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Supporting the Contribution of Higher Education Institutions to Regional Development

Peer Review Report:

Atlantic Canada

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The views expressed are those of the authors and not necessarily those of the OECD or its Member Countries.

This Peer Review Report is based on the review visit to Atlantic Canada region in September 2006, the regional Self-Evaluation Report, and other background material. As a result, the report reflects the situation up to that period. The preparation and completion of this report would not have been possible without the support of many people and organisations. OECD/IMHE and the Peer Review Team for the Atlantic Canada region wish to acknowledge the substantial contribution of the region, particularly through its Coordinator, the authors of the Self-Evaluation Report, and its Regional Steering Group.

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ABBREVIATIONS AND ACRONYMS

AAU	Association of Atlantic Universities
ACOA	Atlantic Canada Opportunities Agency
ACST	Advisory Council on Science and Technology
AIF	Atlantic Innovation Fund
APCCC	Atlantic Provinces Community College Consortium
APEC	Atlantic Provinces Economic Council
CAD	Canadian Dollars
CFI	Canada Foundation for Innovation
CIDA	Canadian International Development Agency
CNA	College of the North Atlantic
CPD	Continuing Professional Development
CU	Cultural Technology
FCAR	Fonds pour la Formation des Chercheurs et l'Aide à la Recherche
GDP	Gross Domestic Product
HE	Higher Education
HEI	Higher Education Institution
HRD	Human Resources Development
ICT	Information Communication Technology
IMHE	Programme on Institutional Management in Higher Education
IPR	Intellectual Property Rights
IRAP	Industrial Research Assistance Program
MPHEC	Maritime Provinces Higher Education Council
NB	New Brunswick
NL	Newfoundland and Labrador
NS	Nova Scotia
NGO	Non-Governmental Organisation
NRC	National Research Council
NSCC	Nova Scotia Community College
OECD	Organisation for Economic Co-operation and Development
PEI	Prince Edward Island
UPEI	University of Prince Edward Island
PRR	Peer Review Report
PRT	Peer Review Team
RGDP	Regional Gross Domestic Product
RSC	Regional Steering Committee
R&D	Research and Development
SER	Self-Evaluation Report
SME	Small and medium-sized enterprise

PREFACE

The Peer Review Team (PRT) has written this report to assist several audiences. The first of these is the higher education institutions and the representatives of the public, private and community sectors who are working together to enhance the development of the four Atlantic provinces of Nova Scotia, New Brunswick, Prince Edward Island, and Newfoundland and Labrador. We hope that the report will help them in this relationship-building process for the benefit of the development of the region. We believe there is considerable potential to further strengthen the concept of a co-operative Atlantic Canada region to realise the future potential of each of the four provinces and their higher education institutions (HEIs) in a way that maintains their respective uniqueness.

The second audience for this report is the many other regions around the world, not part of the project, where there is the opportunity for building co-operation across provincial borders and between institutions in order to enhance regional development outcomes.

We have attempted to present this Peer Review Report (PRR) in a way that is useful to all interest groups, with a minimum of assumptions about local knowledge. We refer to and have drawn upon the region's Self-Evaluation Report (SER, Locke et al, 2007) which is available, along with this report, on the OECD website for the project on *Supporting the Contribution of HEIs to Regional Development*.¹ Both reports are also on the country pages of the OECD website.

We are grateful for the generous hospitality given to the Peer Review Team by the Regional Steering Committee during its week long stay in Atlantic Canada. We are particularly grateful for the assistance of the regional co-ordinator, Dr Wade Locke from Memorial University of Newfoundland and Labrador in St. John's, Ms Elizabeth Beale and Ms Lise Brooks from the Atlantic Provinces Economic Council in Halifax, and the support provided by the Atlantic Canada Opportunities Agency (ACOA) from the Government of Canada.

We have departed from the initial draft OECD reporting template only insofar as the particular characteristics of the region seemed to require this, but not so far as to make inter-regional comparison problematic.

¹ See www.oecd.org/edu/higher/regionaldevelopment.

EXECUTIVE SUMMARY

Background: OECD review

This review of Atlantic Canada is part of the OECD project entitled *Supporting the Contribution of Higher Education Institutions (HEIs) to Regional Development* which has embraced 14 regions in 12 countries. The thematic review project was launched as a response to a multiplicity of initiatives across OECD countries seeking to mobilise higher education in support of regional development. The aim was to synthesise this experience into a coherent body of policy and practice to guide higher education institutions and regional and national governments. At the same time, the project was designed to assist with capacity building in each country/region through providing an opportunity for dialogue between higher education institutions and regional stakeholders and clarifying roles and responsibilities.

Review process

The Peer Review drew on a self-evaluation process guided by an OECD template. This asked HEIs to critically evaluate, with their regional partners and in the context of national higher education and regional policies, how effective they were in contributing to the development of their regions. Key aspects of the self-evaluation related to: the contribution of research to regional innovation; the role of teaching and learning in the development of human capital; the contribution to social, cultural and environmental development and the role of the HEIs in building regional capacity to act in an increasingly competitive global economy.

The Atlantic Canada self-evaluation was co-ordinated by a multi-institutional Regional Steering Committee comprising the Atlantic Canada Opportunities Agency (ACOA), the Atlantic Provinces Economic Council (APEC), the Atlantic Provinces Community College Consortium (APCCC), the Association of Atlantic Universities (AAU), the Council of Atlantic Premiers and representatives of the four provinces. The Peer Review Team – Professor Steve Garlick (Australia), Professor Mario Polèse (Canada), Dr Gordon Davies (USA) and Dr Fumi Kitagawa (Japan) – visited the region in September 2006. The review visit included around 40 meetings across the four Atlantic provinces. The consultations were with the regional steering committee, nine universities, three of the four provincial colleges systems as well as the Atlantic Provinces Community College Consortium, provincial governments, Atlantic Policy Congress of First Nation Chiefs, industry, labour, local authorities, the Federal regional development agency ACOA, research centres, innovation entities, students and regional organisations for higher education and development.²

Atlantic Canada

The size, demography, geography and diversity of Atlantic Canada, its juxtaposition with the rest of Canada and North America, and the presence of multiple actors and spheres of government make it a complex geography for regional development purposes.

². The resulting Self-Evaluation Report and the Peer Review Report are available at the OECD website www.oecd.org/edu/higher/regionaldevelopment.

Atlantic Canada comprises the three Maritime Provinces, *i.e.* Nova Scotia, Prince Edward Island and New Brunswick along with Newfoundland and Labrador. It covers a land area twice the size of the United Kingdom. About 7% (2.3 million) of Canada's population live there. Educational attainment across the region is low by Canadian standards. All four provinces register net out-migration of university graduates, with Newfoundland and Labrador showing the greatest losses. The population is dispersed, with only four cities having more than 100 000 inhabitants and the remainder of the people being spread across many rural towns and small and remote communities.

For most of the past 100 years, the Atlantic Provinces have been poorer than the rest of Canada, although the gap has closed in recent decades. While there are significant differences in the economic performance of the individual provinces, overall the region has had difficulty sustaining economic growth, per capita income, employment rates and R&D investments. A higher share of income in Atlantic Canada comes from government transfers than it does in the rest of Canada. The service industry represents the dominant source of employment. Employment in health and education sectors is relatively more important than for Canada as a whole while manufacturing and business services are less significant. A significant number of employment is still found in the traditional big resource sectors such as forestry, fishing, and mining. These sectors are not typically major players in university-based research.

Key challenges for Atlantic Canada include:

- Retaining graduates, particularly in places outside the few larger cities; improving lifelong learning opportunities in an ageing population; improving literacy and numeracy skills; enhancing the low attractive power of the region for out-of-region and foreign students; and improving employment rates and targeting particularly skills shortage in certain segments of the regional labour market;
- Improving the competitiveness of regional researchers in national research funding opportunities in a number of higher education institutions, enhancing the ability of the community colleges to attract national funding for applied research for community-oriented solutions and, more broadly, aligning university research to community needs;
- Increasing the relatively low level of matching funding provided for innovation in the region by local business, and improving the innovation absorptive capacity of the micro and small enterprises that dominate the local communities in the region.

Higher education institutions' contribution to region building

The Atlantic Canada post-secondary education system has 19 universities and 4 community college systems (with about 50 campuses in total) enrolling 153 000 students: 96 000 in universities and 57 000 in community colleges. Education is a provincial responsibility whereas research and innovation funding support is predominantly federally provided. Each community college system has its own legislative and funding responsibility for higher education.

The higher education institutions range from full-service universities with a significant graduate component (*e.g.* Dalhousie University, Memorial University of Newfoundland, and the University of New Brunswick) to smaller liberal arts institutions (*e.g.* Mount Allison University) and community colleges. Despite the quality and size of the major universities they are mostly minor players from a Canada-wide perspective.

Most higher education institutions recognise the importance of local/provincial/regional engagement. The economic impacts of universities in smaller communities are substantial. For example Acadia

University is estimated to generate 43% of the employment and 62% of the income in the community of Wolfville, Nova Scotia. Even in larger communities universities have an impressive economic impact, e.g. Memorial University is associated with 7% of the employment and 6% of the income in St. John's, New Labrador. Community colleges are estimated to generate nearly 100 000 direct and indirect jobs with Atlantic Canada. In addition they have an economic output effect of CAD 1.7 billion within the region.

There is a growing culture of co-operation across the four provinces to produce region-wide initiatives for the enhancement of higher education's contribution to the region's development. These include *block transfer credit arrangements* which strengthen education pathways across community colleges and universities; *the Atlantic Innovation Fund*, which boosts the capacity for research and innovation partnerships, *Springboard*, which promotes the sharing of resources and expertise among universities to support technology transfer; and *Genome Atlantic*, which promotes fundamental and applied research in genomics across the four Atlantic provinces.

There are also provincial initiatives, such as the *debt forgiveness programmes* aimed at arresting the brain drain of graduate students, and a number of initiatives at individual higher education institutions which enhance the contribution of higher education to the wider community. These include *brokerage bodies* between higher education research and community needs (e.g. the Leslie Harris Centre of Regional Policy and Development at Memorial University); *applied community-focussed research initiatives by the Community Colleges* (e.g. Corner Brook in Newfoundland and at Middleton in the Annapolis Valley in Nova Scotia); *specialist research and consultancy* (e.g. Harris Centre and the Mount Allison University Rural and Small Town Programme); *innovation and technology transfer* between universities and business enterprises (e.g. Genesis Centre at Memorial University, the InNOVAcorp at Dalhousie, the Centre for Community and Enterprise Networking in Sydney, Cape Breton), *entrepreneurship initiatives* (e.g. University of New Brunswick and Memorial University); *a focus on assisting the disadvantaged* (e.g. Holland College and University of Prince Edward Island); *lifelong learning initiatives* (e.g. Mount Saint Vincent University, University of New Brunswick and University of Prince Edward Island) and *support for culture* in its various forms (e.g. L'Université de Moncton and University of Cape Breton).

Suggested directions

The Peer Review Team recognises the significant progress that Atlantic Canada has made in building the co-operative infrastructure for a regional approach. This provides a strong base for further work.

In order to reduce the brain drain, to deliver the enterprising human capital needs of the region's economic base and to assist with a number of productivity and social equity benefits conjoint action is required. For this purpose, the Peer Review Team recommends the following broad directions for consideration in Atlantic Canada:

- Begin discussions around the creation of human capital to meet regional needs that encapsulate all education sectors and include areas such as: pathways between schools, vocational education, community colleges and universities; reduction of duplication and overlap in programme offerings; a focus on the international student as a migration policy instrument; and strong enterprising connections to regional priority areas through initiatives like work-integrated learning;
- Link these discussions to involve the sectors of the community which are traditionally bypassed by higher education such as those with literacy and numeracy difficulties, with older ages, and from disadvantaged communities;

- Consider jointly creating a research granting fund for higher education that focuses on regional priority areas, encourages partnerships with business and community organisations and encompasses also the community colleges;
- Consider creating internal research seed funds within individual higher education institutions focusing on regional objectives;
- Encourage expatriate research experts back to work on key regional priority areas in Atlantic Canada;
- Encourage industry experts into universities to foster co-operative research initiatives with industry;
- Introduce mechanisms in higher education institutions that facilitate student and staff entrepreneurship and innovation, knowledge brokerage for business, avoid excessive complexity in the innovation support environment, and promote close connection of processes of innovation to agreed regional priority areas;
- Establish a competitive regional fund to facilitate collaboration and structural adjustment within and between higher education institutions with the aim to strengthen regional connectivity and to achieve resource savings;
- Recognise the regional engagement function in the quality management performance framework of higher education institutions, along with that for teaching and learning, and research;
- Carry out an audit of regional engagement activities of each higher education institution, with the self-evaluation survey providing a useful starting point;
- Emphasise the importance of social, cultural and environmental contributions in regional development outcomes and recognise their role as providing an important supporting fabric to key economic objectives for the region;
- Integrate a clear regional dimension into the strategies, policies and staff incentive arrangements of higher education institutions, including the institution's management quality performance frameworks.

1. INTRODUCTION

1.1 Evaluation context and approach

This review of the Atlantic Canada region is part of a 14 region evaluation across 12 countries through an OECD project entitled *Supporting the Contribution of Higher Education Institutions to Regional Development*.

The OECD Programme on Institutional Management of Higher Education (IMHE), in collaboration with the directorate of Public Governance and Territorial Development, launched the project in spring 2004 as a response to the wide range of initiatives seeking to mobilise higher education in support of regional development. The project involved: (a) evaluating the current contribution of the HEIs to regional development and identifying the strengths, opportunities, weaknesses and threats to creating a stronger role for HEIs in contributing to better regional development outcomes; and (b) stimulating dialogue between higher education institutions and regional interests, assisting with identification of roles and responsibilities, providing advice at a state and national policy level and laying the foundations of an international network for further exchange of ideas and good practice.

The first stage in the review process involved each region undertaking a self-evaluation of the contribution of higher education institutions to the region's development objectives. Participating regions designated Regional Co-ordinators and Regional Steering Groups to oversee this process of self-evaluation, culminating in the preparation of a regionally agreed Self-Evaluation Report. It is hoped that the Regional Steering Group in each region will continue its leadership work beyond the project. In the second stage, an International Peer Review Team with two International Experts, one being the Lead Evaluator, as well as a National Expert and Team Co-ordinator, carried out a complimentary, but independent, review of the region and its HEIs in the context of the conclusions reached by the region itself through the SER. The entire project was co-ordinated and led through project management at the OECD secretariat and a Project Task Group which was also charged with nominating the members of the Peer Review Teams. An international workshop, held in Copenhagen in October 2006, was a forum for an exchange of regional experiences. A final OECD synthesis report, drawing on these experiences and a comprehensive review of the literature, will be presented in Valencia in September 2007.

The focus of the OECD project has been on mutual co-operation between higher education institutions and regional entities. It has sought to establish a regional learning and interactive capacity-building process through ongoing dialogue. The Atlantic Canada project has been a significant undertaking as it involves dialogue and action across four self-governing Canadian provinces, with a combined population of 2.3 million people, and a higher education system comprising both universities and community colleges. Seventeen universities out of the total of nineteen and four community college systems with more than 50 campuses participated in the self-evaluation survey.

The Peer Review Team notes that significant efforts have already been made to establish mechanisms to build relations across the four Atlantic Provinces and their higher education institutions. Participants in these efforts include the Council of Atlantic Premiers, the Atlantic Provinces Economic Council (APEC), the Association of Atlantic Universities (AAU), the Maritime Provinces Higher Education Council (MPHEC), the Atlantic Provinces Community College Consortium (APCCC) and the Atlantic Canada Opportunities Agency (ACOA).

1.2 The conduct of the evaluation

Self-evaluation process and Self-Evaluation Report

The self-evaluation exercise of Atlantic Canada was co-ordinated by a multi-institutional Regional Steering Committee comprising ACOA, APEC, APCCC, AAU, the Council of Atlantic Premiers and representatives of the four provinces. The committee was chaired by Ms Elizabeth Beale of APEC. Dr Wade Locke from Memorial University provided the Secretariat to the Steering Committee. Details about the Atlantic Canada Steering Committee and its Working Group are at Appendix 2 of this report.

The entire cost of the Atlantic Canada self-evaluation was about CAD 0.5 million. The direct cost of CAD 180 000 was covered by ACOA, and CAD 15 000 was covered by the Leslie Harris Centre of Regional Policy and Development (the Harris Centre) at Memorial University. It is calculated that CAD 300 000 was provided by the different participating institutions (APEC, AAU, APCCC, and Memorial University – including Regional Co-ordinator and other co-ordination functions) as an “in kind” contribution, mostly through staff involvement.

The Peer Review Team has assumed that the Atlantic Canada Steering Committee sought involvement in the OECD project to acquire knowledge that would help to strengthen higher education’s contribution to regional development processes and outcomes. Atlantic Canada is considered in the Self-Evaluation Report to be a loose voluntary association of provinces with some shared history, common economic interests and seeking to achieve various kinds of effectiveness. All four member provinces have undergone a considerable change in recent years and as a group lag behind Canadian socio-economic aggregates. The moratorium placed on the fishing of cod in the 1990s has had a large impact on these aggregate measures.

International Peer Review

The international Peer Review Team (PRT) for Atlantic Canada was established in mid-2006. Professor Steve Garlick (Australia) was nominated the Lead Evaluator, Professor Mario Polèse (Canada) the National Expert, Dr Gordon Davies (USA) the International Expert, and Dr Fumi Kitagawa (Japan) the Team Co-ordinator. Details about the Review Team are at Appendix 1 of this Report.

The Lead Evaluator and the Team Co-ordinator met with members of the Regional Steering Group and a number of other key stakeholders in August 2006 to agree on the procedures for the review, priorities for consultations with the region, and to give feedback on the early draft of the Self-Evaluation Report³. An early draft of the Self-Evaluation Report with a compendium of survey results was submitted to the Peer Review Team at this time along with additional information.

The full Peer Review visit took place between 17 and 23 September 2006. It included meetings with leadership and staff of the higher education institutions, regional development agencies, and officials from government, business and other non-government institutions (For details, see Appendix 3). During and after the visit the Review Team received additional material on particular initiatives that the higher education institutions and other organisations in the region were undertaking.⁴

³ For the OECD guidelines on self-evaluation and Aide Memoire, see the project website www.oecd.org/edu/higher/regionaldevelopment

⁴ The Peer Review Team was split into two to cover all the four provinces in the region. The Lead Evaluator spent a further three weeks touring the region and talking, in particular, to a wide range of non-higher education organisations about regional issues. This was useful in gaining a fuller appreciation of the region.

The Peer Review Team notes that the concept of an Atlantic Provinces approach to higher education and region development is relatively new. It commends the efforts of the Federal Government, through ACOA, as well as the four provincial governments, the community colleges and HEI networks and APEC in fostering a culture of co-operation and providing the support needed to enhance the prospects for a region-wide approach to its future and the role of higher education institutions in the knowledge economy. The Peer Review Team recommends the continuation of these arrangements during the formative period of this significant cross-provincial co-operation.

1.3 Atlantic Canada – key features of the region and HEIs

Among the regions participating in the OECD review project, Atlantic Canada is unique in terms of its size, geography and diversity, as well as the presence of multiple actors and governments and the characteristics of the higher education system. It is a dual system of universities and community colleges where legislative and policy responsibility is held at a provincial level, with a national approach to research and innovation. At the institutional level, most HEIs are small by western standards with many having historical antecedents based on religious denomination.

In terms of demographics, Atlantic Canada is highly decentralised, with only around 35% of the population in the larger cities and the remainder spread among many small communities and towns as a result of early settlement patterns predicated on exploiting the key natural resources of fishing, forestry, mining, and farming more generally. Many of the small rural communities struggle to maintain their viability today in the face of diminishing natural resources or markets for them. There is a drift of younger people to the largest centres of Halifax, St. John's, Moncton and Saint John or outside Atlantic Canada, to the rapidly developing western provinces.

This demographic perspective and dynamic is important for the provision of higher education. On the demand side, higher education may be seen as a “ticket out of town” if students migrate to other provinces after graduation. There is not a strong connection between the creation of human capital, research and innovation through higher education and the development of the Atlantic Canada region. The leakage of knowledge workers can be perceived as an unsatisfactory return on investment in higher education for the provincial governments in the region. It can mean that Atlantic Canada's investment in human capital contributes to the increased competitiveness of other regions. This is important in an economy where population growth is slow and declining and where there is a clear need to boost the region's competitiveness. The key question for the PRT was to identify how the region's human capital resource, as well as its research and innovation, could be maximized for the benefit of the region through the higher education system?

