stream International.

Application Service Providers (ASP's)

Many organizations struggle with the challenge of installing and operating the information technology operating systems and applications essential to their productivity. Many, too, cannot afford the IT skills required to install and maintain these hardware and

software applications. This is an opportunity for ASP's to provide companies of all sizes the flexibility to focus on their core business, without worrying about their computer hardware, software, databases, network, and IT staff. ASP services provide a computer outsourcing solution that includes computer equipment, software, website hosting, and round-the-clock support, via the Internet from state-of-the-art computer centres.

Web Hosting

According to a study by Convergence Consulting group, the web-hosting market in Canada, of which IBM Canada Ltd. and EDS Canada Inc. are the leaders, will increase by 52% to \$692 million in 2002 and 37% to \$949 million in 2003. The U.S. market is approximately 25 times larger than the Canadian market. The hosting market features three major segments, the most basic of which is shared hosting by a third party of small companies' web sites and e-mail systems. More advanced companies may choose to locate their own equipment at a remote facility that offers services, such as a secure environment and backup power. Many companies are opting for complete outsourcing of their hardware and systems. Depending on the level of outsourcing, companies can save 25% to 70% by using service providers rather than in-house.³⁷

Offsite Data Storage and Backup

Similar to web-hosting and application service provision, companies can now provide affordable and reliable offsite storage of clients' data as a subcontracted service. This is beneficial in that it transfers the data to an offsite location that is typically more secure and expandable and it transfers responsibility to a third-party. Many U.S.-based companies are now adopting this approach for protecting their data.

Recommendation #E-2: Develop a long-term strategy for the commercialization of the wireless sector research.

All stages of innovation and commercialization activity require additional investment. The greater challenge is to target funding to those areas of strength with the best opportunity to stimulate sustainable economic development. University expertise, assets, capabilities, and partnership will be essential. University willingness to be engaged in more applied research will be critical.³⁸ Cape Breton must build partnerships and collaborate more than ever before.

The NRC research lab, in conjunction with the Microelectronics lab at UCCB, appears to be at this point the platform for long-term sustainability in the Cape Breton knowledge-based sector. Its development should encourage a number of other activities in the academic, research, and business communities. An MOU that formally documents a strategy for sustainability of research and knowledge-sharing between the NRC wireless

³⁷ Mark Evans, "Web-hosting seen to grow 52% this year", *The Financial Post*, June 24, 2002, FP-5.

³⁸ Dr. Alan Cornford, Marin Consultants Inc., and Gardiner Pinfold Consultants Ltd., "Innovation and Commercialization in Atlantic Canada", December 2001.

research lab, the UCCB Microelectronics lab, the Cape Breton Growth Fund, and ECBC is a necessity to ensure that all parties are working toward a common, explicit goal.

The CBGF should allocate some funding to ensure that a comprehensive roadmap for the conduct and commercialization of this research is prepared with participation by all parties. The roadmap must be continually monitored and amended as necessary.

Recommendation #E-3: Encourage and facilitate the partnering of private sector companies with research institutions for prototyping and ultimately commercializing wireless technology research. Programs are currently available to assist financially in this regard.

One means of leveraging industry investment is by capitalizing on existing physical and intellectual assets. Thus, universities and government laboratories and agencies must take up the challenge to increase innovation and assist with commercialization on behalf of industry during a transition period. The region must build on its existing resources of universities and research centres, agencies, and key industries.

The CBGF should encourage and proactively match private sector candidates with the appropriate research teams for commercialization possibilities. To assist industry in the costly and time-intensive process of taking a product from the research stage to full-scale application in industry or to a commercial market, ACOA currently has innovation funding available. Its existing Business Development Program provides funding of up to 75% of the eligible costs for private sector companies prototyping and commercializing research. This will help private sector companies obtain some reassurance that the research in which they are assisting has real commercial or industry application possibilities. It will also serve to make the research commercialization process more effective, which may encourage additional public-private partnerships. The business development team discussed in Recommendation #E-1 would carry out the role of encouraging and facilitating these public/private partnerships.

Recommendation #E-4: Support harmonization and simplification of the four Atlantic Provinces' securities regulations to allow ease of entry for investors and simplify equity issues and regulatory compliance for entrepreneurs.

One suggestion that has arisen in several discussions with stakeholders is the possibility of providing capital gains relief for angel investors to allow them to more freely move money between investments or transfer from one investment to another without triggering a tax liability. However, notwithstanding the difficulties in enacting federal tax legislation for a region within a province, the benefit that would be obtained from capital gains relief for angel investors is believed to be minimal, since such investors typically do not move their funds between investments more than once in a lifetime.

Perhaps a more effective means of easing the access to funding is for an advocacy group, such as the Technology Advisory Group (TAG), to petition the provincial governments of the four Atlantic Provinces to amend securities legislation to make it easier for early

stage companies to raise money on the open market. This has been done with some success in the United States and Ontario.

Equity markets play a crucial role in economic development. Capital investment is the key enabler of growth and securities markets must not unduly hinder business access to capital while protecting investors' interests. In Atlantic Canada, already a small market, each province has its own set of very distinct securities regulatory regimes. Few companies in the region now find it cost-effective to undertake the expense of complying with each of the provinces' securities regulations to raise capital through an equity issue. "The fractured nature of the region's securities regulations is one problem that could be dealt with quickly and inexpensively."³⁹

An efficient, liquid equity market encourages other investors to enter the field simply as shareholders rather than as venture capitalists. It thus expands the sources of capital available for entrepreneurs and the number of investment avenues available for those seeking the best return on their money.

While the CBGF cannot provide funding or actively participate in lobby efforts, this point is raised because it is an important issue and a significant impediment to the ability of Atlantic companies to elicit private sector financing.

Recommendation #E-5: Develop a model to exploit distributed work opportunities.

Distributed work describes the practice of working without regard to location by using a combination of modern communications and computing technologies. It often entails working as part of a geographically dispersed team in activities such as research, report writing, and multimedia done largely without traveling to a common site. To the extent that a job involves the creation, manipulation, storage, or communication of information, it is increasingly possible to do that job anywhere that the appropriate information processing equipment and communications links are found. There are numerous economic and social benefits to be gained by enhancing and extending distributed work practices. These include increased geographic independence for employees, greater flexibility in convening project teams for employers, and less use of traditional transportation resources.

Various types of distributed work are reasonably common in the U.S. workplace. Statistics Canada reports indicate that there is a significant increase in the number of Canadians conducting distributed work. In 2001, about one-quarter of households that reported regular home use indicated that at least one member used the Internet for work-related business. This was the case for nearly 1.5 million households, up from just over 1 million in 2000. About 900,000 households reported that at least one household member regularly used the Internet at home for self-employment activities. Almost one-fifth of

³⁹ Atlantic Institute for Market Studies (AIMS), "*Venture Capital in Atlantic Canada: Asking the Right Questions*".

regular home use in 2001 was by employees taking advantage of the Internet to work scheduled hours at home.

Improvements in the capabilities and availability of technology have meant that distributed work can be done more easily now than in the past. The implementation and effectiveness of distributed work, however, are often constrained by the computing and communications applications available to support it. Computing power, in terms of processing speed and available bandwidth, are very important but not always available. However, technology itself is only an enabler of change rather than a direct motivator of change. During a period when Cape Breton's economy is in transition to a postindustrial model, its work force would be well served by having efficient and effective tools for engaging in distributed work, which will provide greater geographic flexibility, expanded employment opportunities, and improved use of the existing infrastructure. Like export markets, distributed work taps into external revenue sources in order to bring earnings into the region.

It is recommended that the economic development team (Recommendation #E-1) conduct public consultations to determine the capacity for distributed work in the rural areas of Cape Breton. The CAP sites, for instance, have an excellent infrastructure and could possibly be used in rural areas and elsewhere until broadband connectivity is widely available. The economic development team should prepare a study that identifies the required infrastructure and workforce skills for conducting distributed work. A member of the team should also act as a broker between distributed work opportunities and the workforce. There is a number of Internet sites, such as www.elance.com, www.guru.com, and www.allfreelance.com, that are clearinghouses for distributed work to which workers could be directed. An initial subsidy could be provided for workers in cases where a subscription charge is required for the service.

Recommendation #E-6: Forge strategic partnerships.

An important factor in developing business in smaller regions in the knowledge-based economy is the importance of strategic partnerships.

There is a strong link between partnership and growth. A survey conducted by the Canadian Advanced Technology Association indicates that companies that have built upon alliances or strategic partnerships grew 37% faster than stand-alone companies. This is true for a number of reasons:

- Partnerships help to spread risk.
- Partnerships increase access to investment
- Partnerships provide an opportunity to leverage resources and a tremendous opportunity to learn.

Many Cape Breton knowledge-based companies are relatively small compared to those that they may be competing against for work. Such businesses should be encouraged to work in partnerships that would allow them to combine their expertise and to attract

larger pieces of work. In order to facilitate this process, a member of the economic development team (Recommendation #E-1) should act as a liaison that would match companies either within Cape Breton or between Cape Breton firms and ones outside the region.

Recommendation #E-7: Establish a program to encourage and assist e-business by the region's small businesses.

E-business is a means by which Cape Breton entrepreneurs can supply goods and services to a worldwide market. Despite the uncertain market and technology failures of the last two years, there is significant evidence that e-commerce continues to grow. Two years ago, for example, *InformationWeek Research's* semiannual E-Business Agenda study reported that the average American company received 10% of its revenue electronically. A year ago, that figure was 14%; this year, it's 17%. The CBGF should establish a program to assist entrepreneurs or small businesses, such as tourism-related enterprises, to conduct e-business. The program could be in the form of relatively small, non-repayable contributions to assist in either the development of commercially productive web sites for existing businesses or to defray the costs of getting connected to the Internet for commercial purposes. Eligible costs would include the costs of obtaining hardware or software for the purposes of engaging in e-business. The Nova Scotia E-Business Info-Guide (<http://www.cbcs.org/ns>) would be a useful resource.

This program would have the positive effect of increasing the connectivity of Cape Breton businesses and increasing the use of technology in revenue generation. It would also make it possible for individuals in remote areas to become more employable in the new economy.

Recommendation #E-8: Establish an economic development advisory group to continually conceive, explore, and evaluate innovative economic development initiatives for the knowledge-based sector.

An economic development advisory group should be formed with responsibility for the knowledge-based sector. While the group would have an ongoing role, its first objective would be to ensure the successful implementation of the strategy approved by the CBGF Board in relation to the proposed recommendations included in this report. Afterwards, it would be a long-term source of new ideas and continued development.

The advisory group should bring together the best available thinkers, innovators, and business people from Cape Breton Island with the common purpose of developing long-term, innovative economic improvement and development strategies. The key objectives of the advisory group would be to raise the level of business activity and reduce dependence on federal and provincial government funds, to help foster an attitude of innovation and creativity among Cape Bretoners, to promote better ways of adding value to existing goods and services, and to develop an implementation plan for their recommendations. The advisory group must have funds allotted to allow for exploration of significant ideas or initiatives. It is envisioned that this group would have an ongoing

mandate, even after the termination of the CBGF Board at which time they would become accountable to ECBC. The group must have a very clear focus and be periodically assessed to ensure that it is adding value to the economy of Cape Breton.

Recommendation #E-9: Establish a program for funding innovative start-up companies in the knowledge-based sector with particular emphasis on those companies that complement wireless sector initiatives.

As globalization continues to integrate the world market and promote large enterprises, smaller regions like Cape Breton face increasing difficulty in retaining their workforce and small to medium scale enterprises. Economists have long recognized a thriving SME sector as one of the key characteristics of a prosperous and growing economy. Business creation is fundamental to the health and progression of an economy in any sector. New businesses contribute to the sustainable growth of the economy in a number of ways:

- By being a major source of innovation and ideas;
- By creating wealth *and* employment;
- By increasing competition; and
- By motivating other entrepreneurs.