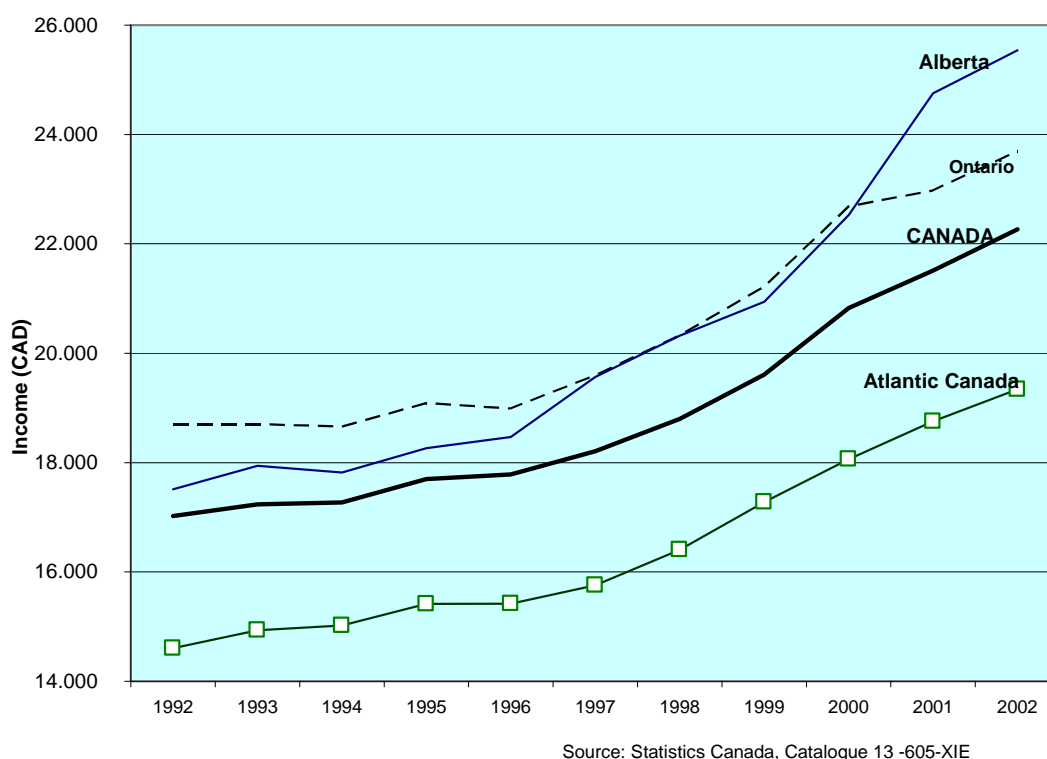
On the higher education supply side there is a question of engagement, flexibility and viability at an institutional level. Higher education governance and funding policy for teaching and learning is vested with the provinces, while research and innovation funding for the region's universities is mostly in the hands of the federal government. The three Maritime Provinces have a number of relatively small universities; there are examples of programme duplication and overlap that could be rationalised. The other element of the higher education system, the community colleges, appear more co-ordinated in their programme offerings but their links with universities are not yet fully developed, and their access to research and innovation money is considerably more limited than that of the universities. Research connections between the universities and the colleges are still quite limited.

Challenges are reinforced by the lack of a mature, globally competitive and innovative economic base. Outside the provision of traditional services, natural resource farming and processing represent a big component of the region's economy. In a modern world where speed is the essence, the physical location of the region and its reliance on high weight/low value-added commodities is a disadvantage. (Recent

development in energy industries may be an exception to this.) The result is an economic profile that features a high reliance on low value-added natural resource products and an abundance of micro and small business enterprises. Such a profile calls for a human capital strategy that is “enterprising” in its focus and aims to create “job makers”, rather than “job takers”.

Figure 1.1 below shows that Atlantic Canada lags behind other regions in Canada in terms of personal disposal income per capita (1992-2002).

Figure 1.1 Personal Disposal Income per Capita by Region 1992-2002



1.4 The structure of this report

The next chapter describes the socio-economic characteristics of Atlantic Canada, the structure of the higher education system and the structure of governance arrangements. It identifies some important underlying challenges that affect the capacity of the region to progress its development objectives in the context of a global economic dynamic.

Chapter 3 examines issues of human resource and human capital development within the regional context. This chapter outlines the structure of teaching and learning and suggests initiatives for enhancing human capital outcomes for the region. Chapter 4 discusses current arrangements in the region for building research and innovation capacity. It highlights a number of structural constraints and suggests several ways to overcome the constraints to research and innovation in the region.

Chapter 5 considers wider approaches to development; the social, cultural and environmental agenda. Here we attempt to look beyond the narrow economic perspective into the aspects that provide the supporting fabric for a sustainable approach to the region's development.

Chapter 6 draws together the discussion in the previous chapters and suggests a number of initiatives the region and its higher education institutions might take by way of capacity building to further strengthen the contribution of higher education to regional development. Our approach in this chapter is to highlight initiatives that both "reach in" to the higher education institutions to make them more responsive to regional needs, and to highlight those initiatives that enable higher education institutions to "reach out" in their knowledge relations with others.

The final chapter provide a summary of conclusions for the region and for wider comparison and draws together the various recommendations that have been stated in the earlier chapters of the report.

This Peer Review Report draws on interviews carried out during a week-long site visit in September 2006, on the findings of the Self-Evaluation Report, and on some additional information provided to the Peer Review Team during and immediately after the review visit. Time constraints did not allow the OECD team to visit every higher education institution or key community in the region or to meet with a wide cross-section of representatives of each. Therefore, the review inevitably represents an overview of an evolving process of development. This review makes observations and suggestions, but no summative judgements.

2. NATIONAL AND REGIONAL CONTEXTS

2.1 Atlantic Canada: overview

This chapter sets the stage for those that follow, which deal more directly with the contributions of HEIs to the development of the Atlantic Canada region and the unique challenges it faces.

Atlantic Canada encompasses the four easternmost provinces of Canada: New Brunswick, Prince Edward Island (PEI), Nova Scotia, and the Province of Newfoundland and Labrador (see Map 2.1).

Map 2.1 Atlantic Canada and the rest of Canada



Much geography, few people

Few regions in the industrialised world face challenges equal to those of Atlantic Canada. Atlantic Canada's natural landscape is spectacular in its rugged and scenic beauty and its wildlife a wonderful attribute. However, this landscape and the climate can be harsh and daunting.

Atlantic Canada covers a land area (539 101 km²), more than twice that of the United Kingdom, yet its total population of 2.3 million (about 7.5% of the Canadian total) is half that of Metropolitan Toronto, Canada's largest city. The region's largest urban area, Halifax, is a sophisticated, pleasant and well-equipped city, but small by world standards with a population of 360 000 (2001 census). The population of the next largest urban area, St. John's, the capital of Newfoundland and Labrador, is 173 000. Below that, only two other urban areas have populations over 100 000: Moncton and Saint John, both located in the Province of New Brunswick. A sense of the immensity of the territory is brought home by the simple fact that more than a thousand kilometres separate Halifax and St. John's, with no land link. One must either travel by car and ferry, about a day's travel, or travel by airplane, about a one-and-half hour flight. The two cities lie in different time zones.

Much of Atlantic Canada is made up of small towns and villages, whose economies have historically depended on fishing, forestry, farming or mining. Almost half of Atlantic Canada is classified as rural, compared to 20% for all of Canada. Some "outports", the name Newfoundlanders use to designate isolated fishing villages, can only be reached by the sea. Three of the region's provinces are islands in whole or in part: Prince Edward Island, Nova Scotia, and Newfoundland – "The Rock", as it is affectionately called by its inhabitants – conveys the lack of fertility of the land. Growing seasons are short and the climate often harsh. Communication remains a major problem. There is no land link between the island of Newfoundland and Labrador. Cape Breton, part of the Province of Nova Scotia, is an island, connected to the mainland by a causeway, while the province itself is a peninsula connected to the rest of Canada by a small neck of land.

A first challenge for the region is to nurture and attract economic activities that are able to profitably thrive in an environment of sparse populations, great distances and harsh climate. This is a challenge in an age where agglomeration economies underpin regional growth and development. Nevertheless, a large urban-based population is not necessarily a requirement for strong regional economic growth. The key is the way the available human capital is utilised to best effect.

The table below (Table 2.1) shows data for Atlantic Canada provinces and the Canadian aggregate across a number of variables that convey the difficulty in terms of the relationship between population size, growth, human capital and income measures.

Distance from major markets

Atlantic Canada sits on the north-eastern edge of the North American continent, far from any large metropolitan area. The nearest urban area with a population above one million, Boston, in the United States, is over one thousand kilometres (by road) from Halifax. The nearest Canadian urban area of comparable size, Montreal, is some 1 300 km from Halifax. This translates into high transport costs, and as a consequence a disadvantage for high volume/ low value added goods that need to be rapidly delivered to market.

Atlantic Canada's small internal market means that its economy is highly dependant on exports. The small size of its internal market means that business start-ups, especially in specialised knowledge-rich sectors, must look beyond the region if they are to expand.

A second challenge for the region is finding goods or services that are able to absorb the transport costs. Local producers must offer an advantage, in quality, creativity or otherwise, which compensates for higher distance costs.

Table 2.1 Selected Data by Province. 2001 Census

Characteristic	Canada	NL	PEI	NS	NB
Population	30 007 000	512 930	135 294	908 007	729 498
% change since 1996	4.0	-7.0	0.5	-0.1	-1.2
Median age	37.6	38.4	37.7	38.8	38.6
% 20-34 with less than a high school diploma	15.6	20.7	19.8	16.1	17.0
% 20-34 with a university degree*	22.9	16.3	17.5	22.8	18.0
Average earnings (CAD, all)	31 700	24 165	22 300	26 320	24 970
Average earnings (CAD, full time)	43 300	37 910	33 510	37 900	36 100
Labour Force Participation Rate (%)	66.4	57.6	69.0	61.6	63.1

* BA or higher NL = Newfoundland & Labrador

PEI = Prince Edward Island

NS = Nova Scotia

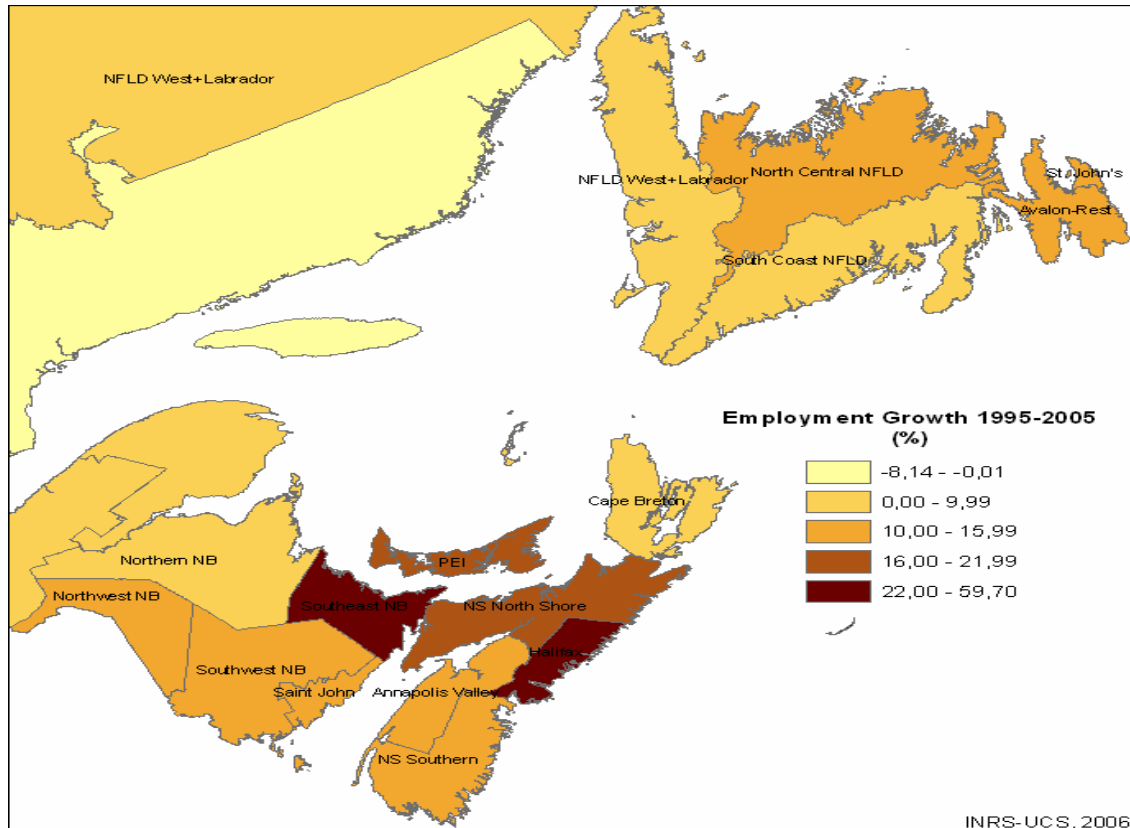
NB = New Brunswick

Source: Statistics Canada: Community Profiles

2.2 Resources and transport

The region's strengths, and they are many, are in almost all cases tied to Atlantic Canada's natural resource base and to its unique geography. Unprocessed resources remain an important source of export income: fish and seafood, timber, ores, agricultural produce and, increasingly, natural gas and petrol, especially in Newfoundland and Labrador, and Nova Scotia. Labrador also has an important untapped hydroelectric potential. Prince Edward Island potatoes are well-known across Canada, as are its mussels. Frozen vegetables and french fries from New Brunswick are a staple in many Canadian households. Fresh (or smoked) salmon served in the chic restaurants of New York are most likely to come from New Brunswick. The region's lobsters and snow crabs are exported around the world and remain lucrative sources of income for many fishermen. Most manufacturing is concerned with the processing of natural resources: pulp and paper mills, fish and food processing plants, smelters, and oil refining.

Map 2.2 Employment Growth 1995 – 2005



The region's other major advantage is its coastal geography and its strategic position as a point of entry into Canada and eastern United States. The role of Halifax as a service centre reaches well beyond the region's boundaries. The port of Halifax is Canada's third largest in container traffic and second largest on the East Coast after Montreal. Halifax is, in principle, in little danger of losing this natural advantage, although competition from mega-ports in the south-east US is increasingly fierce for servicing continental markets. However, as ships become bigger, its role as a port of entry for Eastern North America may well grow. By the same token, the trade corridor (road and rail) linking Halifax with the rest of Canada, on which both Moncton and Fredericton are located, continues to attract transport-sensitive activities. This development corridor (Map 2.2), the most densely settled part of the region, is the spinal cord of the Maritime urban system and economy.⁵ Halifax is also home to Canada's largest naval base on the Atlantic seaboard, a major source of employment.⁶ Together with its numerous institutions of higher learning (see Table 2.2), coastal and defence functions, as well as other services including wholesale services, government, health, and related professional and scientific services, Halifax remains the region's primary service centre, drawing in migrants from the rest of Atlantic Canada.

⁵ The three provinces of Nova Scotia, New Brunswick and Prince Edward Island are traditionally referred to as the Maritime Provinces, as distinct from "Atlantic Canada", which also includes Newfoundland and Labrador.

⁶ Defence-related activities accounted for some 9 000 jobs in the greater Halifax area (2001 census).

The region's second largest urban area, St. John's, is also primarily a service centre;⁷ with transportation, distribution, communications, government and related professional services again playing an important role; but with the notable difference that St. John's' trade area is largely limited to Newfoundland and Labrador. St. John's is also home to Atlantic Canada's largest university, Memorial, measured in terms of enrolment (Table 2.2). The recent upsurge in offshore oil and natural gas exploration (and exploitation) has infused the city with a new dynamism, spurring a growing engineering and construction sector linked to the offshore, as well as filling provincial government coffers with much-needed revenues.

Table 2.2 Location and Enrolment Data of Atlantic Canada Universities and Community Colleges

Institution	Main Campus	Enrolment 2004
Atlantic Canada – Combined		153 091
Memorial University	St. John's, NL	18 325
University of Prince Edward Island	Charlottetown, PEI	4 049
Université Sainte Anne	Church Point, NS	518
Acadia University	Wolfville, NS	4 134
Atlantic School of Theology	Halifax, NS	148
Cape Breton University	Sydney, NS	3 584
Dalhousie University	Halifax, NS	15 814
University of Kings College	Halifax, NS	1 043
Mount St. Vincent University	Halifax, NS	4 592
Saint Mary's University	Halifax, NS	11 975
St. Francis Xavier University	Antigonish, NS	5 271
Nova Scotia Agricultural College	Truro, NS	596
Nova Scotia College of Art & Design	Halifax, NS	949
Mount Allison University	Sackville, NB	2 478
St. Thomas University	Fredericton, NB	3 234
Université de Moncton	Moncton, NB	6 400
University of New Brunswick	Fredericton, NB	12 725
College of North Atlantic (17 campuses)	Stephenville, NL	21 355
Holland College (11 campuses)	Charlottetown, PEI	6 436
Nova Scotia Community Colleges (13 campuses)	Halifax, NS	21 745
New Brunswick Community Colleges (11 campuses)	Fredericton, NB	7 720

Source: Self-Selection Survey but enrolment data for universities taken from the AAU economic impact report.

The case of Moncton in south-eastern New Brunswick, the region's fourth largest urban area with a population of about 115 000, is worthy of note as an example of growth not primarily driven by natural resources. Moncton is a distribution and communications centre and a hub for regional courier services helped by its strategic location at the geographic meeting point of the three Maritime Provinces. Moncton's growth, as well as that of its surrounding region, has also been spurred by its emergence as the intellectual and business centre of the French-speaking Acadian community, mainly concentrated in New Brunswick⁸,

⁷ In both Halifax and St. John's, manufacturing accounts for about 5% of total employment, of which food (and fish) processing is by far the largest component.

⁸ New Brunswick is the only officially bilingual province in Canada. French-speaking Acadians account for approximately one-third of the province's population. Their proportion is about the same in the greater Moncton area.

symbolised by the presence of *l'Université de Moncton* (see Box 2.1). The Acadian credit union and other Acadian-based businesses have their head offices in Moncton. Its central position and bilingual character have also made Moncton an attractive location for administrative offices and agencies aiming to serve the entire region; the head offices of the Atlantic Lottery Corporation and of ACOA are notable examples. The presence of the Atlantic Lottery Corporation has in turn spurred an emerging local software industry specialised in gaming and related computer-based products.

Box 2.1 L'Université de Moncton: A symbol of local cultural pride and catalyst of economic development

The struggle for cultural survival of the Acadian people numbering some 300 000 in Atlantic Canada, goes back more than three centuries. Long a people largely dependant on the fishery and agriculture, Acadians have emerged as one of the most dynamic elements in Atlantic Canada, with a vibrant entrepreneurial class and strong community leaders. The cultural revival and the surprising economic vitality, especially of south-eastern New Brunswick centred in Moncton, has sometimes been referred to as the "Acadian Miracle". The *Université de Moncton* has been a central player in this miracle. Incorporated in 1963, the largest fully French-language university (with regional campuses) outside Quebec, it rapidly became a symbol of the coming-of-age of the Acadian people, a beacon not only for Acadian artistic life, but also for scientific achievement, community initiatives and economic development of the French communities in New Brunswick. The university has produced three provincial premiers and community and government leaders, entrepreneurs and professionals. Some 80% of its graduates have remained in New Brunswick; the percentage is even higher for Atlantic Canada, a sign both of the university's bond with the community and the attachment of Acadians to the region.

2.3 Industry-HEI relationships

The knowledge-based economy and industry-HEI relationships

The Moncton example illustrates that it is by no means impossible to develop knowledge-rich activities in Atlantic Canada. The region's nascent high-tech manufacturing industries are largely concentrated in the Fredericton-Moncton-PEI-Halifax corridor, with the latter capturing the lion's share (Figure 2.1)⁹. Most research-based activities, whether in HEIs, consulting or manufacturing, are in fields directly or indirectly related to Atlantic Canada's rich natural resource base or its coastal geography: marine and ocean sciences, aquaculture; potato genomes; offshore drilling; biotechnologies and biochemistry as related to ocean resources; and so on. However, formal R&D remains low compared to the rest of Canada (Table 2.3).

Total R&D spending is well below that in the rest of the nation, 46% of the Canadian average on a per capita basis, a proportion that has barely changed over the last decade. The track record is much better for research expenditures in HEIs, but still below the Canadian average, with the exception of Nova Scotia, a reflection of the dominant position of Halifax as the region's centre of research and higher education.

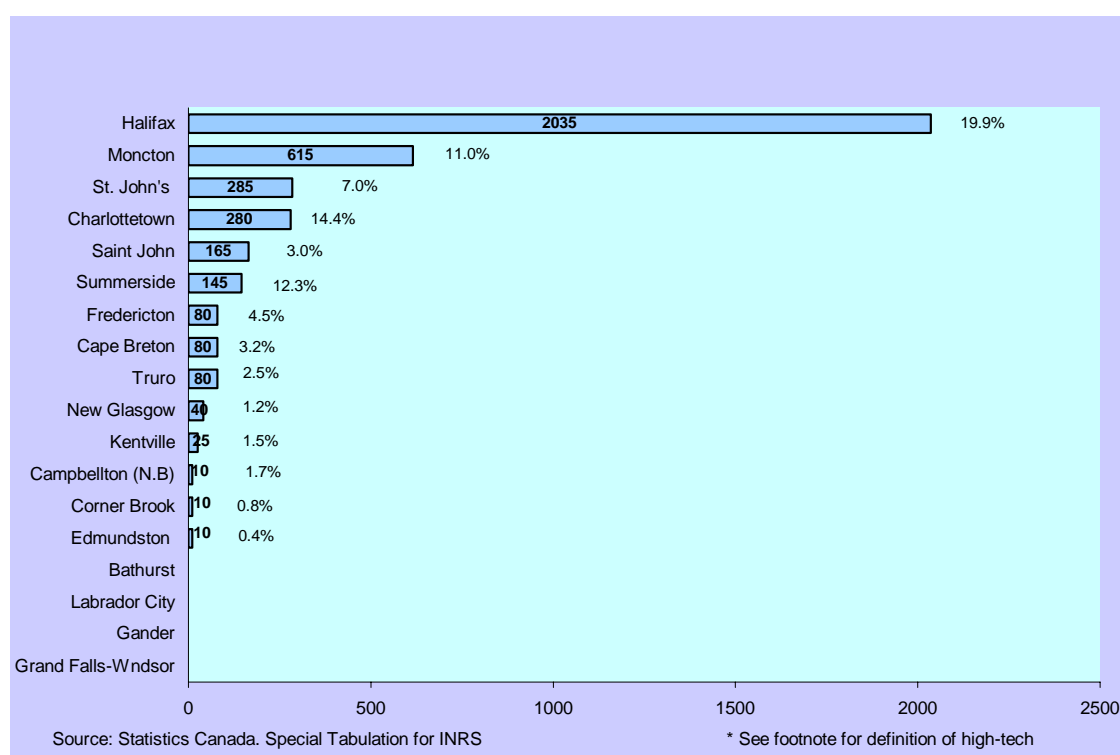
The relatively low level of formal R&D in Atlantic Canada is not necessarily an indication of a low level of innovation for Atlantic businesses. A recent study suggests that Atlantic manufacturing establishments are on average just as innovative, if not more so, than those elsewhere in Canada (Beaudin and Breau, 2001). Nor is there any evidence to suggest that Atlantic Canadians are less entrepreneurial than other Canadians. Indeed, one could reasonably argue that Atlantic Canadian firms need to be even more innovative than those elsewhere given the challenges of geography and distance. The low level of formal R&D is in part a reflection of the structure of the Atlantic economy; for many firms innovation and

⁹ High-tech manufacturing on Figure 2.1 includes the following industries: Pharmaceuticals; Computers and related electronic products; Aerospace products and parts; Medical equipment and supplies. In Nova Scotia, the overwhelming proportion of public research funding, in the order of 80%, goes to institutions (universities, hospitals, etc) in the Halifax area.

competitiveness are not necessarily tied to high-end basic research but rather to more applied research and to on-the-floor improvements and continual learning and the adoption and adaptation of new technologies and techniques.