A program for funding start-ups, similar to that offered by ECBC in the mid-1990's, should be established to revive the region's pool of start-up companies. The program needs to be flexible in its requirement for equity contributions by applicants, and should not be overly restrictive in terms of eligible costs. For knowledge-based companies, salaries must be considered an eligible expenditure. Consideration should be given to providing special incentives for companies proposing initiatives that are complementary to strategic areas of the knowledge-based sector. While it is recognized that this program poses greater risk than funding existing businesses, start-ups are a vital component of domestic wealth creation and sustainability within the sector and an obvious sign of the economic well being of a region or sector.

In any start-up or transforming market, there will invariably be some commercial disappointments. However, it is important to examine the causes and develop measures to address market failures as they often limit the ambitions of entrepreneurs. The start-ups created through assistance from this program may also benefit from co-location in the same facilities as the NRC wireless and the UCCB Microelectronics Laboratories.

“Not all entrepreneurs succeed, but far from being a sign of economic weakness, this dynamism in firm turnover (i.e. entry and exit) reflects the ability [of a region] to expand the boundaries of economic activity.” “This ‘creative destruction’ is a boon for productive growth.”⁴⁰

⁴⁰ Organization for Economic Co-operation and Development (OECD), The New Economy - Beyond the Hype, 2001.

Recommendation #E-10: Encourage diversification by large corporations currently doing business in Cape Breton and continue to pursue new nationals and multinationals.

It is clear that Cape Breton has much to offer companies. What is not clear, however, is whether the benefits to doing business in this region are being adequately communicated to the appropriate individuals or whether the benefits alone are sufficient impetus to relocate an existing operation. With a limited amount of domestic capital available and increasing outward flows of Canadian investment, the region is relatively more reliant than most other developed economies on external investment to stimulate business development.

Attracting external or existing companies to Cape Breton has long been proven a successful means of creating direct employment, economic development, spin-off business and indirect employment, increased demand for professional services, knowledge transfer, and private investment in commercial and social concerns. Large multi-nationals have recently been profiting from the strengths that Cape Breton has to offer. In return, these companies have made substantial investments in physical infrastructure and have improved the financial and motivational interests of the communities in which they operate.

Cape Breton demographics indicate that there is sufficient workforce capacity for further call centres in the region. Consideration should be given to locating any additional call centres, if at all possible, in outlying areas so that the rural communities might share in the economic benefits that they bring. This would help to increase infrastructure and employment capacity in other non-urban areas of Cape Breton and would encourage spin-off businesses in these regions.

CBGF should encourage and leverage diversification by existing companies, such as Stream and EDS, into other initiatives in the region that require different skill sets than do the call centres. If these companies were to establish blocks of business that typically require individuals with a higher level of education or advanced skill set, then this would create pull for additional enrolment in the educational institutions and increase receptor capacity for the region's highly qualified individuals. The CBGF should also continue its efforts to attract nationals and multinationals engaged in other knowledge-based activity in order to limit its dependence on a relatively small number of companies. This initiative will bring additional employment, economic growth, and a diverse corporate culture to the region.

It should be noted that funding for these types of initiatives would likely be a shared effort by the CBGF and other federal or provincial agencies such as ECBC, HRDC, and the Province of Nova Scotia.

Recommendation #E-11: Establish a program to invest in low-to-moderate risk growth companies that have been unable to raise capital on the open market.

The domestic private sector is playing an increasingly important role in sustainable economic development yet its contribution remains small, particularly so in Cape Breton. Attracting only a small part of the resources available in the private sector would represent a substantial inflow of investment to the region. The challenge is to attract more of these resources to the region and to channel these investments into activities supporting sustainable development efforts.

Due to venture capitalists' hesitation to invest in knowledge-based companies resident in Cape Breton, there needs to be a means of enabling those companies that have survived the start-up period and are at either the pre-commercialization, pre-export, or pre-expansion stage to obtain the funds necessary to grow.

The CBGF should continue to invest in those companies in the knowledge-based sector of Cape Breton that have been proven commercially viable and now require additional funding to export their products or services or to increase their commercial capacity. These investments carry much less inherent risk than those funded by the start-up program. All investments must be carefully researched, monitored, and nurtured.

The program requirements might be such that the applicants must first attempt to obtain private funding prior to seeking CBGF funding. Investments could be in the form of debt or equity but should carry terms equivalent to those of venture capital markets, since a major consideration would be to avoid competition with venture capitalists.

A key component of this program, and one that would differentiate it from other government programming, is that a portion of the funds would be allocated to nurturing the investee companies. This would entail sponsoring of national or international expertise in the investee company's particular field or intended market. An eligible cost or a mandatory requirement of the program would be that the companies seek the individuals with expertise and then obtain the necessary funding from CBGF to pay for their guidance. CBGF should be prepared to assist in the matching of applicants with relevant expertise. It is presumed that the advisors would be CEO's of existing large, national or international companies or consulting specialists in a pertinent field.

It is important to recognize that the CBGF have already demonstrated a willingness to make equity investments and to invest in companies that carry a significant degree of investment risk.

8.4 Build a Culture of Innovation

This component of the strategy addresses the need to create a culture of innovation in Cape Breton. As noted in the Situational Analysis phase of the report, the “new” economy is based on the concept that knowledge, learning, and innovation are essential elements for the creation and maintenance of wealth and competitive advantage. Perhaps the major challenge faced by Cape Breton in fostering a culture of innovation is the recent transition from resource-based industries, like mining and steel manufacture. By their nature, such industries are generally hierarchical and do not reward innovation on the part of individual workers. Making the transition to a culture in which innovative ideas are valued and entrepreneurship is encouraged could potentially be an obstacle to participation in the “new” economy. The recent advances in education levels, however, suggest that Cape Bretoners already recognize the worth of education. Specific strategies that will allow Cape Breton to build on its investment in education are required.

Universities are particularly important in building a culture of innovation in a knowledge-based economy. As research institutions, they are literally creators of new knowledge. In addition to the direct research activities undertaken by university faculty and university-based research centers, universities play a much wider role in fostering a culture of innovation across society. They facilitate research and innovation by linking with the private sector and government and can play a key role in attracting investment in innovative new industries. Their graduating students, the innovators of the future, are an important link in the technology transfer chain. Almost one quarter of Canadian R&D is accounted for by the higher education sector. Within Canada, the Atlantic region trails the rest of the country in expenditures on R&D. On a per capita basis, R&D spending in the four Atlantic provinces is the lowest in Canada.⁴¹

Educational institutions greatly enhance the profile of communities in which they are located, and they have a major impact on local economies through direct expenditures and indirect economic spin-offs. In addition to direct salaries and general operating expenditures, educational institutions contribute to the economy through expenditures by students who spend funds on accommodations, food, books, transportation, and personal items. Most of the direct economic benefit from UCCB is in the Sydney area. The consulting team does not suggest that UCCB change its current structure or primary location. We do recommend, however, that the Cape Breton Growth Fund in cooperation with UCCB explore innovative ways to increase the presence of the institution throughout the region. One such method is noted in Recommendation #I-1 which calls for combining the Applied Microelectronics Lab with the NRC lab in a separate facility located adjacent to Silicon Island.

Governments at all levels, as well as business and community leaders, must develop and implement effective strategies to improve the education and literacy levels among the adult population of Cape Breton. A concerted effort is required to encourage high school

⁴¹ “Our University Students: The Key to Atlantic Canada’s Future”, Atlantic Provinces Economic Council, January 2000

students to complete their Grade XII study requirements and to remain in the education program stream (whether academic, technical or vocational) to develop the skills and attributes necessary to obtain meaningful and rewarding permanent employment. Education requirements for most jobs will continue to rise and the fastest growing occupations will be in the managerial, professional, and technical fields - all requiring high levels of education and technical skill. Substantial and continuous investment resulting in the achievement of measurable progress in addressing education, literacy, and skills development issues is fundamental to the success of this economic development strategy.

The challenges facing Atlantic universities in the context of knowledge-based growth are considerable. In a period of decreased public funding when capacity constraints are already being felt, universities are faced with increased enrolments and demand for new and innovative programs, especially in science and technology disciplines and multi-disciplinary fields that link traditional disciplines to new technologies, such as IT. In order to meet the increased demand for enrolment, more specialized programs, and research, Atlantic Canada's universities must be prepared to make major investments in new facilities, on-going maintenance, faculty, and program offerings. This investment cannot occur without a greater commitment from government and a shift in public policy priorities, with wider recognition of the role that the universities can play in speeding up the rate of transformation to a knowledge-based economy. An enhanced university system is necessary in order to achieve success and promote the region's prosperity in the "new" knowledge economy.⁴²

The knowledge-based sector in Cape Breton must be given the tools to compete in the global marketplace. It is important, however, that an innovative approach be taken. For instance, there should be a requirement for knowledge transfer by any large external companies that are engaged to do business in Cape Breton so that they leave some knowledge behind. This approach, which has been followed by other jurisdictions, will build local expertise regardless of the status of the external organization.

Recommendation #B-1: Engage proactively in Canada's Innovation Strategy.

It is essential that the Cape Breton Growth Fund strategy for developing innovation in Cape Breton dovetail with the national Innovation Strategy. Clearly, the development of a culture of innovation is a long-term goal, as the Government of Canada's recently announced Innovation Strategy recognizes. The purpose of this strategy is to foster innovation in Canada, especially in communities. At the community level, its goals are for

- Governments at all levels to work together to stimulate the creation of more clusters of innovation at the community level; and

⁴² "Our University Students: The Key to Atlantic Canada's Future", Atlantic Provinces Economic Council, January 2000

- Governments at all levels to work together to develop innovation potential of communities across Canada by assessing local strengths, weakness and opportunities.

Canada's Innovation Strategy also calls for three primary community-based targets:

- By 2010, develop at least 10 internationally recognized technology clusters;
- By 2010, significantly improve the innovation performance of communities across Canada; and
- By 2005, ensure that high-speed broadband access is widely available to Canadian communities.

The Knowledge Matters: Skills and Learning for Canadians portion of the Innovation Strategy recognizes challenges that must be addressed in the areas of children's education, post-secondary education, the transition from school to work, adult education, and immigration. In each area, goals and milestones are itemized, as are the ways that the Government of Canada could contribute to the accomplishment of their objectives. One proposal that may help address Cape Breton's declining birth rate is to modernize the Canadian immigration system in order "to ensure the benefits of immigration are more evenly distributed across the country." Although these proposed contributions will be discussed with all stakeholders before they are finalized, they are wide-ranging and substantive. While specific amounts have not yet been allocated for Canada's Innovation Strategy, it is clear that a substantive amount of funding will be required in order to achieve the targets.

The Cape Breton Growth Fund must take a proactive role to ensure that Cape Breton is a full participant in the Innovation Strategy. Recommendation #I-3 suggests assigning a member of the economic development team to ensuring the realization of the Innovation Strategy's broadband commitment. It is essential to the development of the knowledge-based sector in Cape Breton that all aspects of the Innovation Strategy be pursued as actively as possible. It is recommended that the mandate of the economic development team include liaison with the Innovation Strategy representatives.

Recommendation #B-2: Promote the establishment of post-graduate programs at UCCB that support the wireless research activity being performed in the region.

Higher education is vital for ensuring an adequate supply of qualified labour to sustain the growth process. Doctoral or Masters level graduates are essential to innovation and technological change and narrowing the gap between research and its application in industry.

Post-graduate programs at UCCB in disciplines related to the planned wireless and microelectronics research must be established in the short to medium term if the research is to be effectively conducted, applied, and commercialized. While there are some constraints to this occurring in the short-term, such as the requirements for post-graduate

program approval by the Maritime Provinces Higher Education Commission (MPHEC), constant influence should be applied to ensure that these programs are implemented as soon as possible. Any future post-graduate programs in this field should be developed in conjunction with the NRC and Microelectronics research teams.

The CBGF can assist by helping to finance the significant costs involved with the development of a post-graduate program, which often requires contracted services such as curriculum development and proposal preparation for MPHEC approvals.

A readily available supply of highly qualified individuals capable of conducting or supervising research will reduce the necessity for the research labs to look outside the region for this talent and will bring much needed, high-paying jobs to the region. This will ultimately stimulate spin-off businesses and economic development unrelated to the research programs.