The traditional big resource sectors, forestry, fishing and mining, are typically not major consumers of university-based research. Many large resource firms have their headquarters outside the region which constitutes an additional difficulty in building up significant industry-university research relationships.¹⁰ Also, Halifax-based universities do not seem to have drawn major research benefits from the city's role as Canada's chief naval base on the Atlantic.

Figure 2.1 Employment in High-tech Manufacturing (Total and as a % of total manufacturing employment. Urban Areas. 2001)



In short, the region's industrial structure creates a special challenge for HEIs regarding the development of a research and training relationship with local industry. However, Atlantic institutions are by no means inactive in this area: the most recent Statistics Canada survey (2005) shows that they obtained 4% of sponsored research funding and accounted for 5% of inventions disclosed, 4% of inventions protected and 7% of spin-off companies created, an additional sign that the entrepreneurial spirit is alive and well in Atlantic Canada. But the region lags in both new and total licenses and options (2%), as well as income from intellectual property commercialisation (1%), undoubtedly a reflection of the small size of the firms and contracts involved.

¹⁰ The main industry-funded research centre on forestry in Canada is, for example, located in the Montreal area.

Table 2.3 Science Expenditures in Atlantic Provinces

	NL	PEI	NS	NB	Atlantic	CANADA
R&D expenditures in higher education* 2004-5 (in millions CAD)	115	24	266	114	519	9 000
% of Canada	1.3	0.3	3.0	1.3	5.8	
Per Capita Ratio	0.80	0.62	1.02	0.54	0.79	1.00
1994-5 (in millions CAD)	59	4	113	54	230	3 674
% of Canada	1.6	0.1	3.1	1.5	6.3	
Per Capita Ratio	0.83	0.23	0.97	0.57	0.77	1.00
Total expenditures on R&D** 2003 in millions CAD	161	42	410	194	807	23 992
% of Canada	0.7	0.2	1.7	0.8	3.4	
Per Capita Ratio	0.42	0.41	0.59	0.35	0.46	1.00
1994 in millions CAD	108	17	265	134	524	13 341
% of Canada	0.8	0.1	2.0	1.0	3.9	
Per Capita Ratio	0.42	0.27	0.62	0.39	0.48	1.00

Source: Statistics Canada; cat 88-001-XIE. *Service Bulletin Science Statistics*.

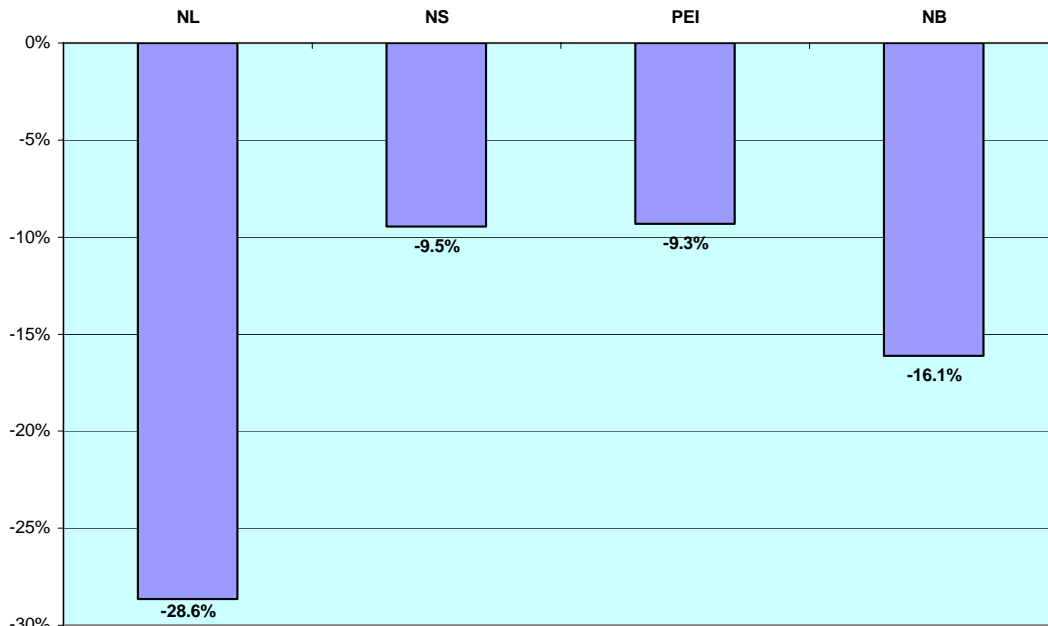
* Vol. 30 No 5. 2006. **Vol. 29, No 8. 2005

2.4 Interregional competition for resources and the lure of the West

The challenge to HEIs in Atlantic Canada is compounded by the competitive nature of the Canadian educational system and the high mobility of human capital. The region's HEIs attracted less than 6% of Canada's relevant research expenditures. Competition for research funds among HEIs is fierce in Canada. Federal granting councils and government departments remain by far the chief source of research funding for Canadian universities, particularly for basic research. Despite the undisputed quality of Atlantic Canada's major universities they remain relatively minor players in attracting competitive grants from a Canada-wide perspective. The absence of a large metropolis remains a handicap. Halifax, St John's and Fredericton¹¹ do not offer the diverse knowledge-rich environment and international connectedness equivalent to that of Vancouver, Montreal or Toronto. The region's industrial structure and small internal market also limit the capacity of local HEIs to access industry research funds.

¹¹ These three cities are home to the region's four largest universities, with enrolments above 10 000 (see Table 2.2)

Figure 2.2 Net Migration Rates for University Graduates Aged 20-34 (as a % of all graduates in the province aged 20-34 in 2001) by Province, 1996-2001



* B.A. degree or higher

Source: Statistics Canada. Special Tabulation for INRS

NL = Newfoundland and Labrador

NS = Nova Scotia

PEI = Prince Edward Island

NB = New Brunswick

The *relative* position of the region within Canada creates another challenge, which affects the capacity of HEIs to respond to the human resource needs of the region. Historically, the Atlantic provinces have been poorer than the rest of Canada, although the gap has closed in recent decades. The indicators show that Atlantic Canada falls systematically below the Canadian average in per capita income, employment rates and other measures, although there are important differences between provinces (see Self-Evaluation Report).¹² Canadians, like all North Americans, are highly mobile.¹³ The result is that the region as a whole experiences net out-migration, with numerous communities exhibiting population loss, especially outside the Halifax-Moncton-Fredericton corridor and in Newfoundland and Labrador outside the Avalon Peninsula (St. John's). The most mobile are the most educated. All four provinces register net negative (out) migration rates for university graduates (Figure 2.2), with Newfoundland and Labrador showing the greatest losses.

¹² Newfoundland and Labrador is historically the poorest province with the lowest per capita income – about 80% of the Canadian average – and with the highest unemployment rate. Prince Edward Island, although the second poorest, generally registers fairly high labour force participation rates, an indication of two very different economies and labour markets.

¹³ This is somewhat less true for Francophones (Acadians), First Nations and the Inuit people.

The out-migration of university graduates is fuelled by job opportunities and higher relative wage rates elsewhere. Historically, migrants have primarily gone to southern Ontario, mainly greater Toronto and Alberta. The problem has become more acute due to the surge in oil prices and the corresponding growth of the Alberta economy.¹⁴ By some accounts, Alberta today harbours the second largest (known) oil reserves on the planet. The attraction of Alberta is almost irresistible for many new graduates, especially for those in communities where job opportunities are few. Not only are jobs immediately available in the Alberta oil patch (candidates are reportedly sometimes hired right off the plane), but wage differentials are considerable. A doubling of salaries is not unheard of. The pressure for graduates to leave the Atlantic provinces is also compounded if the graduate has incurred a large student debt. Tuition fees vary between provinces, universities and disciplines averaging CAD 25 000. About 50% of students graduate with debt.¹⁵

The impact on the Atlantic region's stock of human capital is apparent from these two push and pull effects. The percentage of the population between the ages of 20 and 34 with a university degree (Bachelor's degree or higher) is below the Canadian average.¹⁶ Yet, its universities produced an above average number of undergraduate degrees (Ruggeri and Zou, 2005). Atlantic Canada appears to be particularly strong in scientific disciplines, agricultural and biological sciences, mathematics and physical sciences, engineering and applied sciences, where one would normally expect local demand to be the greatest. The same study suggests that Atlantic Canada also produces an above-average number of community college diplomas. Provincial spending on a per capita basis in Atlantic Canada for post-secondary education, including operating grants to universities, is in general close to or above the Canadian average (CAUT, 2004).

Out-migration raises questions about the provincial nature of higher education institution funding and the decentralised nature of population in Atlantic Canada¹⁷. An inter-provincial compensatory regime, whereby poorer (out-migration) provinces are in part compensated by richer in-migration provinces, would enable equilibrating policies to reduce inter-provincial disparity. Given the unlikelihood of this occurring, some of the provinces in Atlantic Canada, have attempted to ameliorate the human capital loss by introducing financial incentives. For example, the Government of New Brunswick has introduced a programme that offers university graduates (from any Canadian university) who settle in New Brunswick, an annual incentive of between CAD 2 000 and CAD 10 000 for off-setting against their student debt. Nova Scotia has introduced a debt forgiveness programme for students staying in the province after graduation and also a tuition rebate programme where each full time student receives a bursary CAD 440 a year.

Debt forgiveness, lower tuition and other financial incentives may incite some graduates to stay in the region but this can also reduce the local resources available to universities and colleges already at a

¹⁴ Thus, out-migration to the rest of Canada from Nova Scotia – arguably the least human capital challenged province – rose from 15 859 to 20 416 between 1 July 2003 and 1 July 2006. We may assume that the majority of this increase is due to Alberta. The equivalent numbers for Newfoundland and Labrador are 10 424 and 14 912 – a 40% increase (Statistics Canada, 2006).

¹⁵ Within Nova Scotia, the range of tuition fees in Arts programmes ranged from ACD 5 500 to 8 062 for the academic year 2006-2007.

¹⁶ According to Statistics Canada 2001 census, the figure was 20% for Atlantic Canada, compared to 23% for all of Canada. However, Nova Scotia with 22.8% came close to the national average.

¹⁷ There is some debate as to the true extent of the outflow. The majority of graduates tend to stay in the greater region, though not necessarily in the communities where they received their degree. The problem is obviously more acute in some places than in others. However, overall net migration rates for university graduates are negative in all four provinces.

disadvantage compared to universities in Canada's largest cities. It is reasonable to assume that the revenues foregone will be born by provincial departments of education. Continued spending on higher education institutions is necessary if they are to remain competitive, and a debt forgiveness plan may cause out-migration to accelerate if it leads to a revenue neutral increase in overall tuition fees for institutions. This is a classical dilemma for regions of out-migration in which higher education is in whole or in part locally funded. It raises the issue of the mission of the university (or college) as a teaching institution: What should be the appropriate balance between the institution's responsibility to maximise the life chances of students generally through education, in which case out-migration is not an issue, and its role as a contributor to the collective good of the local community, province, Atlantic Canada or Canada as a whole? With the increasing importance of knowledge as a key competitive regional attribute in a global economy, there is additional pressure on HEIs to deliver on knowledge locally.

The answer will vary with the division of costs between students and the general taxpayer, but also with the nature of the community and of the institution. A higher education institution located in an area of acute out-migration, such as Cape Breton University, is faced with very different challenges than a large university located in a major centre such as Dalhousie University in Halifax.

2.5 Many actors: diversified and decentralised governance structures

The recognition of Atlantic Canada as a unified region is a product of its political position within the Canadian Confederation as well as its geographical attributes. After Newfoundland and Labrador joined Canada in 1949, the term "Atlantic Canada" came into use to designate the four provinces lying on the Atlantic seaboard. Over time, elements of a common identity have been forged, if only to defend the region's interests against the richer and more powerful provinces and in order to co-ordinate the meagre resources of Canada's four smallest provinces. Several co-ordinating bodies and lobbies have come into being; most notably the Council of Atlantic Premiers and the Atlantic Provinces Economic Council. The region's universities have come together to form the Association of Atlantic Universities and more recently, the Council of Atlantic Premiers has sponsored the creation of the Atlantic Provinces Community College Consortium, which co-ordinates initiatives such as block transfer agreements between provinces (see Chapter 3, Box 3.2).

All such inter-provincial agreements and associations remain voluntary. No supra-provincial body exists with legislative and spending powers at the regional level. However, ACOA has acted as a powerful force within the federal government driving region-wide initiatives (see Box 2.2). It is, however useful to note that ACOA does not have a mandate for human capital development although it is involved in job creation/community support initiatives. This has a bearing on ACOA's ability to support the region in human capital development.

Box 2.2. ACOA (Atlantic Canada Opportunities Agency): A regional development agency that reconciles central financing and accountability with regional control

ACOA is the principal instrument of the Canadian Federal Government for promoting economic development of the Atlantic Provinces. Its unique character lies not so much in its policy tools, discussed in more detail elsewhere in this report, as in its position within Canada's government structure. Its unique position gives it direct access to the upper echelons of political power while at the same time ensuring its autonomy as a regional agency. ACOA is in effect a separate ministry with its own responsible minister, elected from the region, ensuring that the region's voice is heard in cabinet. By the same token, its status as a separate government department allows it to develop distinct policies adapted to the region, as well as allowing for a high degree of flexibility. ACOA's head office is located in the region where final decision-making power resides, advised by a local board, in accordance with the normal rules of ministerial consent and parliamentary accountability.

Founded in 1987, another positive asset is ACOA's longevity – all too rare in public initiatives; this has allowed ACOA to experiment and to learn and, above all, to establish its credibility as an essential partner across the region,

working in conjunction with provinces, local authorities, business, community groups, and HEIs. A number of measures have been developed over the years to increase the HEI's contribution to regional development. Some extend to a large number of HEIs, while others are stand-alone projects with individual HEIs.

Announced in 2000, the Atlantic Innovation Fund (see Box 4.1) has proven to be a key catalyst in encouraging partnerships among businesses and the research community, including HEIs. The Export Internships for Trade Graduates (EITG) programme is another example of an ACOA initiative involving HEIs. The Agency, in partnership with Atlantic Canadian post-secondary institutions, places university students who completed formal training in the area of trade with companies actively pursuing new export markets. The programme provides hands-on, trade-related work experience for students, while contributing to the export performance of the region by providing SMEs with in-house trade expertise. ACOA also works with universities in the region to support their international recruitment efforts, and is considering ways of strengthening the role that HEIs in the region play with regard to immigration and the retention of international students.

In matters relating to higher education, the four provinces are sovereign. The Canadian constitution makes education a provincial jurisdiction. No national department of education exists. Local government is also an exclusive provincial jurisdiction. In the end, any common strategy in relation to higher education working with local communities cannot go beyond what the provinces are willing to agree to, and to jointly enforce through mutual co-operation.

Canada is a highly decentralised federation. Each province has its own history and institutional culture. This also holds for post secondary education. Thus, the origins and structure of Nova Scotia's university system are very different from those of Newfoundland and Labrador. In the later case, the university system is entirely state-initiated, with a single university, Memorial University, whose main campus is in St. John's. In Nova Scotia, in contrast, a number of generally smaller universities were founded, in general, by religious communities of various denominations. The relationship between the province and the universities varies in each case. In New Brunswick two parallel systems, English and French, function side by side. The organisation of community college systems also varies between provinces.¹⁸

The range of university institutions in Atlantic Canada runs the whole gamut from large full-service universities with a significant graduate component, such as Dalhousie, the University of New Brunswick, and Memorial, to smaller liberal arts institutions such as Mount Allison. Community colleges are different again. Neither are the governance structures homogenous across the region. Pay scales, hiring practices, organisational structures and promotion criteria vary from institution to institution. University (and college) employees are not, as in some European nations, considered civil servants.

To add to the complexity, the Government of Canada is also an important player in the university system via its impact on research funding and through the research installations and institutions it administers on the ground. The Department of Fisheries and Oceans runs the Canadian Coast Guard College, located in Cape Breton. The National Research Council has four laboratories in the region; one in each province. The federal government, via four departments, finances the Bedford Institute of Oceanography, the largest of its kind in Canada, located in Dartmouth. As noted earlier, the four Federal Research Councils, plus Canadian International Development Agency (CIDA) and Canada Foundation for Innovation (CFI),¹⁹ are also major sources of federal research funding and as such have an influence on the

¹⁸ The post-secondary education system in Atlantic Canada is described in greater detail in Chapter 3.

¹⁹ Canada Foundation for Innovation (CFI) is an independent corporation established in 1997 by the federal government to strengthen Canadian capability for research. Canadian International Development Agency (CIDA) supports sustainable development activities in order to reduce poverty and to contribute to a more secure, equitable and prosperous world. Established in 1999, Canadian Institutes of Health Research (CIHR) is the major federal agency responsible for funding health research in Canada. National Research

research agenda of HEIs. The Government of Canada is not obligated to co-ordinate its actions with higher education institutions with provincial or local authorities, although it often does.

In the past, federal provincial co-operation agreements were the mainstay of many regional development initiatives in Atlantic Canada. Today they have fallen out of use and the federal government and provinces co-operate on a select basis. The plethora of actors, institutions, and governments can leave the impression of a lack of planning and co-ordination. But this is not the case. Co-ordination is often informal, which might make formal region-wide strategic planning exercises more difficult. But it also leaves ample room for experimentation, invention and flexibility when dealing with specific issues.

A region of regions

The diversity of institutional and governance structures is in part a reflection of the region's economic, cultural and social diversity. On strictly economic criteria, Atlantic Canada is a composite of regions. Statistics Canada identifies some fourteen economic regions for its labour force survey, plus eighteen urban agglomerations for census purposes. These are separate labour markets and local economies. Each warrants an analysis in its own right; but this is beyond this evaluation. A few examples will suffice to convey the diversity of Atlantic Canada's numerous communities.

The fertile soils and mild climate, by Canadian standards, of Nova Scotia's Annapolis Valley, for example, offer a very different environment from that of the Western Shore of Newfoundland. The Annapolis Valley is within relatively easy reach of Halifax and has access to a direct ferry connection to New England, while Western Newfoundland is almost a thousand kilometres from St. John's and even further from North American markets. The Annapolis Valley's economic base is largely founded on diversified agriculture and manufacturing, while Western Newfoundland's economy is still very much dependent on a single pulp and paper mill, located in Corner Brook, and on fishery. Employment will most probably remain stable in the Annapolis Valley, and perhaps even grow, but job losses seem almost unavoidable in Western Newfoundland. Employment in the paper mill and in forestry will in all probability decline in the future as productivity increases; the fishery is no longer a source of job growth. However, Corner Brook, the province's second city, is also an important regional service centre, home to the Sir Wilfrid Grenfell College campus of Memorial University as well as a major campus of the College of the North Atlantic. Hopefully, this strong institutional base – together with the undeniable tourist potential of the area – will allow Corner Brook to build an alternative economic base less dependant on natural resources.

Not all places are so fortunate. Atlantic Canada is peppered with one-industry communities, dependent on a paper mill, mine, smelter, or transport facility. The Brunswick mine (with about 800 employees), one of the world's largest zinc mines, and the nearby Belledune smelter (about 400 workers) remain the chief sources of employment for the town of Bathurst in north-eastern New Brunswick. By current estimates, the mine will soon run dry. In contrast, the town of Edmundston, of about similar size, located on the north-western tip of New Brunswick, is not dependant on a single industry. The challenge to local community colleges and university campuses will be different in each location, and the type of relationship with the community will also be different. Such relatively small urban centres, which constitute separate labour markets, also present very different economic and social environments from those of larger diversified urban centres such as Halifax and St. John's. Relations between the community and an HEI will be different in a larger city.

Council (NRC) is the nation's leading research organisation. Natural Sciences and Engineering Research Council (NSERC) is the national instrument for making strategic investments in Canada's capability in science and technology. Social Sciences and Humanities Research Council (SSHRC) is Canada's federal funding agency for university-based research and graduate training in the social sciences and humanities.