Prior to the establishment of a post-graduate program in wireless technology or a related discipline at UCCB, it is very important that funds be allotted for subsidizing graduate students from other universities to conduct research in the strategic areas. This will have economic benefits for the region, sustain the research efforts of NRC and UCCB, and enhance the program development process. The consultants acknowledge that the CBGF has, in May 2002, taken steps to address this issue through the establishment of the “Knowledge-based Industrial Outreach Initiative”. This initiative has been undertaken in partnership with NRC-IRAP, UCCB, and the private sector and will develop a group of interns who will undertake research and development work for local knowledge-based companies. The CBGF expects to contribute \$1,640,000 to this initiative.

Recommendation #B-3: Increase the number of foreign students.

UCCB’s and Marconi’s course offerings indicate that both institutions clearly recognize the value of knowledge-based work, although one of their challenges is that graduates must often re-locate in order to find employment. The recommendations made regarding distributed work and increasing the ICT industrial capacity are intended to help address this issue.

UCCB and Marconi are currently combining to offer an oil and gas course that has attracted students from Angola. This kind of initiative is one that needs to be encouraged. It brings economic benefits to Cape Breton Island since foreign students pay considerably higher tuition and require local goods and services while in residence. This measure will also bring wider recognition of Cape Breton’s post-secondary institutions. UCCB provided the consulting team with a brief organizational chart of a plan to increase the number of international students attending educational institutions in Cape Breton. It is recommended that projects such as this, particularly those that have an engineering, information technology, or electromechanical focus that would be complementary to the Cape Breton knowledge-based sector, be supported by the CBGF.

Recommendation #B-4: Raise the profile of the knowledge-based sector and stimulate entrepreneurship in schools.

One important way of developing the sector in Cape Breton is to raise the profile of knowledge-based work and entrepreneurship in the schools, both for educators and students.

For teachers and guidance counselors, the recommendation is to fund programs in the K-12 system so that they are aware of what options there are in the knowledge-based sector. It is recognized that teachers are front-line workers who can have a tremendous impact on students but require the resources to effect change. As part of this recommendation, technology should be used to facilitate the development of entrepreneurship in Cape Breton. An Enterprise Guide web site should be created with the purpose of providing guidance for teachers in developing entrepreneurship and enterprise skills in their students. The Atlantic Canada Opportunity Agency (ACOA) currently hosts a site called Opportunity Trails (http://www.acoa.ca/e/business/educator/guide2_section1.shtml) that is designed to assist educators in promoting entrepreneurship development. Ideally, the Enterprise Guide web site would not only provide information but would also allow teachers to interact and to exchange ideas and lesson plans. This recommendation may overlap with programs developed as a result of Canada's Innovation Strategy.

For students, a school program should be developed that would encourage participants to develop ideas and design products of the future. A trained teacher and a mentor from the business community, who ideally would work with one student, would facilitate the process. The key is to make innovation exciting and challenging. This recommendation might be incorporated into the broader Innovation Strategy of the Government of Canada. ACOA's Youth Entrepreneurship program might be an additional source of funding for this program. Clearly, the CBGF will have to work very closely with the provincial Department of Education, the regional school boards, and the teachers' unions to ensure that all parties involved achieve the maximum benefit.

Both English language public school boards in Cape Breton face the dilemma of declining enrolment. The Strait Regional School Board has already made efforts to mitigate this situation through technology. They have developed a distance education program that is one of the best in the country and have sought external markets for their services. For instance, the Board has approached the Nova Scotia Department of Education to offer the province's high school correspondence course, which is currently paper-based, through their technology infrastructure.

This venture is an excellent example of an educational initiative that needs to be encouraged. The educational community in Cape Breton (including both school boards, both community colleges, the private colleges, and UCCB) needs to develop a strategic plan, using this type of model, for an Island-wide, potentially exportable education system.

Recommendation #B-5: Stimulate investment through advertising campaign.

As previously noted, one of the challenges faced by Cape Breton is the transition from a culture of dependence to one of innovation and entrepreneurship. The Growth Fund can assist in this process by initiating an advertising campaign in local, regional, and national media that would regularly highlight the successes of regional companies. The purpose of this campaign would be twofold:

- 1) To make individuals within Cape Breton aware that Cape Breton is a good place to invest and to start a business; and
- 2) To inform individuals and corporations nationally and internationally of the benefits to investing or locating in Cape Breton.

Enterprise Cape Breton Corporation has already taken action in this regard with the advertising supplement placed in Maclean's magazine in April 2002. While this was an important step, it needs to be continued locally and nationally.

Recommendation #B-6: Sponsor an annual innovation summit.

The growth of business is driven by ideas, which puts innovation at the heart of economic well-being and business prosperity. Capitalizing on ideas in the knowledge-based economy requires leadership and vision, as well as strong partnerships. An Innovation Summit would be an important step towards communicating a shared vision and developing strategic alliances. It would also raise the profile of Cape Breton as a significant player in the knowledge-economy.

Participants at the Summit would include leaders and decision-makers, entrepreneurs and innovators - all key players in the development of a national innovation system. There should be representatives from public and private research organizations, business and industry (large corporations *and* SME's), academia and education, start-up companies and venture capitalists, and provincial and federal governments. Eminent international speakers could join with their Cape Breton contemporaries in a series of sessions designed to foster intensive interaction and discussion between presenters and participants.

The CBGF should take the lead in facilitating the first series of these annual summits to stimulate activity and recognition of the importance of the knowledge-based sector in Cape Breton.

8.5 Summary

Summary of Recommendations

<i>Strategy Recommendation</i>	<i>Estimated Cost - Low</i>	<i>Estimated Cost - High</i>	<i>Implement. Period</i>
Invest in Infrastructure			
I1 - Establish an Innovation Centre	\$ 5,000,000	\$ 6,000,000	MT
I2 - Combine NRC Research, Microelectronics, and Wireless teaching labs	500,000	750,000	MT
I3 - Acquire Broadband Through National Innovation Strategy	50,000	75,000	ST
I4 - Construct a Cape Breton Portal	100,000	150,000	MT
I5 - Gather Relevant and Timely Statistics	100,000	150,000	MT
	5,750,000	7,125,000	
Enable Sector Growth			
E1 - Fund a Cape Breton Business Development Team	375,000	450,000	ST
E2 - Develop a Long-Term Strategic Plan for the Wireless Sector	100,000	150,000	ST
E3 - Encourage Public/Private Partnerships for Commercialization of R&D	*	*	LT
E4 - Encourage Streamlining of Atlantic Canada Securities Regulations	*	*	LT
E5 - Develop a Model to Exploit Distributed Work Opportunities	75,000	100,000	MT
E6 - Forge Strategic Partnerships	*	*	MT
E7 - Establish a Program to Assist E-business	750,000	1,000,000	ST
E8 - Establish and Economic Development Advisory Group	250,000	300,000	MT
E9 - Establish a Program for Funding Start-ups in the Knowledge Sector	3,000,000	3,500,000	ST
E10 - Encourage Diversification by Existing Companies	*	*	ST
E11 - Invest in Entrepreneurial Growth Companies	8,000,000	10,000,000	ST
	12,550,000	15,500,000	
Build an Innovation Culture			
B1 - Engage Proactively in Canada's Innovation Strategy	*	*	ST
B2 - Promote the Establishment of Post-Graduate Programs	200,000	250,000	LT
B3 - Increase the Number of Foreign Students	100,000	150,000	MT
B4 - Raise Awareness and Stimulate Entrepreneurship in Youth	300,000	350,000	LT
B5 - Stimulate Economic Activity with Advertising Campaigns	750,000	1,000,000	MT
B6 - Sponsor an Annual Innovation Summit	250,000	300,000	MT
	1,600,000	2,050,000	
Total Estimated Cost of All Strategy Recommendations	\$ 19,900,000	\$ 24,675,000	

* These items do not have any estimated costs associated with them because they may have been covered by other recommendations, may be the financial responsibility of other government departments and agencies, or may be to some extent outside the direct control of the CBGF.

Under the heading *Implementation Period*, we have categorized each recommendation as to the estimated timing of implementation, with Short-Term (ST) meaning that the initiative will be substantially completed within the next twelve months, Medium-Term (MT) within one to three years, and Long-Term (LT) three years and beyond. These classifications are subjective and are *not* intended to be a prioritization in terms of economic impact or other measure of importance. It should also be noted that some initiatives designated as MT or LT could start the planning process immediately but the majority of the expenditures would be incurred in years two or three. For example, the establishment of an innovation centre will require 6-12 months of planning to develop capital cost estimates, prepare architectural drawings, arrange financing etc.

9.0 Conclusion

The Situational Analysis identified the following challenges that Cape Breton faces in the knowledge-based sector:

- Shortage of business leadership;
- Declining knowledge-based start-ups;
- Difficulty accessing start-up and early stage financing;
- Changing economic drivers from resource-based economy ;
- Difficulty in creating effective clusters;
- Lack of ICT-related graduate programs at UCCB; and
- Lack of control over r its regulatory environment.

The Strategy has addressed these challenges as much as possible. The proposed economic development team and the advisory group will provide direction in business development and growth. The proposed business investment programs are designed to assist Cape Breton Island start-up and growth companies. By building a culture of innovation, Cape Breton will be better prepared to meet the challenges of the “new” economy. The Innovation Centre concept is founded on the notion of co-location and clustering of key stakeholders, including the NRC, UCCB, and NSCC Marconi...The suggested graduate programs at UCCB in knowledge-based disciplines will promote innovation and aid commercialization of research. The report has identified key areas where proactive engagement with other levels of government will help to make Cape Breton more competitive in the provincial, national, and international environments.

As the world moves towards a more global economy, the importance of innovation as a driver of sustainable economic growth cannot be overstated. Innovation leads to increased competitiveness, which in turn leads to employment generation and wealth creation. Cape Breton’s success in the knowledge economy will critically depend on how well it can exploit its most valuable assets, including the knowledge, skills and ideas of its people.

It is the consultants’ understanding that the Knowledge-Based Sector Task Force, following the completion of this report, is responsible for developing a recommended strategy implementation plan for presentation to the CBGF Board. However, implementation of this strategy will require much more than the efforts and resources of the Cape Breton Growth Fund. All stakeholders in the Cape Breton knowledge-based economy must work together as a unified group to achieve the greatest results for the region.

APPENDIX I - STAKEHOLDERS CONSULTED

Note: The following individuals had opportunity for input into this report through interviews or through the direct mailing of the questionnaire:

Brown, Dr. Keith	University College of Cape Breton
Brown, Lorna	NRC
Boudreau, Carla	EDS
Coleman, Liz	Information Technology Innovation Centre
Couturier, Christian	Director, Atlantic Research Programs, I.I.T., NRC
Coyle, Nick	Techlink International Ltd.
Feener, Sterling	Nova Scotia Community College-Marconi Campus
Fougere, Linda	CAP Society of Cape Breton County
Gauthier, Charles	National Research Council
Georghiou, Matt	Media Spark
Green, Shawn	Virtual Media Productions
Gillis, Phonse	Director of Education, Strait Highlands District Area School Board
Heggie, Murray	Packetware Inc.
LeClerc, Mark	Tesma Precision Finished Components
Lewis, Bert	NS Community College-Strait Area Campus
Mallet, Marc-Alain	NRC
McInnis, Gordon	Acting President, University College of Cape Breton
MacIntosh, Leo	TD Canada Trust
MacKenzie, Scott	LMDA IT Task Team
MacLean, Dave	NS Community College-Marconi Campus
MacLeod, Doug	Stream International
MacLeod, Ken	University College of Cape Breton
MacNeil, Ron	University College of Cape Breton
MacNeil, Wilf	Chair, CBGF Steering Committee
Malcom, John	Cape Breton Regional Health Authority
Martell, Dave	(IRAP) National Research Council
Matthews, Dave	Ocean Nutrition
Milburn, Doug	Advanced Glazings Ltd.
Oulette, John	Strait Highlands Regional Development Agency
Paris, Jim	EDS Sydney
Patterson, Paul	Economist
Penney, Joan	Aliant
Robinson, Mike	Stream International Inc.
Tilley, Fred	Nova Scotia Community College-Marconi Campus
Wareham, Paul	Dynagen Technology Inc.
Whalley, John	Cape Breton Regional Municipality
Wilson, Tom	Chair, Victoria County CAPs

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<http://www.allfreelance.com>