The contrast is also striking between an “old” industrial centre such as the Sydney – Glace Bay area of Cape Breton, which recalls the depressed steel and coal mining towns of the English Midlands and the North East, and a growing service centre such as Moncton. The two labour markets are considerably different, although the two urban regions are of similar size. Other older industrial centres such as Saint John, New Brunswick, with its shipyards, oil refineries and steel, can be found in Atlantic Canada. Manpower retraining needs and entrepreneurial traditions are not the same in environments characterised by large firms in industry or in mining, as in environments characterised by family farms, small businesses and services. Both are present in Atlantic Canada.

Atlantic Canada is not only a composite of distinct labour markets and local economies, but also of communities with different languages, ethnic origins, and historical memories. The music and songs of not only Newfoundland, but also of Cape Breton and other parts of the Maritimes are instantly recognizable around the world. The region has also produced many writers of repute. This rich heritage has spawned a minor cultural industry in which local HEIs, have been major players.

The First Nations, the Innu and the Métis in Labrador and the Mi’kmaq and Malecite in the Maritime Provinces, have a cultural presence which cannot be ignored. The majority of the Mi’kmaq nation lives on reserves, which fall under federal jurisdiction. The Innu of Labrador are in the process of acquiring their own reserve. The Labrador Inuit have had their own autonomous government and territory since 2005, Nunatsiavut, following the signing of an agreement with the Government of Newfoundland and Labrador. The challenges facing the First Nation and Inuit communities of Atlantic Canada are of an entirely different order than those of most other communities in the region.

Atlantic Canada, specifically the Maritimes, is also the cradle of the Acadian people; who have left their mark in their place names, customs, music, cuisine, and language. New Brunswick has a complete and separately administered French school system, from primary level to university (see Box 2.1 *L’Université de Moncton*). Both Nova Scotia and PEI have French schools in communities where demand is sufficient. *L’Université Ste Anne*, located in Church Point,²⁰ although small, has regional sites across Nova Scotia and PEI. Several communities, notably in New Brunswick, are overwhelmingly French-speaking, with French the normal language of commerce and public administration. The region around Edmundston as well as the Acadian Peninsula, centered on the communities of Caraquet and Shippagan, are almost exclusively French. Several communities in Nova Scotia, such as Chéticamp in Cape Breton, also have French-speaking majorities.

The linguistic difference has at least three implications for local HEIs. First, French-language communities are necessarily distinct labour markets, often more linked to each other than to neighbouring English-speaking communities. Since cultural survival remains a constant concern, the attachment to the community is often strong, as will be the concern that higher education and training does not facilitate assimilation into the surrounding English-speaking world. Second, the language difference means that natural partnerships will often develop with other French-speaking institutions or firms in Quebec. *L’Université de Moncton* for example has developed a partnership with the (French-language) University of Sherbrooke in Quebec in the area of medicine. Finally, the language difference means a smaller potential local pool of students, limiting the growth of institutions, as well as signifying a different potential pool of foreign students.

The Acadian example provides a useful illustration that any future human resources strategy or human capital strategy for Atlantic Canada must allow for a variety of models, depending on local context and on the nature of the institutions concerned. This provides a helpful rule for policy proposals presented in this report.

²⁰ *Point-à-l’Église* in French, located in the Acadian region of la Baie Ste-Marie in southern Nova Scotia.

2.6 Summary

In some cases the most significant contribution a HEI can make to local economic development is via its direct or transactions impact on the community as an employer and, hopefully, engine of economic growth. In some communities, St Francis Xavier University in Antigonish, Nova Scotia for example, the university or college is the principal economic entity for the community. In such cases, the institution is an “export” industry, bringing money into the community.

In order to maximise this transactions’ impact, academic excellence must remain a priority; that is, if the HEI is to act as a magnet for students outside the community, outside the province and outside of Canada. The core business of HEIs is and must remain quality teaching and knowledge creation and dissemination. When higher learning is applied in a mutual way with the communities in which the HEI is located, there is the possibility of achieving considerably greater regional impact than can be gained through simple transactions.

Higher education institutions in Atlantic Canada outside the major centres and without large injections of private funding have traditionally found it difficult to compete with the more established institutions in the metropolitan centres. For example, all localities and institutions do not have the same capacity to attract or to hold students. Tuition varies from institution to institution, often within the same province. In some cases, mechanisms are already in place to enable outlying campuses to be more competitive destinations, and hopefully lessen the pressures for students to leave the area after graduation. For example, the Nova Scotia funding formula provides institutions that operate outside the Halifax Metro area extra funding to help offset the extra costs associated with operating away from the centre of the province.

Where appropriate, provinces might consider, within their higher education funding formulae, the introduction of new or additional compensatory elements that would enable institutions in these places to better cope with the cost disadvantages associated with their location.

In today’s world of buzz-words and development fads, every community aspires to be a high-tech cluster. Less glamorous resource-based sectors, however, should not be frowned upon as they will remain the mainstay of the Atlantic economy and the foundation of its strength. Inventing the ultimate potato chip may be no less praiseworthy than inventing the ultimate computer chip. By the same token, the basic life-skills essential to the progress of communities in modern economies, notably, literacy and numeracy, should not be neglected, more of which is discussed in the following chapter.

3. THE CONTRIBUTION OF TEACHING AND LEARNING TO THE REGION'S LABOUR MARKET AND SKILLS

3.1 Introduction

In this chapter we explore how the teaching and learning offered by colleges and universities in Atlantic Canada can better respond to the human capital needs of the region. The chapter comprises a discussion around three areas: (a) the key pressures and tensions currently affecting teaching and learning that may be impediments to achieving better regional development outcomes; (b) some examples of good practice and other initiatives that are attempting to overcome some of these impediments; and (c) additional thoughts for consideration by policy makers, providers and other stakeholders concerned to build a stronger base of human capital in Atlantic Canada.

Between 1991 and 2001, about 178 000 jobs requiring some kind of higher education were created in the region, while about 77 000 jobs were eliminated for workers without post-secondary education (APEC/Statistics Canada, Figure 3.1). While there will be some new jobs created for persons without post-secondary education, the trend toward jobs requiring university or college preparation is projected to continue.

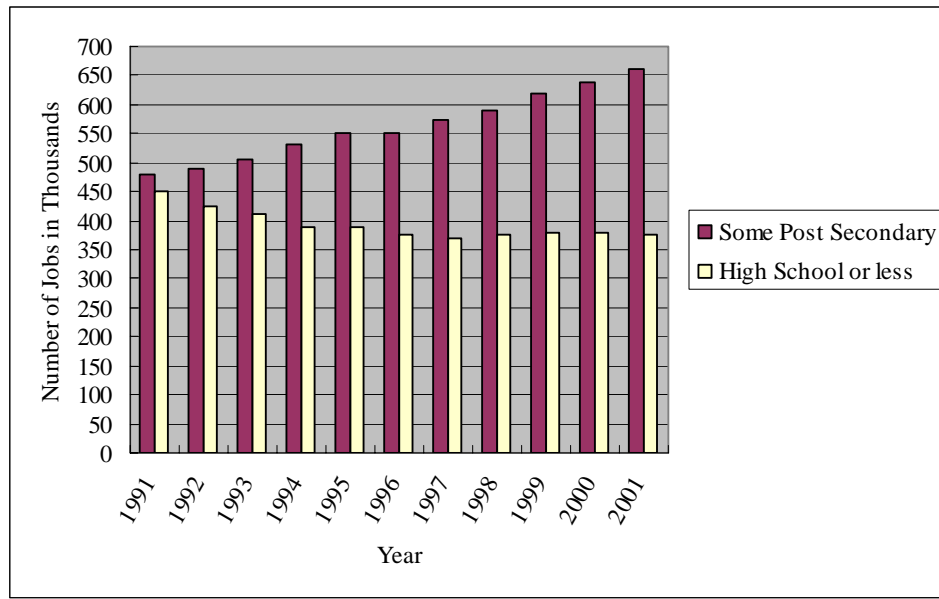
As in other nations throughout the world, higher education has become a necessity for the workforce. Atlantic Canada now grapples with a set of difficult labour market dynamics: unemployment rates higher than the national average, relatively high levels of underemployment, shortages of skilled labour in key occupation areas, and out-migration of skilled persons to Canadian regions to the west of the Atlantic region.

3.2 Pressures and tensions in the provision of teaching and learning in Atlantic Canada

The Self-Evaluation Report provides a comprehensive description of the ways the region's universities and community colleges provide instructional programmes that respond to local, provincial, and regional needs.

Chapter 2 highlights a range of factors affecting the overall provision of higher education designed to stimulate better regional development outcomes in Atlantic Canada. In this chapter we focus on these as they affect teaching and learning in the region. They include the extensive geography and sparsely populated settlement patterns, the evolving nature of the region's economic base toward higher value-added resource industrial structure, the high cost of education provision, the low history of family involvement in higher education, the "pull" factor of other Canadian provinces, provision for minority groups and the current cross-provincial institutional arrangements for education provision.

Figure 3.1 The New Economy and the Demand for Better Educated Workers, Total Employment, Atlantic Canada by Educational Level 1992-2001



Source APEC/Statistics Canada

Geography and the cost of provision

The vastness of Atlantic Canada and the decentralised nature of its population have been described in the previous chapter. “We are a province the size of Texas with a population of one-half million”, an official of Newfoundland-Labrador reminded us.

Education is both expensive to deliver and to access in such settings. The community colleges and universities cannot provide a full array of programmes within reasonable commuting distance of every potential student in the rural areas. It also makes going to college more expensive because many students have to move to enrol in the programmes they want. Unfortunately, this impacts mostly on students from rural areas, whose average family incomes tend to be lower, who often are burdened with the expenses of room and board as they pursue higher education credentials. While it makes good economic sense to concentrate limited resources in offering quality programmes, the consequences can be higher out-of-pocket costs or debt for students who probably are among the most disadvantaged in terms of socio-economic status; or low participation rates in these rural areas.

Out-migration

As discussed in Chapter 2, higher education can be seen as a “ticket out of town” for a substantial number of young people in Atlantic Canada, but the degree to which this is true, varies both by urban or

rural area, and by province.²¹ It is, however, clear that higher education gives people from rural areas the skills they need to work in or near the cities where the job opportunities and remuneration are greater, or to head west to provinces outside Atlantic Canada.

This should not in itself change governments' or institutional commitments to provide as much higher education as possible to Atlantic Canada students. In modern, technologically advanced societies, every person has a right to be educated to the level she or he wants and can benefit from. But there are tensions here, one of which is between the mobility afforded to individuals by advanced education and the regional need for an adequate supply of human capital, particularly given the Canadian system where investment in the provision of higher education is a provincial responsibility.

The provinces of Atlantic Canada need to devise strategies that balance national objectives of improving access and participation to higher education with local goals of building viable local and regional societies. Retaining and attracting human capital in the region will also have positive national aggregate effects. Attracting more full-fee paying foreign students, possibly with a "fast track" toward residency status, and allowing them to work outside the college or university while studying, are good initiatives. But this gives rise to another tension: that between higher education's core missions of teaching and research and its use as an instrument for immigration and regional policies (Lebrun and Rebelo, 2006).

*The Peer Review Team recommends that the HEIs in the region continue to attract more foreign students, possibly with a "fast track" toward residency status, and allowing them to work outside the college or university while studying.*²²

By creating flexible, high quality programmes, particularly in the sciences, engineering, and business, the region's institutions might become a centre of global higher education. Of course, higher education is a viable export industry only if foreign students who are not going to stay in the region pay the full cost of their education (which might actually be the marginal cost associated with using excess capacity in particular programmes).

Higher education can be viewed as an "export industry" in selected fields. This need not be limited to the larger universities. For example, Holland College is doing this as are other institutions.

As noted in Chapter 2, another way to retain more students might be some form of debt forgiveness based upon continued residence either in a province or the region. However, unless debt forgiveness is linked to a strategy aimed at enhancing human capital outcomes in the region, it is likely to have little economic benefit. One suggestion may be to forgive student debt to support young entrepreneurs to start new local businesses. Such an approach would be consistent with the economic base profile of the region discussed in the previous chapter. If this were done, the debt forgiveness policy could be linked to teaching and learning initiatives that strengthen the entrepreneurial capacities of students through formal courses and work-integrated learning initiatives, such as regionally targeted internships and similar activities.

²¹ The informal conversations between the PRT and young people in a variety of settings tended to confirm that out-migration of young graduates is a serious issue affecting the economies of Atlantic Canada. For example, none of the university students on Cape Breton Island expected to reside locally after graduation. The Maritime Provinces Higher Education Commission and a senior administrator of Memorial University reported that out-migration in Nova Scotia and Newfoundland and Labrador was not as heavy as generally assumed.

²² Off-campus work is available for students studying at such institutions in provinces and territories that have signed agreements with Citizenship and Immigration Canada (CIC). The community colleges and universities in Nova Scotia are participating in this programme.

Some form of debt forgiveness that is based upon continued residence either in a province or the region might be helpful. Special forgiveness provisions for graduate entrepreneurs trying to start new business in the local area might be a way to go.

We also were advised that parts of Atlantic Canada have always been places from which people went away to work. They came back if they could and often sent money back to support their families. But families once were much larger; today's very low birth-rates do not support population growth or even stability. Population growth today is driven more by interregional and international migration, and we have no definitive evidence to support the argument that graduate loss actually results in increased cash flow back into the region.

Duplication, necessary and unnecessary

There are continuing pressures to duplicate educational programmes now being offered regionally (for example in the field of medicine and veterinary). These are potentially expensive undertakings and provincial governments should weigh long-term financial commitments against the benefits of starting new academic programmes.

The Maritime Provinces Higher Education Commission might be given additional support to develop initiatives that avoid unnecessary duplication and promote collaborative academic planning. The Guide to Block Transfer Agreements put in place by the APCCC, and the use of e-learning methods are approaches that have this objective. (Box 3.2)

Not all duplication is undesirable. The Université de Moncton has made important contributions to its immediate economic region and to New Brunswick, and has strengthened Francophone culture in and beyond Atlantic Canada. Core curricula should be offered as widely as possible in order to accommodate students who are place-bound for financial, family, work, or other reasons. An important task within the provinces and regionally is to determine which duplication is necessary, that which meets the needs of people and their communities, and that which is merely a response to institutional or political ambitions.

3.3 Localising the work of HEIs

The Self-Evaluation Report provides evidence that the higher education institutions are being innovative and responsive in shaping their instructional programmes to meet local, provincial and sometimes regional needs. The lists of activities, including localised forestry and forest products emphases, co-operative placement of students with local businesses and industries, centres that help women in business, and many others, are impressive.

While Dalhousie University offers programmes that are national and international in scope, it also offers special emphasis in subjects that reflect Halifax's marine and ocean industries. Memorial University and the University of New Brunswick also combine major research programmes with attention to economic interests crucial to their provinces and the region.

Cape Breton and Memorial Universities, and the College of the North Atlantic offer special services and academic programmes to indigenous peoples. Acadia University emphasises the local environment and geographic characteristics in its teaching and research. Cape Breton University offers study in Celtic language and history that reaches beyond the cultural heritage of Cape Breton Island.

It was suggested to the Peer Review Team on several occasions that universities might establish better connections with their rural communities by building working relationships with local and municipal governments. This might include consulting arrangements (the Harris Centre of Memorial University does this, for example), work-integrated learning programmes such as internships and employability type

programmes, and programmes of instruction for government employees. The universities were aware of the difficulties faced by small towns and rural areas, but might consider the possibility of becoming more responsive. Some of the smaller institutions, such as Mount Allison, appear to have very productive “town-gown” relationships. Mount Allison is particularly supportive of local fine and performing arts activities, and offers instruction on entrepreneurship and the arts. In addition, in 2004 the university helped create a spin-off business, Environmental Proteomics, based on productive faculty research.

Another area where stronger connections can be made is in programme pathways between education sectors such as from high school and vocational education to college and university.

Holland College and the University of Prince Edward Island make many contributions to the social and economic well-being of their province. Their recognition that many persons need special help to overcome educational disadvantage is particularly noteworthy. Holland assumes responsibility for providing basic adult education and it also works in the high schools to reach students who are disengaged and not apt to continue their education. The University of Prince Edward Island offers special support and intervention services for entering students whom it judges to be at risk of failure. Both institutions are engaged in meeting the educational needs of working adults and other older persons.

The Nova Scotia College of Art and Design teaches the skills and knowledge of various crafts and disciplines, often focusing on the physical and cultural environment of the region. The College also recognises that many of its graduates will become entrepreneurs in the local area, seeking markets for their works, skills and knowledge. Mount Allison University also helps students of fine arts in this way.

The University of New Brunswick has established an Entrepreneurship chair and an Institute for Entrepreneurial Studies. The focus is on engineering and business students. Memorial University advises student entrepreneurs through its Gateway Program in the P.J. Gardiner Institute for Small Business Studies. The PRT supports the idea where courses in entrepreneurship are offered to students across all Faculties, as Mount Allison does; such courses should not simply tell students about entrepreneurship, but should go further in helping students that *want* to be entrepreneurs to acquire entrepreneurial skills and realise practical outcomes.

Mount Allison, like several other institutions in the Atlantic Region, is the largest employer in its area. Regularly rated as one of the best small universities in the nation, it draws students from all over and provides sound undergraduate experiences. But Mount Allison also is engaged with local communities. It offers distance learning courses for rural students, internships and field work, and research experience into locally important issues. The Rural and Small Town Programme at the University of Mount Allison is noteworthy (Box 3.1). It prepares people and organisations to adapt to change and to act on opportunities for developing sustainable rural communities and small towns.

Box 3.1 The Mount Allison University Rural and Small Town Programme

The Rural and small town programme at Mount Allison University works with local communities and other agencies to find policy and practice solutions to aid in revitalising small rural communities and their towns throughout Canada. It has a particular focus on rural communities in Nova Scotia, Brunswick and other areas in the Atlantic region.

The programme applies research methodologies as well as close community engagement to develop self-help tools, and indicators and advice for local rural communities, government, regional organisations, and other institutions and business seeking to achieve better rural outcomes. The programme also runs conferences on key areas of interest for rural towns.

Areas being investigated cover a wide range of population, labour market, housing, land, youth, homelessness, Indigenous, telecommunications, digital, sectoral development, and environmental areas. Local communities that have benefited from their involvement in the RSTP include: Amherst, Grand Manan, Allardville, Dorchester, Sackville, Riverview, and Lennox Island to name a few.

3.4 Lifelong learning

The Self-Evaluation Report provides an impressive list of teaching and learning activities with a regional focus, many of which revolve around students with special needs (First Nation, disabled, isolated communities) or those coming from socio-economic and educationally disadvantaged backgrounds. They range from community college programmes that provide basic adult education to special programmes that help persons make what may be a difficult transition to becoming students. Scholarship funding is provided to students from under-represented groups.

Several institutions, such as Mount Saint Vincent University, and the universities of New Brunswick and Prince Edward Island, will assess prior learning gained in non-traditional education and work experience and award credit for it. Nova Scotia Community College reports that disabled college graduates are employed at a rate three times that of the over-all population of disabled working adults.

One of the most innovative efforts to encourage lifelong learning is a “Guide to Block Transfer Agreements” prepared by the Atlantic Provinces Community College Consortium and issued in compact disk format (see Box 3.2). The community colleges of the four provinces appear keenly aware that substantial numbers of their students will want to continue their educations at the university level. This guide can help them determine how to achieve their goal. *The Association of Atlantic Universities reportedly is working with APCCC to develop a region-wide block credit transfer programme between the region’s universities and community colleges. If such an agreement is reached, its provisions should be distributed as widely as possible through both education and business networks.*

Box 3.2 The Atlantic Provinces Community College Consortium *Guide to Block Transfer Agreements*

Formally established in 1998, the Atlantic Provinces Community Colleges Consortium (APCCC) comprises the four provincial college systems; Nova Scotia Community College, the College of the North Atlantic in Newfoundland and Labrador, Holland College in Prince Edward Island, and New Brunswick College. The APCCC coordinates activities among the four provincial college systems and shares resources and expertise among the 50 education and training community colleges across the whole of the Atlantic Canada region.

The APCCC have produced and disseminated *A Guide to Block Transfer Agreements* that aims to assist in course decision making by students and education planners, guidance officers and teachers concerning the transfer of education credit from community colleges throughout Atlantic Canada to other Canadian colleges and universities.

A student completing a tourism and hospitality management certificate course in a Nova Scotia community college, for example, will receive credit to transfer to year three of a Bachelor of Tourism and Hospitality degree course at Mount St Vincent University. A student completing a college course in environmental technology at New Brunswick Community College, for example, can transfer credit to Cape Breton University to the second year of a Bachelor of Technology – Environmental Science.

There are around 250 potential credit transfer arrangements included in *The Guide*. There are also a range of course delivery mechanisms for students to choose from in the community college system, including distance e-learning. *The Guide* is a significant resource for ensuring students gain access to their preferred learning wherever in Atlantic Canada they might reside. It also ensures all colleges focus on those areas of teaching and learning where they can have the biggest impact locally without compromising student education and training needs.

The literacy problem

Although the severity of adult illiteracy differs across the provinces, adult basic education remains a key issue for all of Atlantic Canada. A recent issue of the Halifax business magazine *Progress* (September 2006, Vol. 13 No 07) contains an article on the “looming labour shortage” in Atlantic Canada and another on the “literacy trap” that reports on the region’s high rate of functional illiteracy (including prose and document literacy, numeracy, and problem-solving). The combined message of the articles is straightforward: the region needs skilled workers to replace those who are ageing and those who are leaving for work elsewhere, but a large portion of the workforce lacks functional literacy and cannot fill the jobs. Consequently, the region has unemployment rates that exceed the national average and also has jobs that go unfilled due to a shortage of skilled labour.