<http://www.mycommunityinformation.com>

<http://www.atlanticzone.ca/>

<http://www.sanantonio.gov/>

APPENDIX III - KNOWLEDGE-BASED COMPANIES IN CAPE BRETON

Company Name and Contact Information	Nature of Business
AG Research 225 Charlotte Street, Sydney B1P 6J7 Tel: 902-562-3202 Fax: 902-563-5077 www.agresearch.ca/	Founded in 1991 and headquartered in Sydney, with satellite offices in Halifax and Dartmouth, AG Research delivers software business solutions to corporations and various levels of government both in Canada and the United States. Their products are tightly integrated with clients' existing systems such as SAP, Oracle, JD Edwards, and SQL Server. AG also hosts applications for such customers as the Bermuda government and various utilities across Canada. Approximately 25% of their revenue comes from export business. They have 26 full-time employees.
Advanced Glazings Ltd 65 Memorial Dr., North Sydney, B2A 3S8 Tel. 902-794-2899	Advanced Glazings' business involves developing and manufacturing harnessing of architectural day lighting. The company began in 1995 and currently has 16 full-time employees. Approximately 90% of the business is exported outside the country and 99% is exported outside Cape Breton.
Alliance Computer Systems 134 Welton St., Sydney B1P 5R8 Tel. 902-564-8700 Fax 902-562-6723	The primary business activities are computer sales and service. The company began business in 1986 and has five full-time employees. Approximately 5% of the company's business is from outside Cape Breton.
Auracom 245 George St., Sydney, B1P 6J9 Tel. 902-562-9555 Fax 902-562-9555	Auracom is an internet service provider franchise. There are Auracom franchises throughout North America. In Cape Breton, it operates with one part-time employee. It began business in Cape Breton in 2001.
B & A Professional Cad Svc 8 Carmichael Dr., Sydney B1S 3R3 Tel. 902-563-6594	
Breton Technology Kollosus Software 653 George Street, Sydney, B1P 1L2 Tel. 902-539-1132 Fax 902-539-1133	
C & L Computers 15032 Cabot Trail Rd., B0E 1H0 Tel. 902-224-2667	The company conducts computer repairs and provides software support. It began business in Cape Breton in 1994 and currently has two part-time and two full-time employees. Approximately 5% of the company's business originates outside the Cape Breton region.
Cape Breton Community Network 70 Crescent St. Suite 103, Sydney Tel. 902-567-3842 http://www.cbnet.ns.ca/cbnet/mainmenu.html	CBNet is an internet service provider established for the purpose of providing the people of Cape Breton with a means to affordable Internet access, utilizing both telco and cable technologies.
Cheticamp Marine Electronics 1088 Belle Marche St. Belle Marche B0E 1E0 Tel. 902-224-3360	The company, founded in 1979, sells and services marine electronics, and has one full time employee. Approximately 5% of the company's business originates outside of the Cape Breton region.
Copol International Limited 69 Hortigan Dr., North Sydney B2A 3M4 Tel. 902-794-9685 Fax 902-794-7592	Copol International is a manufacturer of Polypropylene. The company employs 55 people full-time and exports 100% of its product outside the Cape Breton region, approximately 85% outside of Canada.
DynaGen Systems Inc. 1250 Grandlake Rd., Sydney B1R 1A2 Tel. 902-562-0133 Fax 902-567-0633	DynaGen was founded in 1993. It is a leading supplier of engine driven automation systems technology. DynaGen specializes in emergency and stand-by power applications for residential and commercial sectors. Almost all of its business is exported outside of Cape Breton. DynaGen employs 20 full-time workers.
EDS Canada Customer Interaction Centre 370 Welton Street Sydney B1P 5S4 Tel. 563-4600 Fax. 902-368-6787	EDS Canada Customer Interaction Centre in Sydney was established in 2000. A new Centre is opening in Port Hawkesbury later in 2002. The Interaction Centre is a call centre that supports services such as internet providers and products like computers. When the Port Hawkesbury site opens, EDS will have a total of 1,500 workers on Cape Breton, making it the largest private sector employer on the Island.
EDS Canada Imaging And Data Processing 500 Kings Rd. Suite #208, Sydney B1S 1B1 Tel. 902-563-3280 Fax 902-564-5308	The EDS Canada Imaging and Data Processing unit specializes in capturing, editing, storing, retrieving, displaying and distributing data electronically. This unit can demonstrate applications that fully exploit imaging concepts. As part of SHL Systemhouse, it was established in Sydney in 1995. It currently employs 150 workers.
First Communication 458 Keltic Dr., Sydney Tel. 902-564-4403	First Communication is a fibre cable and cable company that also does network installations. It has approximately 120 full-time employees and exports approximately 85% of its products and services outside of Cape Breton.