Of course the percentage of persons 65 and older who lack proficiency skills is higher than the percentage of those in the workforce. But among the workforce (ages 16 to 65), Newfoundland and Labrador reported 50% proficient compared to 58% nationally. Among youth (ages 16 to 25), 57.5% were proficient compared to 64.4% in Alberta (Data provided by Newfoundland and Labrador Government Office of Adult Learning and Literacy, from the International Adult Literacy and Skills Survey, Statistics Canada, 2005). Newfoundland and Labrador’s population with higher education demonstrated proficiency at or above the national average.

Persons who lack literacy skills cannot fill most of the better-paying jobs in the labour market. The social assistance and employment insurance benefit programmes of government tend to make jobs that pay a minimum wage unacceptable (people give up almost as much in benefits as they gain in earnings). And, not surprisingly, the most unskilled people are the least likely to be engaged in any form of lifelong learning.

The results are a shortage of skilled workers and a substantial portion of the working age population that is a drag on the economy rather than an asset. Further, because literacy proficiency is a trans-generational issue, the children of parents who lack skills are apt to enter school with an inherited disadvantage. (In other countries, there also are links to family violence, poor health, and other social problems).

Again, the community colleges are responding to this need. They are supported, and sometimes assisted, by universities. The University of Prince Edward Island, for instance, does work in Family Literacy, while the University of New Brunswick has a Centre for Family Violence Research that contributes to a better understanding of one set of social problems linked to low rates of literacy.

Separately, or as a region, the provinces of Atlantic Canada might make functional literacy a higher priority. It does not appear that enough attention is being paid to the problem and probably not enough money is being spent to deal with it.

Box 3.3 Adult Literacy Practices

Adult literacy is a significant problem through Atlantic Canada. About 40% of the population aged 16 and above is challenged by materials equivalent to those used in the modern workplace. In one province, 55% scored below level three in prose literacy on the International Adult Literacy and Skills Survey (IALSS), and 65% scored below level three in numeracy. (Level three is the desired threshold for coping with the increasing skill demands of a knowledge economy and society.)

Provincial governments and HEIs seem to have recognised that the region’s workforce is weakened by the number of adults who lack basic skills. These are the adults who do not migrate to other parts of Canada. They and

their children face daunting challenges. They are a significant expense to governments and cannot contribute to the economy.

The community colleges have been engaged in providing literacy and numeracy programmes. Holland College and the College of the North Atlantic (CAN) have been particularly active. Holland works in high schools to reach disengaged students; CNA offers access and transition programs for adults needing basic skills, poorly prepared high school students, and young people from families with histories of non-achievement. The government of New Brunswick has begun an adult literacy initiative, relying on community colleges to deliver services.

The University of Prince Edward Island (UPEI) has a programme that gives special help and mentoring to entering students identified as possibly under-prepared. UPEI also provides websites for basic skills and tutoring and reaches into high schools to help students prepare for advanced education.

Alternative means of delivery

Web-based instruction is being used throughout higher education in Atlantic Canada, although the Self-Evaluation Report identifies several barriers to wider acceptance. Among the barriers are the cost of producing web-based courses and resistance to change. Institutions may have other priorities and be unwilling to invest in distance learning. Faculty may prefer to continue what they are used to doing and refuse either to develop new approaches or even to learn how to do so.

Despite the barriers, progress is being made in using advanced communications technology to extend services. For example, Dalhousie University offers distance learning programmes in nursing, business, and social work, and courses in public administration. And the University of New Brunswick offers nursing at satellite campuses, combining distance and face-to-face learning, and a complete nursing program at two sites. It also offers a “First-Year at Home” option. Memorial University offers several hundred web-based courses and first-year university studies at some campuses of the College of the North Atlantic. It also offers programmes in rural areas that combine distance learning with on-site instruction. Other universities, such as Acadia, Cape Breton, St. Thomas, Mount Allison, and Saint Mary’s, and the community colleges, also offer distance learning course or programmes. Mount Saint Vincent University offers both on-line and televised courses.

The community colleges and universities, possibly working through their respective regional associations, might consider adopting common “courseware” for their distance learning offerings, thereby making it easier for students to move from institution to institution in order to meet their personal, academic and professional needs.

3.5 Regional collaboration in teaching and learning

Each province appears to have a vision for higher education. Most recently, the Government of Newfoundland and Labrador produced a White Paper that laid out higher education priorities for the immediate future. Nova Scotia has an educational strategy document titled “Brighter Futures Together,” and New Brunswick has a “Quality Learning Agenda” that embraces kindergarten through adult education and lifelong learning. Prince Edward Island does not appear to have a formal strategic document but its university and community college work closely together and with the provincial Department of Education.

The strategic planning documents prepared or under consideration by the provinces are important. The notion that systems of education, from pre-school through college and university, and including continuing and adult basic education, should be coherent and reasonably simple to navigate, seems self-evident. They are, after all, sets of institutions that provide instruction and guidance to human beings who

are trying to make their lives as coherent as possible, often under difficult circumstances. Well-articulated systems of education should be most helpful.

The PRT would add that such “cradle to the grave” approaches to education could more tightly link into the region’s strategic directions, thereby providing a full regional human capital strategy plan. Such a plan would focus on the region’s long term human capital needs, would emphasise pathways within the sector (high schools, vocational education, colleges and universities), and link more effectively and purposefully course design and delivery to emerging regional needs.

With a relatively small population and economy, *higher education in Atlantic Canada might consider increasing specialisation among institutions, defining the specialisations as clearly as possible to the public, and developing smooth paths of transfer for students who wish to move from one institution to another. The APCCC seems to have taken on a leadership role in negotiating transfer agreements. The AAU is in discussion with APCCC to join with them in this work. (As noted earlier, a Memorandum of Understanding concerning a regional block credit transfer is in process.)*

Higher education might best be viewed as a whole across provinces and, to the extent possible, across the region. Collectively, does it meet the needs of the people and their communities, and of the economy that sustains them in a strategic way? The institutions might agree to develop particular curricular strengths and encourage students to construct strong programmes of study by doing modules from different institutions. This approach is being considered in some smaller nations (Ireland, for instance) to permit easier and more rational cross-institutional and cross-border enrolments.

3.6 Summary

The Atlantic institutions of higher education have responded well to local, provincial, and regional needs. They need to continue working toward building stronger relations to make the best possible use of scarce resources.

Higher education in Atlantic Canada might consider increasing specialisation among institutions, and increasing their efforts in developing smooth pathways for students who wish to move from one institution to another.

The colleges and universities could increase their efforts in student recruiting and marketing: going out into the schools, workplaces, social service settings, and inviting potential students to take advantage of opportunities they may neither know about nor trust. Along similar lines, higher education can be used as a tool for immigration for attracting more foreign students as potential human capital and “fast tracking” their residency status.

Even though much has been accomplished, the economy of Atlantic Canada continues to experience stress that affects not only commercial enterprises but also individuals, families, and communities. *Separately or as a region, the provinces of Atlantic Canada might make functional literacy a higher priority.*

There are limits to what the region’s colleges and universities can do; they are only one set of institutions among many that shape and support the society. But the challenges facing the provinces of Atlantic Canada are not the kind that will be overcome quickly; governments and institutions need to keep plugging away. We understand from the Regional Steering Committee that some work has begun in developing a strategy that links all levels of education to one another and, in turn, links education to economic opportunity. We applaud such efforts.

The AAU, the APCCC, the departments of education in each province in the region, the APEC and the Council of Atlantic Premiers together consider the creation of a human capital strategy for the region that takes the “cradle to the grave” concept of linked education (schools, vocational education, community colleges and universities) and connect it more directly to regional strategies and priorities.

4. THE CONTRIBUTION OF RESEARCH TO REGIONAL INNOVATION

4.1 Introduction

This chapter focuses on how HEIs in Atlantic Canada can better contribute to the development of the region through research and innovation. Given the limited number of large corporations which are able to invest large amounts in R&D, and the inability of most small and medium-sized enterprises (SMEs) to invest in the application of R&D, university research accounts for most of the activity in the region's R&D sector.

Atlantic Canada is in transition from being a natural resource-based economy to a knowledge-based economy. Investment in innovation is an important mechanism for this transformation to occur in a way that will position the region competitively in the long run.

The chapter is structured as follows. First, the research and innovation characteristics of the Atlantic region are discussed. Second, initiatives taken at federal and regional levels to build the region's research and innovation capacity are discussed, including in particular the role played by the Atlantic Canada Opportunities Agency (ACOA), the federal regional development agency. Third, a number of good practices already adopted by Atlantic higher education institutions as well as regional initiatives to create a "culture of innovation" are highlighted. Finally, some new ways to build research and innovation capacity within the region are suggested.

4.2 Research and innovation in Atlantic Canada

Creating a culture of innovation

As pointed out in Chapter 2, Atlantic Canada is characterised by a relatively low level of formal R&D.²³ Atlantic Canada's universities are responsible for approximately 63% of all R&D conducted in the region. Only 18% of the region's R&D is performed by the private sector, compared to 56% nationally. The region needs a critical mass of industry innovation, better commercialisation, absorptive capacity and partner relationships if it is to fundamentally incorporate R&D as an effective driver for sustainable regional development outcomes that will benefit the whole community. Some of the federal programmes need to be customised and may be supplemented to meet regional needs and to accelerate innovation in the region's economy.

Atlantic Canada does not have critical mass in many of its research and innovation systems, and infrastructure and industrial capacity are also limited. This is, in part, a function of industry structure in the region. There are few large firms, and, in particular, head office R&D centres, and a low level of applied industry R&D. While there is substantial support available for regional R&D from federal programmes, industry in Atlantic Canada has not leveraged it at a level proportional with industry elsewhere across the

²³ The region represents 7.7% of the Canadian population, yet only 1% of the nation's total industry investment in R&D is spent in the region. Universities in the region are much close to the national average, receiving 6.7% of the investment spent in Canada on university R&D.

nation. Recent statistics show that industry funding for R&D is matched only 6% in Atlantic Canada as compared to 26% in the rest of Canada. This limited industrial R&D matching capacity has constrained the region's access to many national funding programs.

Creating a culture of innovation in Atlantic Canada therefore remains an important challenge, both within publicly funded organisations and in industry (Cornford, A., Martin Consultants, Gardner Pinfield Consultants, 2002). Currently, there is no single regional innovation policy and strategy which encompass the four provinces.

The Peer Review Team recommends, given the special circumstances of the Atlantic region, that such a strategy be considered, bringing together various entities concerned with R&D in a way that is tailored and targeted to local circumstances.

Such an approach would compliment "An Agenda for Growth and Prosperity in Atlantic Canada", where APEC recommends the establishment of an Integrated Science and Technology Partnership for Atlantic Canada, with the goal of providing a consolidated strategy to support the development of science-based industries across Atlantic Canada (APEC, 2004).

The Peer Review Team commends the initiative that the Federal Government of Canada, through the Atlantic Canada Opportunities Agency (ACOA) (see Box 2.2), has taken to overcome regional barriers to growth and identifying dynamic opportunities. The Atlantic Innovation Fund is an example of a positive step in that direction (Box 4.1).

Challenges and opportunities for HEIs

Both HEIs and provincial governments recognise the economic benefits associated with academic research. However, this recognition needs to be put in perspective with a wider national R&D institutional landscape. Research funding varies widely from institution to institution and from region to region. The universities and 2 hospitals in Atlantic Canada received CAD 186 million in research funding in 2003.²⁴ This compares to 37 institutions in Ontario that received CAD 1.6 billion in research funding in the same year (Statistics Canada, 2006).

Atlantic Canada has several research-intensive universities (most notably Dalhousie, Memorial, UNB and UPEI), with specialised areas of research that contribute to the region as well as to the rest of Canada and beyond. These universities have all increased their research revenues in the last decade. However, competition for scarce resources and differing priorities within the region will constrain partnerships that are essential for regional success. Among the universities and the provincial community college systems that make up higher education in Atlantic Canada, a good balance must be struck between *knowledge exploration* (basic research, knowledge dissemination) and *knowledge exploitation* (commercialisation, technology transfer, start-ups).

ACOA Approach - Atlantic Innovation Fund

In order to maintain opportunities for growth and prosperity for all of Canada, federal policy makers have to balance the need for national frameworks and policies that promote consistency of purpose and cohesion with an equal need to recognise and be sensitive to the unique characteristics and priorities of the regions, including cities, rural areas and smaller communities.

²⁴ In this chapter, discussions on commercialisation activities from research at university hospitals are not fully developed whilst the Peer Review Team acknowledges the contribution of medical research to regional development in various forms. For instance, see the Atlantic Canada SER (Locke et. Al, 2006).

ACOA focuses particularly on assisting the transition to a knowledge based economy in Atlantic Canada through investments in innovation and commercialisation, strategic measures to increase trade and investment programmes to improve the business climate, whilst working with communities to diversify local economies and address adjustment challenges and community priorities.²⁵

The *Atlantic Innovation Fund (AIF)* is a driving force behind the latest acceleration of R&D in the Atlantic region (Box 4.1). More specifically, AIF is designed to focus on areas of strategic importance to the region that offer the most potential for future growth, including information technology, ocean technologies, aquaculture, bio-technology, health/medical technologies and environmental technologies. AIF investments could also strengthen the region's ability to develop technologies that allow natural resource industries – such as oil and gas, agriculture and agri-food, fisheries, forestry and mining – to maintain and increase their competitiveness through innovation. The *Strategic Community Investment Fund* is helping small and rural communities strengthen their economic base. The *Business Development Program* and other ACOA programmes are helping thousands of entrepreneurs start up and expand businesses, optimise trade and export opportunities, and develop new tourism products.

Box 4.1. Atlantic Innovation Fund (AIF)

Taken together, the first and second Atlantic Investment Partnerships represents a ten-year, CAD 1.4 billion initiative designed to build new partnerships that will increase the capacity of Atlantic Canadians to compete in an increasingly global, knowledge-based economy. Through the Atlantic Investment Partnership, the Government of Canada has made major investments in the areas of innovation, community economic development, trade and investment, and entrepreneurship and business skills development.

Announced in 2000, and renewed in 2005 as the main component of the Atlantic Investment Partnership, the Atlantic Innovation Fund (AIF) is a programme designed to strengthen the economy of Atlantic Canada by accelerating the development of knowledge-based industry. The AIF has proven to be a key catalyst in encouraging strong partnerships among businesses and the research community including HEIs. Its objectives are to: build capacity for innovation and research and development (R&D) that leads to technologies, products, processes or services that contribute to economic growth in Atlantic Canada; increase the capacity for commercialisation of R&D outputs; strengthen the region's innovation capacity by supporting research, development and commercialisation partnerships and alliances among private sector firms, universities, research institutions and other organisations in Atlantic Canada; and maximise the region's ability to access national R&D funding programmes. The Atlantic Innovation Fund focuses on R&D projects in the area of natural and applied sciences, as well as in social sciences, humanities, arts and culture.

Strengthening applied research

Atlantic Canada's economic structure, as well as the presence of numerous small and industrially specialised communities, means that the most useful R&D and training activities are often of a type for which universities are ill-equipped and which are not prized in academia. Community colleges are more often much better placed and likely to be the only proximate sources of relevant applied research and training.

There are examples of applied research being carried out through the community college system (Box 4.2). Approximately CAD 30 million in research activity is ongoing in community college projects directly

²⁵ There are three other regional development agencies in Canada: Western Economic Diversification (WD) and the Federal Economic Development Initiative in Northern Ontario (FedNor); Canada Economic Development for Quebec Region (CED-Q).

tied to business and industry. These activities need to be supported by sufficient infrastructure and institutional mechanisms.

Several other provinces have established agencies such as regional science councils to foster applied industry research and to encourage stronger university/industry collaborative research relationships. In British Columbia, a review of the BC Science Council provides evidence of significant rates of return on investments in applied research. Atlantic Canada has few significant sources of applied R&D investment via other agencies or applied R&D science councils.

Thought might be given to an Atlantic applied research council specifically directed at community colleges.

Box 4.2. Applied Research by the Community Colleges

The community colleges throughout the region have demonstrated considerable capacity to conduct applied research with the potential to boost the region's economies. The Geo-Spatial Research Center at the College of the North Atlantic (CNA) in Corner Brook has the potential to be a spin-off venture; meanwhile, it can assist local industries develop rational, environmentally sound, and cost-effective plans to use natural resources.

In 1999, Nova Scotia Community College (NSCC) determined that applied research was one area which was within its mandate and was, indeed, a natural extension of the college's role in the economic and social development of the province. Accordingly, application was made to the first national competition for infrastructure funding under the Canada Foundation for Innovation programme. Success in this competition led to the establishment of the Applied Geomatics Research Group at the Annapolis Valley Campus in Middleton. The college is now expanding its areas of interest to include community economic development and health and human services.

The Peer Review Team recommends that the Regional Steering Committee, in consultation with other appropriate Atlantic Canada agencies, including ACOA, develop science and innovation strategies to strengthen applied research involving the universities, community colleges and business and industry.

Matching federal investment and support for regional innovation

The Government of Canada has created a number of innovative schemes for delivering research support. There are programmes and funds to assist with *research chairs*,²⁶ innovation infrastructure (Canadian Foundation for Innovation, CFI) and strategic research (Natural Science and Engineering Research Council, NSERC; and National Research Council, NRC). The NRC Industrial Research Assistance Program (NRC-IRAP) provides a range of both technical and business oriented advisory services along with potential financial support to growth-oriented Canadian SMEs. The federal government recently allocated an additional CAD 100 million a year for higher education research.

Atlantic Canada universities find it hard to compete for increasingly competitive federal research funds. *Thought therefore might be given to the establishment of an Atlantic research granting council*

²⁶ In 2000, the Government of Canada created a new permanent programme to establish 2000 research professorships, *Canada Research Chairs*, in universities across the country by 2008. The Canada Research Chairs Program invests CAD 300 million a year to attract and retain some of the world's most accomplished and promising researchers.

*modeled on the practices in other provinces. For example, Quebec's former FCAR programme, for example, funded research grants for young researchers.*²⁷

The FCAR (*Fonds pour la formation des chercheurs et l'aide à la recherche*) acted as a farm club (incubator), providing funding until a researcher was qualified to succeed in the more competitive Federal research funding arena. The Quebec experience suggests that it can work. However, Atlantic Canada does not have Quebec's resources, nor is it a single province, able to readily define a clear line of ministerial responsibility. Such a council would require a high degree of inter-provincial coordination.

The triple helix model of research funding within a regional context (government, university and business), with research tied closely to regional priorities but with a focus on "smart" innovation, discovery, and applied research may be a way to go. Should such a region-specific funding partnership model for research and innovation be developed, it would need to be sensitive to the abilities of Atlantic Canada SMEs to fund and participate in R&D. This could encourage firms lacking R&D capacity to begin to engage researchers in advanced product development, outsourcing research components to university partners. Such programmes are especially relevant for encouraging SMEs in traditional sectors to upgrade, by developing new products, based on a combination of advanced research and traditional skills.

When the matching opportunity is local and focused, there is a positive sign in all of this. In the case of NRC/IRAP, Atlantic Canada matching is 13.8%, which is almost twice the national average. Recognising the economic potential of R&D clusters, many provincial and municipal jurisdictions have joined forces with the Federal government to start venture funds, incubators and research facilities at the local level. Many have strong NRC/IRAP and Industrial Technology Advisor (ITA) linkages, as well as reasonably strong small business development, loan and investment programmes, and some tax-based programs.

Closer co-ordination among provincial and federal R&D agencies needs to be promoted to reduce overlap of functions and improve efficiencies in the funding and performance of R&D. At the same time, the current strong requirements for matching funds should be reconsidered with regard to the balance between near and long term research and economic development strategies. Matches are more likely to be found in areas of near term R&D that already have industry involvement. Longer term fields may not have companies active in the region, or if they exist they are often new start-ups with few funds available to invest in university projects.

4.3 Institutional strategies for industry-university innovation links in Atlantic Canada

Commercialisation and technology transfer: policy and management of Intellectual Property Rights (IPR)

At the national level, the *Expert Panel on the Commercialisation of University Research* was created in October 1998 by the Advisory Council on Science and Technology (ACST). The Panel's mandate was to provide independent, expert advice on options to maximise the social and economic benefits to Canada from the public investment in university research. One of the recommendations of the Panel was to create a body at the federal level to help increase interactions between industry and the public research sector.²⁸ Given our comments above, this kind of body might also be appropriate at the regional level, especially

²⁷ The FCAR has since been disbanded and replaced by new Quebec-based granting councils with different missions.

²⁸ The creation of a business-led Commercialization Partnership Board (CPB) was recommended by the Expert Panel.

given the recent development of collaborative mechanisms within Atlantic Canada and the clear regional differences in R&D resources.

Intellectual Property policies at universities and other research institutes are also important to industry partnerships. Opportunities for control of IP via licensing and royalty agreements are often perceived by researchers as an incentive to undertake R&D. IPRs are covered by various provisions and may have different conditions attached to them. In general in Atlantic Canada, at universities the inventor or the researcher owns the IPRs while at community colleges, the institution owns the IPRs. The complex web of IP ownership policies in Canada is seen to discourage industry-academic collaboration by creating a disincentive to the formation of R&D consortiums.

The Peer Review Team believes that universities should make an increased effort, where appropriate, to reduce IP barriers to industry investment in university R&D and to facilitate long-term university-industry relationships.