Company Name and Contact Information	Nature of Business
Folkus Atlantic 67 Hospital St. Sydney, B1S 2H9 http://www.folkus.com/	Folkus Atlantic is a television, video and new media production house. It was started in 1991.
Future Gen Int. Computers 2 MacIntosh Ave. # 2, Port Hawkesbury B9A 3K5 Tel. 902-625-3334 Fax 902-625-2144	The company, which began in 1976, assembles computers for wholesale and retail and has one full-time and two part-time employees.
Helix Digital Inc. 222 George Street, Sydney, B1P 6Y9 Tel. 902-539-6999 Fax 902-539-2181	Founded in 1999, Helix Digital Inc. provides technical services to producers of classical animation for television & feature film audiences worldwide. Their services include digital ink & pain, compositing, digital backgrounds, special f/x, and Flash production web development.
Hospitality Marketing Concepts	Hospitality Marketing Concepts is a call centre. It opened in 2000 and employs roughly 80 workers.
IBM Canada 340 Keltic Dr., Sydney B1R 1V7 Tel. 902-562-2126 Fax 902-539-2853	IBM Canada, a technology centre, employs three people full-time.
ICT Canada Marketing 325 Vulcan Ave, Sydney, NS B1P 5X1 Tel. 902-563-9050	ICT Canada Marketing is a call centre located in Sydney. The ICT Group operates call centres throughout North America, as well as Europe and Australia.
L&B Computers P.O. Box 256 Louisdale B0E 1V0 Tel. 902-345-2082	L&B Computers, a computer retailer, began in 1994 and employs one person full-time. Approximately 10% of the company's product is exported outside Cape Breton.
Loravan Canada Inc. 262 Commercial Street, North Sydney Tel. 902-794-4177	Loravan Canada Inc. is engaged in the development of computerized sport/practice equipment. The company began in 1999, and has two part-time employees.
Mediaspark It Solutions Inc. P.O. Box 975, Sydney Tel. 902-562-0042	
Merritt Business Machines 280 Townsend St., Sydney B1A 5E9 Tel. 902-539-1716 Fax 902-539-7103	Merritt Business Machines sells and services office equipment. The company began in 1980, has one part-time and two full-time employees.
Moran Dan P.O. Box 542, Baddeck B0E 1B0 Tel. 902-295-2526 Fax 902-295-2528	The company specializes in web design and hosting and has one full-time employee. The company began business in Cape Breton in 1994 and exports approximately 3% of its services outside the Cape Breton region.
Morgan's Electronics 288 Macintyre Lane, Glace Bay B1A 4S3 Tel. 902-849-0311 Fax 902-849-0311	Morgan's Electronics engages in sales of home entertainment equipment and repair of electronics. The company began in 1992 and has two full-time employees.
Nedco Telecom 1212 Upper Prince St., Sydney B1P 6K6 Tel. 902-564-2645 Fax 902-564-2654	Nedco Telecom is an electrical wholesale company that began in the 1960's and currently employs four people full-time and one part-time.
Next Generation Computers 365 George St., Sydney B1P 6K2 Tel. 902-562-6975 Fax 902-564-5193	Next Generation Computers began in 1995 and is engaged in retail sales and service of computers and networks. The company has one part-time and three full-time employees.
Nova Communications 102 Reeves St. Sydney B1P 3C5 Tel. 902-564-4047	Nova Communications, a retailer of wireless communications equipment, began in 1982 and currently employs 40 people full-time. Approximately 10% of the company's business originates outside the Cape Breton region.
Novation Limited 80 Marine Dr., Sydney B1P 6H1 Tel. 902-562-8838 Fax 902-562-7455	Novation Limited began in 1995 and engages in software and electronic design and development.
Packetware Tracking 325 Vulcan Ave, Sydney B1P 5X1 Tel. 902-539-2327 Fax 902-539-1651	Packetware Tracking develops security for the software industry. The company began operations in 1997 and currently employs 27 people full-time.
Quality Connections 327 Windmill Rd., Sydney B3A 1H7 Tel. 902-567-1551	Quality Connections sells business and telephone systems since 1985. The company currently has thirty full-time employees.
Rolling Phones 516 Grand Lake Rd., Glace Bay Tel. 902-564-2255	Rolling Phones, which began in 1991, sells telecommunication equipment and employs 15 people full-time and 11 part-time. Approximately 95% of the company's business is exported outside the Cape Breton region.

Company Name and Contact Information	Nature of Business
Ron Weber and Associates Tele-Services 1173 King's Road Sydney, B1S 3B3 Tel. 902-562-4193 Fax 902-562-6569	Ron Weber and Associates is a call centre located in Sydney. It opened in 2000.
Seaside Cable TV Ltd 1318 Grand Lake Rd., Glace Bay Tel. 902-539-6250	Seaside Cable TV Ltd. is a cable television and internet provider. The company began operations in 1975 and currently employs 19 people full-time.
St. Peters Cable Vision Ltd. Main St., Sydney Tel. 902-539-6250	St. Peters Cable Vision Ltd. is a cable and internet provider that began in 1974 and currently has 25 full-time employees..
Stream International Canada 95 Union St, Glace Bay, NS B1A 6B5 902-842-3800	Stream International is a call centre that supports a variety of services and products both in Canada and the United States. It was established in 2001 and employs 950-1,000 workers.
Surf And Suds 14345 George St., Sydney B1P 1B3 Tel. 902-562-8130 Fax 902-562-5658	Surf And Suds is a computer reseller and internet access site. The company began in 1997 and has three full-time employees.
Techlink International 480 King's Road, Sydney B1S 1A8 Tel. 902-562-6031 Fax 902-562-9882 www.techlinkint.com	Techlink International was founded in 1994 and has its head office in Sydney and sales offices in Halifax. The company has developed a line of gaming products that will allow regulators to operate new and traditional forms of gaming in a responsible fashion. Most of Techlink's business development is directed towards export markets outside Cape Breton in the rest of Canada, the United States, and Europe. The company currently employs 33 full-time staff.
Tesma Precision Components 53 Memorial, North Sydney B2R 3M3 Tel. 902-794-1400 Fax 902-794-4854	Tesma is a subsidiary of Magna Corporation and has been located in Sydney since 1984. Tesma employs 340 workers. They manufacture systems and components for the automotive industry. Almost all of their product is exported outside of Cape Breton.
Thistle Consulting Ltd 70 Sheriff Ave., Sydney B1P 2P5 Tel. 902-562-1023 Fax 902-564-5600	Thistle Consulting Ltd. Began in 1980 and currently employ three full-time and two part-time computer programmers.
Upsource Canada Corp. North Sydney Mall Tel. 902-794-7200	Upsource is a call centre located in North Sydney. It opened in 2001. It employs 71 workers.
Virtual Media Productions P.O. Box 1293, Sydney B1P 6K3 Tel. 902-562-8006 Fax 902-562-8006	Virtual Media Production (VMP) was founded in 1995. It has two focuses: animation and interactive media. VMP has produced animated television programs for CTV and Teletoon. They currently have 8 full-time employees and 4 part-time employees but often employ significantly more during productions. Approximately 25% of their revenue comes from exports.
Voyageur Interactive Technologies Ltd. PO Box 145, Station A, Sydney Tel: (902) 565-8083 Fax: (902) 567-2810	Voyageur Interactive Technologies Ltd. was founded in 1996. Voyageur IT is a designer of multimedia solutions that specializes in creating virtual experiences and interactive resources. With the release of its first CD-ROM title, Parliament Hill: An Interactive Tour Voyageur IT ranks as one of the world's leading developers of Quicktime VR solutions.