Universities have created commercialisation offices (technology transfer offices, TTOs) and licensing agreements, whose success hinges on reward systems for faculty and TTO staffing and on overcoming the information and cultural barriers between universities and firms. Policy-makers have tried to create mechanisms and incentives for collaboration between industry and academia. In Atlantic Canada, *Springboard*, a network with a mandate to support the commercialisation of university research, has been created, providing resources to Atlantic Canadian universities to encourage the transfer of university knowledge and technology to the region's private sector, and to enhance professional development of technology transfer personnel (Box 4.3). The PRT suggests that considerable benefit to regional innovation can occur by more tightly linking research carried out in the faculties with business incubators, accelerators and science and technology park mechanisms.

Box 4.3. Springboard

Springboard is a network of 14 universities across Atlantic Canada. It offers a variety of programmes and services to universities, business and industry in the region. These include an online database of research projects available for licensing, and professional development for technology transfer personnel (Interns in Innovation). In addition, Springboard provides proof-of-concept, patenting, and legal funds for university researchers to speed up the commercialisation of their research.

Springboard, with a private sector-led regional Advisory Board and a Network Member Council, promotes the sharing of resources among small and large research institutions within Atlantic Canada. This means that smaller universities now have access to the expertise they need in the areas of research contracts and intellectual property to negotiate industry-sponsored research agreements. The network also organises training and networking activities to further promote technology transfer opportunities. Springboard, supported by ACOA, under the Atlantic Innovation Fund, is receiving CAD 3.6 million over three years. The Association of Atlantic Universities (AAU) directs the overall operation of the network and actively advocates for funding support to ensure its continued existence and growth. A network that can facilitate communication and sharing of technology transfer resources in the region is a powerful model.²⁹ It is important to develop a viable business model so that the collaborative activities can be sustained.

The Peer Review Team believes that the overall region may be better served by augmenting the skills, staffing and services in a few university-industry dissemination programmes and liaison offices, and establishing partnerships to serve more than one institute. The HEIs in the region need to co-operate as much as they can in promoting commercialisation so that they can optimise their resources.

²⁹ A similar regional partnership is found in western Canada, WestLink, which is strengthening capabilities and facilitate a critical mass of activity at the regional level.

Building on good practices and strengths

The region should build on its existing strengths – knowledge workers, good universities and research centres, good community colleges, government agencies, and key industries. There have been a number of individual good examples of technology transfer from HEIs to industry, which deserve to be noted. Many of the institutional practices are described in the Self-Evaluation Report (pp. 45-56).

At Memorial University in Newfoundland, there is the Genesis Group, the Canadian Centre for Marine Communications, the Canadian Centre for Fisheries Innovation, the Canadian Centre for Core Ocean Research, and the Harris Centre. In Prince Edward Island, there are the PEI Food Technology Centre, AVC Inc.³⁰ and Biovectra. In New Brunswick, there are several service centres for R&D liaison, including the Research and Productivity Council, NRC Institute for Information Technology e-Business (NRC-IIT), Genieo, and Bio Atlantech. NRC-IIT plays an important role in the development of an e-Business technology cluster in the region and has research groups located in Fredericton, Saint John, Moncton and Sydney, Nova Scotia. The National Research Council Canada Industrial Research Assistance Program (NRC-IRAP) is a federal government programme that provides technical and business advisory services as well as potential financial support to growth-oriented Canadian SMEs focused on R&D opportunities. NRC-IRAP is located in Halifax, Nova Scotia, and Dalhousie University's Industry Liaison and Innovation (ILI) office is working with NRC-IRAP on a key industry-related research and development programme³¹. Some provinces have also created innovative programmes to support S&T development and cluster formation. With CAD 35 million in seed capital from the province of New Brunswick, the New Brunswick Innovation Foundation (NBIF) supports the development of innovation by making targeted and leveraged investments in R&D and early stage innovative-led companies in New Brunswick.³²

Local government agencies, such as Technology PEI and PEI Business Development Inc. and ACOA work co-operatively with other federal agencies and financial organisations to offer customised bioscience business development programmes. Programmes are available for initial capital, market research, product development and research & development projects. Many other academic and not-for-profit organisations, such as the Prince Edward Island BioAlliance provide on-going support in the way of professional development, human resource and marketing and communications services to members.

Box 4.4 Genome Atlantic

Genome Atlantic is a non-for-profit corporation with Board members from all four Atlantic provinces, dedicated to the promotion of fundamental and applied research in genomics for the furtherance of scientific understanding and for the development of the knowledge-based economy in the region. Genome Atlantic is one of five regional centres of Genome Canada, promoting genomics research in Canada with endowment funding by Industry Canada. Since 2000, four projects and one platform have been established, using CAD 70 million provided by Genome Canada and local Atlantic Canadian partners.

³⁰ AVC Inc was established in 1993 by the University of Prince Edward Island to assist with, conduct and commercialize research within the Atlantic Veterinary College and the University as a whole.

³¹ The agreement between the two groups represents a CAD 70 000 contribution provided to Dalhousie University, along with industrial advisory services, to promote and leverage the development of research and collaboration between small- and medium-sized enterprises (SMEs) and the university.

³² http://www.nbif.ca/about_whoare.html

Incubation, firm-formation and business development

The Atlantic Provinces have invested in a few incubators to facilitate small business development and university-industry relationships. Incubators assist the transition to commercialisation from innovation activity in universities and other research facilities. Among the few incubation facilities within the region are the Centre for Community and Enterprise Networking (C/CEN), located in Sydney, Nova Scotia; Incutech Brunswick Inc., located in Fredericton, New Brunswick; and the Genesis Centre, located in St. John's, Newfoundland. The Genesis Centre provides a good example of the university supporting local entrepreneurial activities (see Box. 4.5).

Box 4.5 Genesis Centre

The Genesis Centre was created at Memorial University in 1997 with an intention to graduate companies as well as students. The Genesis Centre is a support network for technology-based ventures which seeks business guidance and capital. It is a division of Genesis Group, the technology commercialisation arm of Memorial University. The Centre provides entrepreneurs with access to the university's scientific expertise as well as access to business mentorship—that is, leveraging the involvement of local business people and Memorial alumni living outside the province. It is supported by ACOA and the provincial government. Since 1997, the Centre has accepted 34 companies, which now employ 284 people. Clients have raised more than CAD 4.75 million in private equity. About half of the companies originated from university research. The Centre provides the intangible benefits as well as business resources, technical and scientific resources, and physical resources.

One of the successful graduates from the Genesis Centre is St. John's-based Rutter Inc., which has evolved from a fledgling technology firm to a listing on the TSX Venture Exchange and a prominent place among the country's businesses in five years. Rutter's success story exemplifies how the University helps develop entrepreneurial culture within the area.

An important feature of the work of the Genesis Centre is its access to the faculties of Memorial University. In this way a stronger connection is made between both the discovery and applied research of academics and processes of innovation and sustainable business formation.

In Nova Scotia, InNOVAcorp provides integrated services including incubation facilities, mentoring and financing to help early stage Nova Scotia companies commercialise their technologies and succeed in the global marketplace. The Greater Halifax Partnership is an example of public-private partnership at municipal level aiming to grow existing Halifax-based businesses and to attract new investment.

Firm formation from academic and industrial knowledge resources needs to be further assisted. The role of regionally based public venture capital and a mentoring system within the region as well as outside of the region warrant more attention.

4.4 Research capacity building

Graduate education and undergraduate research training

A particularly crucial issue is building an environment that will encourage young, highly skilled workers to see their future success in Atlantic Canada. The region will experience a shortage of skilled workers because of a low birth rate, the retirement of the baby boom generation and the out-migration of many people aged 20 to 24 seeking higher salaries elsewhere in Canada. This needs to be turned around. As earlier noted, the retention of young people is a critical challenge for Atlantic Canada.

One of the strategies is to focus on *graduate education and research training relevant to the regional economy*. This entails opening up regional development possibilities in more research intensive fields such as bio-technology and nanotechnology, to mention two currently popular areas. But there are, of course, many other areas of regional strengths such as marine biology and agriculture. This strategy needs to include strengthening the industries in the region and their absorptive capacity. Industry-research partnerships can be expanded so that graduate students act as intermediaries between academic research and industrial work. Knowledge Transfer Partnerships (formerly known as Teaching Company Scheme,

TCS) in the UK are good models of utilising universities' research graduate programme to link into business needs.³³

Undergraduate education can be improved by offering research opportunities to selected undergraduates. Some universities have special offices to arrange the match of undergraduate students with research opportunities. In the United States, for example, such a scheme exists in the biological sciences at Cornell University. Other universities run special summer programmes to introduce undergraduates, especially from under-represented groups, to sophisticated research experiences. These summer programmes give students a realistic idea of what a research career would be like, in addition to serving as a recruitment device for the university to attract students to its graduate programmes. There are examples from the other regions which are part of the IMHE project. In Twente in the Netherlands, such a scheme exists in the Industrial Design Centre attached to Saxion University of Applied Science (see the PRR of Twente by Garlick et al, 2006³⁴). Also, there is the student innovation programme (Drivhuset) at Karlstad University in Värmland region, Sweden, (see the PRR for Värmland by Van Vught et al, 2006)³⁵.

Within Atlantic Canada, the Harris Centre at Memorial University has several programmes to help link students as well as faculty with industry, community and government needs. There is an applied research fund, supported by the Provincial Government and ACOA, to facilitate regional research about Newfoundland and Labrador from staff and students within Memorial University. Graduate Student-Industry Knowledge Exchange scheme connects graduate students research with firms, associations, governments, that might be interested in collaborating with, using, and funding the research, and possibly hiring the students in the future. (Box 4.6)

Box 4.6 Harris Centre

Named after former Memorial University President Dr Leslie Harris, the Harris Centre of Regional Policy and Development was established in 2004 to play a whole-of-university broker role between Memorial University and the Newfoundland and Labrador community. The Harris Centre is supported by a broadly based Advisory Board representing Memorial University, community colleges, government, community, business and trade unions. With base support from ACOA, Memorial University, and the Province of Newfoundland and Labrador, the Harris Centre is fast becoming a key mechanism for harnessing, mobilising and directing the University's research and teaching to community need.

Recent projects of significance include researching the development of a proposed *Leading Tickles Marine Protected Area* for the province of Newfoundland and Labrador. The project is a demonstration of the links that can be made between student research and the community with particular studies of capelin, lobster and herring. Other research facilitated by the Harris Centre relates to identifying manufacturing technology opportunities, the recruitment of international medical graduates, transport needs, developing socio-economic indicators of well-being

³³ Knowledge Transfer Partnerships programme (KTP), formerly known as TCS (Teaching Company Scheme), is one of the longest-run UK Government funded programmes which enables UK businesses to benefit from the wide range of expertise available in the UK's "Knowledge Base" including HEIs, further education colleges, and private and public sector research organisations and institutes. Each Knowledge Transfer Partnership is managed by a team involving senior staff from both the Knowledge Base and the Company Partners and a recently qualified graduate recruited as the KTP Associate. The KTP Associate works on a project identified as central to the company's future commercial development. Up to 60% of the costs of each Knowledge Transfer Partnership, including the KTP associate's salary and the academic's time are covered by a government grant. Knowledge Transfer Partnerships prepare graduates for direct experiences in industry enhancing their employability.

³⁴ <http://www.oecd.org/dataoecd/32/3/36217610.pdf>

³⁵ <http://www.oecd.org/dataoecd/27/23/36731313.pdf>

for the province, and assessing the extent of Federal Government presence in Newfoundland and Labrador, to name just a few. Four times a year the Harris Centre presents a public forum to link university researchers with business and community needs. Called “Memorial Presents”, the series has been highly successful in highlighting the university’s capacity to effectively partner with the Province in such key areas as oil and gas industry development, fisheries policy, and rural area rehabilitation.

Attracting and training innovative academic and professional staff

Higher education institutions in Atlantic Canada need more R&D professional staff supported by more diverse incentive structures. People with the right skills are needed to provide the level and quality of service required for success in research-based innovation. There is a need in this area for people who understand science, markets and the legal complexities inherent in the commercialisation of research. Such people are rare, and the universities themselves need to take a hand in educating them. Recruiting people from industry as part-time professors at universities to encourage innovation can be a good model. In the Netherlands, there is a scheme called *lectoraten*, where the HEI receives funding support from the central government to employ lectors, or professors with practical/business experience to help build HEI-community links around research areas (see the PRR for Twente by Garlick et al, 2006)³⁶.

We repeat some of the points raised by *the Expert Panel on the Commercialisation of University Research* by the Advisory Council on Science and Technology (ACST) (1999). Universities should develop innovation policies that reward researchers who engage in commercialisation. Innovative researchers should be entitled to share in the financial benefits from commercialisation undertakings and they should be recognised in tenure and promotion policies for their investment of time and effort in the innovation process. The importance of research-based innovation needs to be recognised in universities’ mandates. At the same time, basic research at universities should not be undermined.

The HEIs in Atlantic Canada have the opportunity to contribute to innovation by promoting the role of academics in identifying commercial opportunities arising from their research. This will require development of a culture in which commercial activities are recognised as a professional contribution on a par with academic excellence, and supported by appropriate human resources strategies.

International collaboration

Atlantic Canada universities and colleges have established numerous agreements with foreign universities, primarily oriented toward exchange of undergraduate students to give them an experience abroad. Some of the programmes combine international training with work placements and entrepreneurship programmes (Box 4.7).

Box 4.7 Forum for International Trade Training (FITT)

The School of Business Administration’s programme at the University of Prince Edward Island combines intensive international trade training courses and one-year work placements. Training sessions are offered on-campus through the nationally recognised Forum for International Trade Training (FITT) professional certification programme.

FITT skills sessions are open to interns and private sector company representatives. Topics covered include international market entry and distribution, trade research, marketing, trade logistics, finance and global entrepreneurship.

³⁶

www.oecd.org/dataoecd/32/3/36217610.pdf

One strategy for developing regional research capabilities is to attract back to Atlantic Canada persons who have pursued careers elsewhere in Canada or in other countries, whether for lack of opportunities at home or for other reasons. A first step might be to identify scholars and entrepreneurs who are from the region but now work elsewhere in Canada or other parts of the world, and encourage them to become involved in joint ventures with Atlantic Canada universities and colleges in key priority research areas. A similar programme to the Canada Research Chair programme can be created at the regional level, aimed at attracting high profile academic researchers to Atlantic Canada to address regional needs in the region. This may be a useful model to consider in order to reduce R&D imbalances.

Universities and colleges can play a central role in helping the region gain qualified knowledge workers by attracting, integrating and retaining international students. Atlantic Canada, through AAU, ACOA and other agencies, has already started to work on this.³⁷ The lengthy immigration process, the inability to find employment and the absence of job opportunities may discourage foreign students from staying in the region.

Linkages between the Atlantic provinces and other parts of Canada and the world need to be used as a base to develop broader collaborations, especially with regard to joint research. A regional research chair programme to attract high profile academic researchers may be a model to consider with funding from either federal or local sources. Further work needs to be encouraged to attract international students into the region.

Building clusters of excellence within and across regions

It has been pointed out that AIF, NRC, NSERC or other federal sources are significant sources for establishing regional partnerships. If matching contributions for several of these federal programmes are not provided within Atlantic Canada, regional competitiveness is further threatened and a significant opportunity for additional investment is lost. It is important to provide matching funds in order to encourage commercialisation of research done at HEIs.

Collaboration among HEIs throughout Atlantic Canada might be part of a regional development strategy. The Canadian National Centers for Excellence (NCE) Programme, which brings together research groups across the nation, also encourages regions to build up capacities at local universities in order to participate in this national programme. The provinces of Atlantic Canada have already built Springboard, the network of universities to promote technology transfer, encouraging the major research universities to work with smaller universities. The PRT applauds such efforts. *The major research universities should continue to work with smaller universities and community colleges to ensure that they and the rural areas they often serve are included in the regional strategy.*

4.5 Summary

Innovation needs to be stimulated in Atlantic Canada, including better higher education-industry relationships to promote commercialisation and policies aimed at increasing the absorptive capacity of the private sector. The region would gain from a collaborative approach to strengthen research and

³⁷ There are no official figures available. According to Lebrun and Rebelo (2006), 67% of students are interested in applying for permanent residency in Canada and residing in Atlantic Canada. Full time employment in the region is one of the most important factors when deciding to apply for permanent residency in Canada. According to CIC, about 30% of international students apply for permanent residence status.

innovation, with support from the universities, community colleges, provincial governments, other public sector bodies, teaching hospitals, and private industry.

The federal government should be flexible enough to respond to regional needs and solutions. These can best be presented by strong regional networks that include government agencies, higher education institutions, and businesses. The provinces provide most of the physical infrastructure and operating costs for education and research in Canada's universities, teaching hospitals and community colleges. Some provinces also perform and fund research in ways similar to the federal government, often in partnership with it.

The provincial governments and ACOA need to provide more support (financial, administrative, and political) for applied research, building on the existing partnerships and research centres. In developing this support, the opportunity for expanding the role of the community colleges should be recognised so that they can fully participate in and contribute to the regional innovation agenda.

In addressing these opportunities it is important to avoid excessive complexity in the support environment. Already, the large number of federal government initiatives designed to improve the transfer and commercialisation of university-based research have led to a complex support environment within the region which contains elements of duplication and overlap. This complexity may have the tendency to hinder the development of new collaborations and partnerships, possibly reducing the intended benefits of these initiatives.

Relationships with other parts of Canada (e.g. other regions and metropolitan areas) and overseas need to be encouraged in order to increase the research and innovation capacity of Atlantic Canada HEIs. Thought may be given to establish a fund to encourage former East Coast researchers of high calibre to return to the region with the prospect of resources to fund their key research agenda in a way that firmly links it into the region's development needs.

5. CONTRIBUTION TO SOCIAL, CULTURAL AND ENVIRONMENTAL DEVELOPMENT

5.1 Introduction

Regional development is sometimes thought of in economic terms only, and with a focus on technology-based development. The OECD project guidelines, however, suggested a wider interpretation. Social, cultural and environmental developments have demonstrable economic and intrinsic benefits. They underpin and stabilise economic growth and bring forth benefits in terms of community health and welfare, social cohesion, community life and sustainable development. Atlantic Canada is well-recognised for its cultural diversity and historical heritage both within and across communities in the four provinces, particularly given the significant roles of the Acadian, First Nation and Indigenous cultures in Atlantic Canadian society.³⁸ The Atlantic Canada Self-Evaluation Report gives a number of examples of the role of the higher education in cultural activity. It is, however, more brief in relation to social and environmental matters. These issues are important in a region that is internationally known, particularly in ecotourism, for its pristine and wild landscape.

5.2 Social development

Through their learning programmes, research, services, and infrastructure, higher education institutions can contribute to improving the health (geriatric care, hospital, nursing, medical, dental), safety, physical fitness and general social well-being (legal, counselling, sociology, childcare, and other welfare services) of the region's residents. This may involve partnerships with existing public health and welfare institutions or with the private sector in areas of R&D and technical innovation, and in the provision of information targeted at health and well-being objectives and welfare planning. It will also involve promoting programmes and demonstrations that foster exchanges across different ethnic and cultural groups and with those at the margins of society, and which build relationships between urban and peripheral rural parts of the region.

In declining urban areas, HEIs can have a positive impact through their campuses and other property assets for the provision, for example, of low-cost student accommodation and low-cost student transportation initiatives. When linked in with the local and municipal authority, the HEI can add to the general amenity of the town centre (*e.g.* parks and gardens, safety, recreation). The contracting out of HEI services such as catering, cleaning, gardening, financial, and others can add to the employment base of depressed urban and rural areas in which the university campuses are located.

In numerous communities across Atlantic Canada community colleges and local university campuses are the loci of community action and of local economic development initiatives. A number of communities have seen their populations decline, with continued decline likely, threatening the existence of essential infrastructures, institutions and services for local economic development.

³⁸ The region is also home to a rich Gaelic tradition, most notably on Cape Breton Island. The region's unique musical and literary heritage, rooted in Irish, Scottish, and English settlement, should also be noted.

Thought might be given by all governments to establishing new partnerships with community colleges or local university campuses to house or jointly deliver certain services or agencies, including business development corporations and other programmes aimed at nurturing entrepreneurial talent and helping business start-ups.

This would have the advantage of creating greater synergy between public agencies and local HEIs and allowing the latter to maintain existing infrastructures. Some community college representatives and local officials also suggested using the colleges as “one-stop” providers of services essential to small communities: health, child-care, welfare, employment counselling, etc. This would enable higher education knowledge to add value to local service provision.

The SER highlights on-campus initiatives, such as Dalhousie University’s health services which are available to staff, students and alumni of the University. It also mentions a rental housing initiative for teenagers in difficulties as a joint venture with the provincial government and the IWK Hospital. While on-campus initiatives are mentioned, there appears to be scope for expanding activities and initiatives where HEIs reach out into the community in the provision of services.

The region can provide a laboratory for social development research. The PRT was made aware of the learning programmes and research centres at HEIs which are dedicated to study the social issues within the region. Examples of good practice, highlighted throughout this report, include: the Harris Centre at Memorial University (Box 4.6), the Mount Allison University Rural and Small Town Programme (Box 3.1) and the Institut Canadien de recherche en politiques et administration publiques (CIRPPA) at l’Université de Moncton.

In order to take this agenda forward the Peer Review Team suggests that the knowledge and expertise these institutions generate in their communities as well as other good practice initiatives need to be communicated well across the region to enable sharing and adoption where relevant. *In this regard we recommend that consideration is given by the region to compiling, on a regular basis, a compendium of good practice in HEI regional contributions to cultural, social, economic and environmental initiatives against criteria that emphasise engagement principles. We would suggest that the criteria, or qualities, highlight the following characteristics: evidence of a long run commitment in terms of time and resources by both the community and the HEI; evidence of a clear purpose and clear expectations about the roles of the partners; evidence of mutual trust and; evidence of result-orientation.*

5.3 Environmental sustainability

HEIs can contribute to sustainable environmental development in their regions by: (1) being a source of regional expertise through research and demonstration; (2) using their infrastructure such as science parks, incubators, laboratories and IT facilities; (3) being facilitators in bringing together diverse regional actors and elements of capacity to the sustainability process; (4) generating human capital in the region through their teaching and learning programmes in areas of sustainable development; (5) providing demonstrations of good practice through their own on-campus management and development activities such as through strategic planning, building design, transportation initiatives, waste minimisation, water and energy efficiency practice, responsible purchasing programmes and other “green campus” and “good citizen” initiatives; (6) offering recognition and reward incentives for staff to be involved in sustainable development leadership groups in the regional community and by extolling the environmental virtues of the region through the HEIs own marketing programmes; and (7) developing their teaching programmes to raise awareness and skills in the student body to become involved in volunteering and community activity in the area of sustainable practices.

The Self-Evaluation Report presents the results of a comprehensive survey of HEIs and regional development. Half of the HEIs responding to the survey which was linked to the self-evaluation believed they were models of good practice in the region in relation to the implementation of “green campus” initiatives. The SER mentions initiatives such as recycling, tree planting and composting and programmes to reduce green house gas emissions. In order to maximise the effects, performance targets and achievements over time in these areas need to be detailed. Research centres with an environmental responsibility and their relations with governments and communities were also mentioned. The Nova Scotia Community College was being recognised for their sustainable building design by receiving a Leadership in Energy and Environmental Design award for the new Dartmouth Waterfront campus currently being erected which will embody “green” design practices. The Centre of Environmental Excellence is being launched in the Sir Wilfrid Grenfell College Campus of Memorial University in Corner Brook. The University of Cape Breton is finding research-based solutions to the environmental problem created by the Sydney Tar Ponds (Box 5.1).

Box 5.1 Cape Breton University and the Sydney Tar Ponds Clean up

The Sydney tar ponds have been a worrying environmental residual from a century of coal mining, coke making and steel production at Sydney on Cape Breton Island, Nova Scotia. Steel making ended in the 1970s and coal mining came to an end in the 1990s. However, the tidal estuary adjacent to the harbour has remained contaminated with a variety of coal-based wastes from the coke ovens and steelmaking process. The University of Cape Breton has always had a concern to see how the expertise of their staff and students could assist the government and the community better understand and overcome the environmental problems at this 30 hectare site, including the presence of polychlorinated biphenyls (PCBs). There have been many biology, environmental science, engineering and economic studies undertaken by University staff and students have been actively encouraged to explore various aspects of the site and its impact.

Over the years there have been a number of solutions put forward for overcoming the tar pond problem that have led to considerable controversy. In January 2007, the provincial and Federal Governments announced a CAD 400 million plan to solidify the toxic sludge in-situ using a portland cement binding agent. Eventually the area will be covered with a plastic sheet, soil and finally grass. In September 2006, the University held a workshop on Solidification and Stabilisation with the Cement Association of Canada, the method that has now been chosen to overcome the problem of the tar ponds.

The contractors charged with the responsibility of the cleanup have been asked by government to work closely with the university to ensure there is a full exchange of knowledge to get the best outcomes possible.

The Peer Review Team were impressed with the rugged and pristine landscape of the four provinces and also became aware of the extensive reliance on natural resource production and the impact this might have on the landscape (terrestrial and ocean), biodiversity and native animal habitat. National questions, such as energy and water use, climate change, have their place at the regional scale through such areas as catchment management, emissions control, biodiversity and ecology, etc.

Higher education institutions in Atlantic Canada have the capacity to play a key role in producing and sharing knowledge about environmental sustainability with their regional communities in any of these areas and we would strongly encourage them to do so.

5.4 Cultural development

Higher education institutions can make an important contribution to the cultural foundation of a region and to general quality of life of the community. They can do this through culturally-based learning programmes that increase awareness, provide policy advice and offer effective services among culturally

diverse groups. HEIs can engage with cultural groups to help build their capacity to better serve their members. They can also make available for public access a broad range of culturally-specific infrastructure, such as museums, libraries, galleries, orchestras, auditoriums, sporting facilities, community radio and television stations. The HEI might also sponsor local cultural festivals and performances, offer specialist expertise and take part in specific community cultural initiatives. Higher education students, particularly those from different nationalities and cultures, also add richness to a region's culture.

The Self-Evaluation Report highlights some of the more traditional ways higher education adds to the cultural fabric of the community, such as museums, theatre, performing, visual and fine arts, etc. Many municipalities have relied on HEIs to provide concert halls, sport and recreation facilities and even conference and meeting facilities. One of the challenges for HEIs is the expectation from government that the HEIs will continue to subsidise these facilities without little or no compensation.

Two areas mentioned in the SER warrant further consideration; namely sports and the place of minority groups in cultural development.

The PRT had the opportunity to meet the Executive Director of the Atlantic Policy Congress in Halifax who highlighted the difficulties facing First Nation and Indigenous people in pursuing higher education from high school. Part of the difficulty stems from the responsibilities of different jurisdictions with higher education being a provincial responsibility whereas Indigenous and First Nation matters are a federal responsibility. It appears that once a student gets to a college or university their completion success is quite good. There is an implicit pressure for them to succeed for their communities. Many Indigenous and First Nation higher education graduates return to their communities as they feel they have an obligation to repay the support provided to them in getting to higher education studies. However, young people from the reservations face financial, cultural and attitudinal constraints as they enrol in advanced education for the first time. The institutions can be intimidating and the costs have to be borne by the whole community.

One initiative worth considering is for Indigenous and First Nation higher education graduate mentors, in collaboration with the higher education institutions, to coach high school students about the advantages of continuing on to higher education studies.

The PRT recommends that the higher education institutions work across the region through cultural exchange and partnering among existing schools, institutions and programmes.

In New Brunswick, the PRT were told that the Acadian community of the Province and across the region would not have maintained its cultural identity without higher education institutions. It should be noted that the Province is fully bilingual, providing a complete French-language (Acadian) school system from the primary to the university level. L'Université de Moncton, whose role was discussed in Chapter 2 (see Box 2.1), stands at the top of this system, with a network of community colleges. L'Université de Moncton provides leadership to the community, as well as advice and active involvement in matters of general concern. It is also a place to which students can come to complete their formal education using the French language, and to which the francophone community, comprising about one-third of the New Brunswick population and a substantial portion of the population of certain parts of Nova Scotia and Prince Edward Island, can return for the lifelong educational experiences that now are crucial to a vibrant economy. L'Université Ste Anne, much smaller, located on the southern tip of Nova Scotia, serves the province's Acadian population, with the addition of out-reach programmes aimed at communities located elsewhere in the Province.

At Cape Breton University the PRT were made aware of the ethnomusicology programme focussed on Celtic, Mi'kmaq, Acadian, Irish, Loyalist and Scottish traditions all of which have their confluence on

Cape Breton Island. The PRT were also made aware of the Beaton Institute, the Mi'kmaq Resource Centre, and the Centre for Cape Breton Studies that supports researchers in their studies on the cultural folklore and music of the island (see Box 5.2).

Box 5.2 Cultural Studies at Cape Breton University

With Cape Breton Island's historical confluence of the Mi'kmaq, Acadian, Irish, Loyalist and Scottish people and their traditions, the Cape Breton University has developed a number of teaching and research foci to further enrich the community's knowledge of the traditions and music of these people. Programmes of anthropology, musicology, folklore, sociology, linguistics and education come together around the heritage and culture of these people.

The University has established the Beaton Institute on its campus in partnership with the Cape Breton community as a historical, cultural, religious, political, social and economic archival for the Island. The resource is available for the whole community to use.

The University also has a long standing partnership with the Gaelic College of Arts and Crafts that enables clear learning pathways between the two institutions for education and research into Gaelic tradition and music and the sharing of resources.

5.5 Summary

The PRT was impressed by the obvious concern demonstrated by higher education institutions for cultural and social preservation and the advancement of all people of the region. Notwithstanding the good examples and initiatives, there was limited evidence of conjoint action in the domain of community development, *e.g.* in the field of environmental sustainability. This can be, at least partly, attributed to the limited resources and the absence of incentives for not only for HEIs, but also their staff members. For example, staff promotion is usually dependent on publication, not on engagement in the 3rd task activities.

Consideration should be given by the region to compiling, on a regular basis, a compendium of good practice in HEI regional contributions to cultural, social, economic and environmental initiatives against criteria that emphasise engagement principles.

This should be followed by a preparation of joint strategies between the HEIs and the appropriate public bodies who should provide incentives and use their resources to underpin selective programmes of action within the HEIs.

6. CAPACITY BUILDING

6.1 Introduction

As was earlier noted, recent years have witnessed an impressive number of efforts to establish mechanisms to build a cohesive and co-operative Atlantic Canada region. These links have been formed across provincial governments (Council of Atlantic Premiers, Council of Atlantic Ministers of Education and Training), universities (Association of Atlantic Universities) and community colleges (Atlantic Provinces Community College Consortium), and economic development agencies (Atlantic Provinces Economic Council, Atlantic Provinces Chamber of Commerce). This has been a significant achievement which should be continued.

The earlier chapters have highlighted some of the natural, governance, economic, social and cultural aspects of Atlantic Canada and the ways in which higher education institutions are contributing to the achievement of better outcomes in these important areas of regional development through their scholarship and the creation of advanced human capital. There have been some impressive achievements.

In this chapter a number of mechanisms of a structural and strategic nature are suggested to embed productive connections between higher education and the Atlantic Canada's development. Three broad types of initiatives are discussed:

- First, those initiatives that occur within the higher education institution itself, which we have called “reaching-in” initiatives. These relate to changes that can be made in such areas as higher education mission, leadership and governance; policies; the design and delivery of teaching and learning programs; the focus of research and innovation projects; approaches to higher education promotion and marketing; the use of infrastructure and capital works; and higher education internationalisation.
- Second, those initiatives between the higher education institution and its regional communities, partners and stakeholders where there are mutual regional interests of critical importance. We have called these “reaching-out” initiatives. Many of these critical regional development matters were highlighted throughout the report and they have been on the agenda of organisations like APEC and the Council of Atlantic Premiers. These include, the loss of key human capital, the building of a culture of innovation in business and the community, how to boost a competitive knowledge-intensive economic base with a focus on higher value-added activity, tackling entrenched unemployment, the delivery of effective services in rural and remote areas, building literacy and numeracy levels among children and adults, recognising and celebrating cultural diversity, and taking a more intense interest in matters of environmental management.
- Third, policy initiatives at a federal and provincial government level designed to facilitate and support the “reaching-in” and “reaching-out” perspectives of higher education. We suggest that APEC, CAP and the Government of Canada (via ACOA) consider a joint approach to an integrated package of HEI structural reform measures to enable Atlantic higher education to

focus more strongly towards achieving agreed Atlantic Canada outcomes. This package of measures should also include a programme of competitive funding to strengthen the connection of research, innovation and teaching and learning programmes to regional priorities.

In addition, the PRT suggests that a monitoring and evaluation framework should be put in place to ensure a process of continuous improvement against specific targets in both higher education quality and higher education impact from the perspective of regional development. This can be done at the individual institutional level, but could also be monitored at an Atlantic Canada level by a consortium of APEC, AAU and APCCC. In this regard, we are suggesting that regional development engagement by higher education institutions be an integral part of the same higher education quality framework that applies to teaching and learning and research performance.

There are a number of worthwhile initiatives underway within the higher education institutions of Atlantic Canada that seek to strengthen the regional development outcomes from higher education. The circumstances in Atlantic Canada, outlined in Chapter 2, make the logistics of achievement perhaps more difficult than in many other regions of the industrialised world. What is lacking is a comprehensive, strategic and joint approach comprising the responsibilities of the individual HEIs, the regional community and the provincial and federal governments. It is now time to move in this direction and build on the goodwill that exists among higher education leadership in Atlantic Canada.

6.2 “Reaching-in” goals at the institutional level

The PRT found limited evidence of explicit strategic planning relating to the way the individual HEI should connect and respond to its regional community in a comprehensive way. Such plans, including goals, actions, measures, targets, timing and responsibility, need to be compiled by each HEI in consultation with their staff, local partners and clients. Such strategies should not only focus on the intended outcomes, but also on the processes that lead to these outcomes, because any mutual sustainable relationship between an institution and the regional community should be based around trust, long term commitment and exchange of good practice.³⁹ It is recognised that such an approach will require adjustments in HEIs of a structural nature which may need financial support. This is discussed further below.

HEIs may need to put in place a key executive person with responsibility for ensuring that their scholarship connections with the regional community are developed in a comprehensive way and that the changes required within the institution to make it more responsive to community needs do in fact occur. Each institution may also consider undertaking an audit of how it is currently contributing to the region’s development and identify how its contribution on this might be enhanced. The survey undertaken as part of the preparation of the Self-Evaluation Report could be a very useful base for a more intensive institutional audit. The mission and value statements of each institution could convey its commitment to the future development of the regional community. HEI policies on staff recruitment and promotion could have criteria reflecting skills and experience that are required in this area of regional engagement. Infrastructure planning and development by HEIs could include how it can partner with regional resources to realise savings and achieve more comprehensive outcomes, and how to enhance community access to institutional infrastructure (sporting facilities, laboratories, libraries, cultural centres, etc). Such approaches, together with innovative purchase and lease financial arrangements with the private sector, would lessen sunk capital maintenance payments that are a large impediment to HEI development in Atlantic Canada at present.

³⁹ Institutional budgets might include a line item to address the goals and actions identified in the plan.

Marketing, promotion and dialogue by the HEI (through websites, hard and soft media, regular events, demonstrations and festivals, etc) might emphasise and demonstrate the commitment of the institution to the regional community.

Facilitating the mutual involvement of regional community partners (business and community organisations) in institutional research programmes across a broad range of social, economic, cultural and environmental fields of local significance will be important and mechanisms may need to be put in place to bring this to fruition. Strong links between faculty research and processes of innovation at the institution and in the community need to be fostered to ensure high quality research relevant to the region produces a worthwhile impact locally. Institutions may consider establishing an internal competitive research grants programme that encourages local partnership-building around matters of local importance.

Teaching initiatives that include work-integrated learning (placements, internships, etc.) and enterprise skills need to ensure that the human capital created can add to the development potential of the local region in targeted areas of importance and opportunity. Internationalisation programmes may need to focus on areas where there is a real need to bring an international perspective to Atlantic Canada goals so that links are formed with regions and higher education institutions around the world to enable good practices to be shared for mutual gain.

6.3 “Reaching-out” goals between the institution and the region

Regional community leaders often hesitate to make contact with the university or college in their community because they do not know where to begin. HEIs need to reflect a welcoming persona and reach-out into the community. Some universities have a designated and well recognised point of contact (such as the Harris Centre at Memorial University), but most do not, apart from the telephone operator or the President’s office. The PRT recommends that each HEI designate a central point of contact that can provide advice and referral for members of the community who make contact with the institution, to assist co-ordinate knowledge within the institution and to make this contact point publicly known.

HEI leaders need to publicly commit their institution to the community’s development through the media, public events, through memoranda of understanding, and key alliances.

The idea of “debt forgiveness” has been discussed earlier in the report as a means of arresting the leakage of graduate students from the region, attracted by greater remuneration and opportunity in other parts of Canada. This strategy has been only partially successful, and may have a negative impact if such a subsidy leads to increasing student fees generally.

In order to make debt forgiveness more effective it should be linked to entrepreneurial strategy, where the financial benefit of debt forgiveness is traded for a commitment by the graduate to pursue a new local enterprise. Such an approach, however, would need to be backed up by an appropriate programme in the HEI that teaches those students that want to be entrepreneurs the required skills of entrepreneurship.

Apart from this, there is a need for a comprehensive region-wide human capital strategy to be developed and driven by the key organisations such as ACOA, APEC, AAU, APCCC, and education Ministries. Such a strategy, as was discussed in earlier chapters, should have both a horizontal and vertical reach. Horizontally, the strategy should link the whole of the education system through unambiguous pathways, work-integrated learning, a focus on local enterprise, life-long learning, local recognition and reward, career planning, and other teaching initiatives, to agreed-upon Atlantic Canada opportunities. There should be no compromise of pedagogy and teaching quality in such an approach. With students being clearer about pathways and occupational opportunities within the region, through a comprehensive human capital plan of this kind, there may be a reduced exodus of young knowledge workers. Vertically,

the human capital strategy needs to reach out to those with spatial and socio-economic disadvantage, particularly in smaller rural communities, to improve their skills (including literacy and numeracy) and life opportunities within the region and drag them into a lifelong learning agenda for Atlantic Canada.

While the structure of industry in Atlantic Canada, vis-à-vis other regions, can make it difficult to enhance innovative capacity of the region, the PRT was made aware of a number of successes which may offer a model to build a wider approach for Atlantic Canada. We were impressed in particular with the broker role being played by the Harris Centre at Memorial University (see Box 4.6) where university research and community need are brought together. We were similarly impressed with the role of the community colleges in pursuing applied research with their communities. The Geomatics project and the Centre for Community Living in the Annapolis Valley (Box 4.2) is a case in point. The ACOA Atlantic Innovation Fund (Box 4.1) and the Springboard initiative (Box 4.3) also add to the region's innovation capacity. Another example is the role of the University of Cape Breton in its attempt to find a solution to the environmental problem created by the Sydney Tar Ponds (Box 5.1).

What the PRT saw as missing was a region-wide blueprint of the entrepreneurship and innovation process that would be relevant. Such a blueprint could include entrepreneurship teaching programmes, business assistance, knowledge brokerage with higher education, student and staff innovation support, a complete toolbox of the suite of innovation funding possibilities (e.g. grants, seed and start-up capital, venture finance, loans, equity), including innovative funding that, may for example, leverage higher education property holdings, and the connected role of incubators, accelerators and science parks.

The Peer Review Team suggests that each HEI (university and college), in collaboration with their local community, agree on areas of priority for research and innovation to advance matters of critical importance in a partnership. The Atlantic Innovation Fund could be a vehicle for funding research and innovation in these areas of community priority.

6.4 Policy changes at a government level

The Peer Review Team suggests that a region-specific competitive grant fund is established within the region with the objectives of enhancing structural reform and efficiency within the higher education institutions, particularly in relation to programme offerings, in ways that build regional relationships with partners and contribute directly to regional goals and priorities. Increased efficiency and savings can be achieved at an institutional level by exploring aspects such as resource sharing, improving institutional education pathways, avoiding duplication and overlap in programme offerings, connecting teaching and research more closely to regional needs, and connecting research more closely to processes of innovation.

The PRT also feels that consideration could be given, within the present provincial funding allocation, to achieving greater institutional spatial equity by recognising the higher costs and lower opportunity of locating a campus in a non-metropolitan area. This would enable institutions to apply spatially variable tuition rates. The PRT understands from the Regional Steering Committee that a scheme along these lines occurs in Nova Scotia. Perhaps this could be used as a model, where relevant, in extending the practice to the other provinces.

Thought could be given for the establishment of an Atlantic research grants council similar to the model of the old Quebec FCAR for early career researchers to focus on Atlantic-specific issues. Such a research funding scheme might, in addition to the usual discovery and quality focus as portrayed through academic publication, have an element based on HEI partnership with regional business and community entities where impact is a required and measured outcome. How to effectively and consistently assess community impact, with similar rigour to the assessment of teaching and research quality, would be a consideration that would need to be worked through with such a scheme.

In Chapter 3, distance learning was discussed as a means to enhance access for those with disabilities or those in remote locations. The PRT feels that the use of technology in this way could be used to streamline course provision across institutions. The adoption of common courseware would ensure consistency in course content and would enable students to be mobile across the Atlantic region, so they could fill skill vacancies in the region where they occur.

6.5 Monitoring and evaluation

The PRT suggests that the key organisations within Atlantic Canada (*e.g.* ACOA, APEC, AAU, APCCC) consider putting in place an evaluation programme to ensure that higher education institutions continuously improve the way they go about engaging with the region's economic, social, cultural and environmental development through teaching, research and innovation. Such an initiative will require the development of suitable metrics, a mechanism for assessment that balances the views of institutions with those in the regional community, benchmarking with similar initiatives in institutions elsewhere and the sharing of good practices. Such a monitoring and evaluation framework for the regional engagement of higher education institutions should ideally be part of the same quality framework that is required of institutions for their teaching and learning and research.

7. CONCLUSIONS AND SUMMARY OF RECOMMENDATIONS

7.1 Introduction

This concluding chapter draws together the recommendations embedded in the earlier chapters of the report. They are not summative judgements and hence should not be read in isolation from the argument in the earlier chapters. The key conclusions deal with building stronger co-operation and commitment amongst key agencies and stakeholders in Atlantic Canada as a platform for enriching the growing and vital contribution of higher education institutions for the future of the region.

7.2 Promoting greater co-operation within Atlantic Canada

Earlier in this report, the idea of an Atlantic Canada region was referred to as a basically voluntary association of the four eastern provinces. No formal regional governance body exists. Nevertheless, a number of alliances have been forged to promote co-operation within the region and to take advantage of the opportunities that Atlantic Canada can exploit.

To increase the contribution that higher education can make to the region's economic, social, cultural and environmental development, the AAU, APCCC, APEC, ACOA, the Council of Atlantic Premiers, and representatives of the four provincial governments are working in various ways to promote a number of region-wide initiatives. The PRT applauds this growing culture of co-operation in the Atlantic Canada region. These are significant steps forward, particularly given the difficult and different geographical, cultural and historical circumstances of the region. The PRT also commends the role of the Regional Steering Committee in providing the support needed to add impetus to this agenda. Such growing co-operation will facilitate the implementation of actions flowing from the ongoing regional higher education agenda.

The Peer Review Team recommends the continuation of these arrangements as a significant demonstration of inter-provincial co-operation. Continued and improved cooperation is essential to the future well-being of the region.

The Self-Evaluation and Peer Review Reports provide the Regional Steering Committee with a useful work programme for strengthening human capital capacity in the region; via the promotion of education, research and innovation, and local institutional leadership to achieve many of the region's economic, social, cultural and environmental priorities. The fourteen regions and their higher education institutions involved in the OECD project also provide a resource on which Atlantic Canada can draw.

7.3 Human capital

In earlier sections of this report and in the SER, the difficulties of attaining a level of human capital needed to make the region globally competitive were discussed. There are both supply and demand side issues at work.

On the supply side, both the SER and this report highlighted current initiatives for enhancing human capital outcomes. Debt forgiveness for graduates in Nova Scotia and block transfer credit arrangements for community college students are examples. Both initiatives have the potential of reducing the outflow of graduates to other parts of Canada.

Other good practice initiatives of an institution-specific nature have focussed, in various ways, in responding to local circumstances. Examples include: the programmes at Cape Breton University and at Memorial University in Newfoundland that address the specific needs of local, often Indigenous communities, cultural literary, music traditions. Other examples are programmes at Holland College (PEI) reaching out to disadvantaged local students, programmes targeting rural and remote students at Mount Allison, and local industry-focused teaching programmes in ocean and marine studies at Dalhousie.

Issues in relation to lifelong learning, literacy, and education as an export product and as an immigration policy instrument are also being explored at both the individual institution level and at the provincial level. We have some recommendations to make about these below.

On the demand side, Chapter 2 described the small enterprise nature of the heavily dependent, but mostly declining, resource-oriented economic base of the region, the relatively low R&D absorption capacity of local businesses, the highly dispersed population and the very restricted economic base of many communities, all factors which create particular challenges. The PRT was made continuously aware of these challenges.

As a result, the Peer Review Team recommends that regional stakeholders consider the preparation of a region-wide human capital strategy that embraces two perspectives.

- The horizontal perspective would see a seamless connectivity across all sectors of education to ensure (a) that pathways are clear, unambiguous and mutually reinforcing and (b) that there is more specialisation and less duplication and overlap. Such a strategy would also be linked closely to regional priorities and emerging opportunities and, as a consequence, would involve the non-education sector in ways that add an entrepreneurial value to skills achieved through education. Initiatives like work-integrated learning are important in building this capacity with the population of the region.
- The vertical perspective of a human capital strategy would seek to involve those sectors of the community that are traditionally missed, for example, those in declining rural communities, those whose members have literacy and numeracy difficulties, those with disabilities, and those who are, because of their older age, bypassed by the higher education system.

The PRT further recommends that:

- When student debt forgiveness initiatives are implemented at the provincial level as a means of curbing graduate loss, these initiatives need to be linked to others that will contribute to realising local development benefits such as through stimulating new entrepreneurial activity.
- Regional actors should work towards a shared view and, ideally, a common strategy on how to use higher education as an instrument for promoting internal and international immigration and, consequently, also as a potential source of income.
- Regional institutions should make concerted efforts to address the needs of adult basic education (literacy and numeracy).

7.4 Research

Chapter 4 discussed the research and research training capacity of Atlantic Canada higher education institutions and how they can contribute to stronger regional development outcomes. A number of good practice examples such as Springboard; the Harris Centre at Memorial University; applied research at several of the community colleges; Annapolis Valley is a prime example; and the Rural and Small Town programmes at Mount Allison; have shown how to bridge the gap between recognising regional community problems and finding solutions to them in which higher education plays a role. Other examples of higher education research relate to investments by the federal and provincial governments in major research centres that address key local industry and resource needs. These include ocean and marine research in Newfoundland, food research in Prince Edward Island, aquaculture, to take only these examples.

Atlantic Canada higher education institutions find it difficult to compete for national research funding with larger institutions in other provinces, and they find it difficult to get large local partners that can help to match federal funds. Traditional resource-based industries in the region tend not to perceive many benefits from investments in research.

The Peer Review Team recommends that Atlantic Canada consider creating its own research fund for higher education, perhaps along the lines of the old Quebec FCAR. It would focus on the region's priority areas and encourage higher education partnerships with industries and communities. The fund should not compromise on research quality, but should nonetheless put emphasis on regional impacts as a major objective. Community colleges as well as universities should be eligible to compete for such funds.

The PRT also recommends that HEIs themselves consider creating their own internal seed funds, if none already exist, for young researchers who focus on regional community engagement objectives. Again, such grants should, where appropriate, encourage partnership contributions from industry and communities. The research brokerage model of the Harris Centre is worth consideration by other higher education institutions.

Other initiatives worth considering include hiring researchers with national and international reputations to attract large research grants that can help the region. There are several avenues here that could be pursued. High profile expatriates in key research areas of relevance might be persuaded to return to the region with offers of well-funded chairs and industry experts could be recruited into academia to assist in building collaboration between higher education research and industry needs. The *lectoraten* are designed to do this in the Netherlands (see Chapter 4).

7.5 Innovation

Promoting a culture for innovation is a prerequisite for the transformation of the Atlantic economy from natural resource dependency to one based upon knowledge and technology. Only 18% of the region's R&D is performed by the private sector, compared with 56% nationally. Not having innovation-oriented businesses firms certainly contributes to the low innovation take-up, as does the lack of absorptive capacity for innovation resulting from a preponderance of SMEs. The relative absence of a head office economy further contributes to the low take-up of innovation.

As discussed in earlier parts of this report, ACOA programmes have been a significant boost to building an innovative culture in Atlantic Canada, particularly through mechanisms such as the Atlantic Innovation Fund, the Strategic Community Investment Fund, the Business Development Program, and Springboard. The Genesis Group at Memorial University have been successful in taking good applied research and growing sustainable business enterprises through innovation and technology transfer, as has

the NRC-IRAP in Halifax with its work with the Dalhousie Industry Liaison and Innovation office. Innovation incubation occurs at a few centres such as Genesis and InNOVA Corp in Halifax. The question is how to build a momentum for innovation that goes beyond the largest urban centres of Halifax and St John's and into the places where transformation is most needed.

The Peer Review Team recommends the preparation of a regional blue print for innovation that deals with a range of innovation and entrepreneurial elements. Such a plan should begin at the institutional level and encourage teaching entrepreneurship to students who want to be local entrepreneurs. The small enterprise base of the region's economy, and its wish to develop into a knowledge economy lends itself to such an approach by higher education.

The teaching of entrepreneurship should include incubation support for the most promising young innovators. The plan should include a business advice and knowledge brokerage service that bridges the gap between higher education research and business needs for market growth and diversification. The full range of funding options for local innovation should be made clear, as should the region's commitment to incubators, accelerators and science parks, and their connection to regional priorities.

A regional blue print for innovation would make connections with the range of existing government mechanisms, particularly the Atlantic Innovation Fund. Two further elements could also be considered as a means of boosting regional innovation: ensuring innovation is connected to regional strengths, and exploring how university capital assets (land, buildings and equipment) as well as faculty and staff can be leveraged to provide support for innovation.

7.6 Structural considerations

Three features affect the competitive position of higher education institutions in Atlantic Canada: their relatively small size, the size of the deferred maintenance of institutional sunk capital, and the small and often declining base of the communities in which they are located⁴⁰. But it also could be argued that the relatively small size of the institutions offers them the advantage of being nimble and responsive to the changes that are needed in a rapidly changing global environment. And the small size of the communities in which they are located can ensure more engaged and mutually beneficial relationships between the institutions and communities. This might be made a competitive edge for higher education in Atlantic Canada, as compared to larger higher education institutions in larger population centres in the rest of the nation.

It is also possible that strong engagement between HEI and other regional stakeholder interests can lead to new areas of infrastructure and resource sharing with consequent expenditure savings. Many HEIs, particularly newer ones, are now sharing with communities and local government agencies such expensive capital assets as sporting facilities, cultural facilities, libraries, business incubators, science laboratories, office space, to name but a few. Such approaches, together with innovative purchase and lease financing arrangements with the private sector may be a strategy for lessening future sunk capital maintenance payments.

For Atlantic Canada to fully exploit this advantage there needs to be a greater institutional commitment in responding to regional needs and to supporting regional goals.

Chapter 6 discussed a number of "reaching-in" initiatives that institutions could take to ensure that they become more responsive, structurally and behaviourally, to their local communities.

⁴⁰ The current accumulated deferred maintenance across Atlantic Canada university campuses is CAD 862 million.

The Peer Review Team recommends that higher education institutions review their missions, governance arrangements, strategic planning, and policies for staff promotion, recruitment and budgeting to ensure that they more fully reflect their role as public knowledge creation and dissemination institutions in the communities in which they are located. Many community members do not know how to gain access to the resources of colleges or universities. A clearly defined, well-publicised central entry point to the institution might help greatly. Mechanisms may be needed to build stronger connections between faculty research and processes of innovation that target regional economic, social, cultural and environmental concerns.

Teaching programmes not only need to respond to regional demand by being both targeted and flexible but should enable students to acquire skills that add to the regional economy's diversity and dynamism. Marketing and promotion, infrastructure planning and internationalisation initiatives need to reflect the relationship between higher education institutions and the communities.

The PRT further recommends that each institution undertakes an audit of its current regional community engagement activities, in co-operation with community partners, and identify areas in which the relationships can be improved. Such an audit should include facilities where there is the prospect for sharing (e.g. sporting facilities, science laboratories, libraries, environmental management facilities such as recycling and waste minimisation) to overcome capital and future maintenance costs. We further recommend that a detailed monitoring and evaluation framework be put in place within institutions, and possibly also on a whole of region basis, to ensure there is continuous and good practice improvement, including benchmarking with other institutions in similar circumstances.

To facilitate these institutional changes we recommend consideration by government of an Atlantic Canada programme of competitive grant assistance that focuses on higher education institutions building collaborative relations with other education sectors and non-education organisations within the region, to remove duplication and overlap and to achieve institutional saving in course offerings and research partnerships.

7.7 Social, cultural and environmental development

Social, cultural and environmental considerations are a significant part of the OECD project. They are seen as providing an important supporting fabric for the sustainable prospects for the region. While the PRT would like to have been exposed to a wider array of initiatives in these three areas in relation to Atlantic Canada, it is clear from other material that the cultural, social and environmental matters are taken seriously. We also recognise that there are significant matters of economic development that are foremost in the minds of national, provincial and local leaders as they grapple with the region's future global prospects.

The region has a rich and diverse cultural underpinning. The diversity gives strength to the region's future possibilities. Earlier chapters commented on the important role played by HEIs in social well-being and welfare and in building relationships between urban and peripheral rural parts of the region. There is also no doubt that the physical environment in Atlantic Canada is quite unique and is highly valued internationally. If it is to feature significantly in the future development prospects of the region, including through ecotourism, it will also need to be given the benefit of sharp focus in higher education teaching and scholarship.

The Peer Review Team recommends that social, cultural and environmental considerations feature strongly in efforts by institutions and regional development agencies to build regional development through higher education.

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APPENDIX 1: THE OECD REVIEW TEAM

Lead Evaluator

Steve Garlick has more than twenty years experience in the field of regional development as a policy developer and ministerial adviser, programme manager, regional practitioner, and researcher. He was a senior executive in the Australian Government for twelve years in the areas of regional development, industry and local government. He holds Masters and PhD degrees in economics. He is currently Professor of Regional Engagement at the University of the Sunshine Coast in Queensland and Professor of Regional Development at Swinburne University of Technology in Melbourne. His research interests are in the fields of regional and community development, higher education, applied ethics, institutional performance assessment, and the role of senior aged people as human capital. For the last eight years he has researched and published particularly in the area of universities and regions. He also runs a research consultancy business. In his spare time he is the president of a large Australian native animal caring organisation and, with his wife, provides clinical care and rehabilitation for injured and orphaned wildlife on their property near Canberra, the National Capital.

International Expert

Gordon Davies served as the Director of the State Council of Higher Education for Virginia from 1977 until 1997, and as President of the Kentucky Council on Postsecondary Education from 1998 until 2002. He has taught at Yale University, Richard Stockton State College, and the Teachers College of Columbia University. He was a founding dean of Richard Stockton State College in New Jersey. A native of New York City, he is a Navy veteran and worked for several years in computer sales for the IBM Corporation. His earned degrees are from Yale University in English (BA) and the Philosophy of Religion (MA, PhD). Currently he directs a project to improve state higher education policy making. Funding for the project is provided by The Pew Charitable Trusts. He serves on the Board of Directors of the National Center for Higher Education Management Systems.

National Expert

Mario Polèse is research professor at the *Institut national de la recherche scientifique* (INRS) in Montreal and holds the Senior Canada Research Chair in Urban and Regional Studies. He is the author of *Économie urbaine et régionale* (Economica, Paris, 2005), the principal textbook in French in urban & regional economics (translated into Spanish and Portuguese). His recent publications include *The Social Sustainability of Cities: Diversity and the Management of Change*, with Richard Stren (U. of T. Press, 2000). *The Periphery in the Knowledge Economy* (with R. Shearmur: INRS, Montreal, 2002); *Connecting Cities with Macroeconomic Concerns: The Missing Link* (with M. Freire: World Bank, 2003). Mario Polèse holds a PhD in Urban and Regional Planning and an MA in Regional Science. He writes regularly on issues of regional and urban development, and frequently acts as a consultant to municipal, provincial, federal, and international agencies. He has held teaching and research positions in Latin America, The Caribbean, Switzerland, Spain and France.

Team Co-ordinator

Fumi Kitagawa holds a PhD in Urban and Regional Studies. Her research expertise includes universities and city-region development, regional innovation systems, innovation policies and competitiveness. In 2005 she held the Jean Monnet Fellowship at the European Forum, “The Role of Universities in Innovation Systems”, Robert Schuman Centre for Advanced Studies at European University Institute. Her recent work at Department of Higher Education Research, National Institute for Educational Policy Research (NIER) has focused on teaching and learning development, internationalisation of higher education, financing of higher education, and university-industry links.

APPENDIX 2: REGIONAL CO-ORDINATOR, REGIONAL STEERING COMMITTEE, AND THE AUTHORS OF THE REGIONAL SELF-EVALUATION REPORT

Regional Co-ordinator

Wade Locke Memorial University

Members of the Regional Steering Committee for Atlantic Canada

Elizabeth Beale Atlantic Provinces Economic Council (Chair)
Rob Greenwood Memorial University
Wade AuCoin Atlantic Canada Opportunities Agency
Peter Halpin Association of Atlantic Universities
Cyril Farrell Atlantic Provinces Community College Consortium
Rhéal Poirier The Council of Atlantic Premiers
Michael Clow Government of Prince Edward Island
Denise Hanrahan Government of Newfoundland and Labrador
Greg Ells Government of Nova Scotia
Brenda McCavour Government of New Brunswick

Authors of the Regional Self-Evaluation Report

Wade Locke Memorial University
Elizabeth Beale Atlantic Provinces Economic Council (Chair)
Rob Greenwood Memorial University
Cyril Farrell Atlantic Provinces Community College Consortium
Stephen Tomblin Memorial University
Pierre-Marcel Dejardins Université de Moncton
Frank Strain Mount Allison University
Godfrey Baldacchino University of Prince Edward Island

APPENDIX 3: PROGRAMME OF THE REVIEW VISIT

17-23 September 2006

Sunday 17 September

Panel Private Meeting

Monday 18 September

8.30am – 9.30am

Meeting/Tele-Conference with Regional Steering Committee

Elizabeth Beale, Wade Locke, Rob Greenwood, Cyril Farrell, Peter Halpin, Greg Ells, Brenda McCavour, Candice Ennis Williams

9.30am – 11.00am

Focus Group on Commercialisation

Lynn Bowen Avery (APCCC)
Robert Cowan (Industrial liaison and Innovation office, Dalhousie University)
Dan MacDonald (InnovaCorp)
Denise Lalanne (NRC)

Team 1

11.00am – 1.00pm

Atlantic Policy Congress of First Nation Chiefs Secretariat Inc.

John J. Paul (Executive Director)

1.30 pm – 2.45pm

Nova Scotia Community College

David Woolnough (Director, Applied Research)
Colin MacLean (Vice President, Organizational Development & Strategic Planning)

3.00 pm – 4.30pm

Dalhousie University

Peter Gregson (Department of Electrical & Computer Engineering)

Team 2

1.30 pm – 3.30 pm

Mount Allison University

Frank Strain (Department of Economics)

Tuesday 19 September

Team 1

8.30 am – 9.40am

Government of Nova Scotia, Office of Economic Development

Greg Ells Director (Universities & Colleges, NS Department of Education)
Jeffery MacCallum (Director, Policies & Strategies, Office of Economic Development)

9.45 am – 10.45am

Nova Scotia Health Research Foundation

Krista Connell (Chief Executive Officer)

1.00 pm – 2.30pm

Nova Scotia Agricultural College

Philip Hicks (President)

4.30pm – 6.00pm

Saint Francis Xavier University

Andrew Kendall (Industry Liaison Office)

Team 2

9.00am – 10.00am **Holland College**
Dawna Noonan (Development & External Relations)
Michael O’Grady (Programs and International Development)

10.30am – 11.30am **University of Prince Edward Island**
Vianne Timmons (VP Academic Development)

11.30am – 12.30pm **Department of Education, Prince Edward Island**
Mike Clow (Director of Continuing Education & Training)

Wednesday 20 September

Team 1

8.30am – 9.45am **Cape Breton University**
Harvey Johnstone (Dean of Research)

10.00am – 11.00am Tony Secco (VP Academic Research)

11.00am – 12.00am Austin Smith (Student Union)

Team 2

9.00am – 10.00am **University of New Brunswick**
Gregory Kealey (VP Research)

10.15am – 12.00m **Maritime Provinces Higher Education Commission**
Mireille Duguay (Chief Executive Officer)
Government of New Brunswick
Brenda McCavour (Post-Secondary Education, Training and Labour)
Louise Boudreau (Department of Post-Secondary Education, Training and Labour)

2.30 pm – 4.00pm **l’Université de Moncton**
Pierre-Marcel Desjardins (Department of Economics)
Daniel Bourgeois (Director, CIRPPPA)
Yves Bourgeois (Senior Researcher, CIRPPPA)

4.00pm – 6.00pm **Atlantic Canada Opportunities Agency**
Wade AuCoin (Policy Analyst)
David Slade (Director General of Policy)
Lucienne Godbout (Director General of Enterprise Development)
Denise Frenette (Director of Innovation)
Beatrice Landry (Director of Strategic Policy Development)
Marc-Andre Chiasson (Senior Development Officer)

Thursday 21 September

9.00am – 10.00am **Memorial University**
Chris Loomis (Vice-President, Research)

10.00am – 11.00am **College of North Atlantic**
Bruce Hollett (President)

Corrine Dunne (Vice-President, Development and College Advancement) Brian Tobin (Vice-President, Academic and Student Services)

- 11.00am – 12.00pm** **Government of Newfoundland and Labrador**
Candice Ennis Williams (Director of Adult Learning & Literacy)
Cyncie Chastup
- 12.00pm – 1.30 pm** **Student Union Representatives**
Kelly Greenfield
Deatra Walsh
- 1.30pm – 2.30pm** **Regional Stakeholders**
Hilary Rodriguez (Rodrigues Winery and Natural Newfoundland Nutraceuticals Inc./Chair, Leslie Harris Centre of Regional Policy and Development)
Victoria Belbin (Executive Director, Newfoundland and Labrador Regional Economic Development Association (NLREDA))
Alison Earle (Assistant Deputy Minister, Executive Council, Rural Secretariat)
Kerry Murray (Director of Economic & Social Policy, Newfoundland & Labrador Federation of Labour)
Stephen Jewczyk, City Planner, City of Mount Pearl
- 2.30pm – 3.30pm** **Newfoundland and Labrador Federation of Labour**
Reg Anstey (President)
Lana Payne (Vice-President)
- 3.30pm – 4.30pm** **St. John's Board of Trade**
Raymond Dillon (President)
- 4.30pm – 5.30pm** **Memorial University (Aboriginal Research)**
David Natcher (Canada Research Chair in Aboriginal Studies, Department of Anthropology)
Larry Felt (Department of Sociology)
- Friday 22September**
- 9.30am – 10.30 am** **Atlantic Provinces Community College Consortium (APCCC)**
Cyril Farrell (Executive Director)
- 10.30am – 11.30am** **Industry Canada**
Patricia Hearn (Provincial Director)
- 11.30am – 1.00pm** **Genesis & Spin-Off Companies**
David King (Genesis, President and CEO)
Fraser Edison (Rutter)
Jamey King (Verafin)
Chris Griffiths (Garison Guitar)
- 1.00pm – 2.00pm** Team Lunch
- 2.00pm – 2.30pm** **Newfoundland and Labrador Provincial Coordinator**
Stephen Tomblin (Department of Political Science, Memorial University)

2.30 pm – 3.30 pm **Harris Centre**
Rob Greenwood (Director)
Michael Clair (Associate Director, Public Policy)
David Yetman
David Vardy

3.30pm – 5.00pm **Meeting/Tele-Conference with Regional Steering Committee**
Wade Locke, Rob Greenwood, Wade Aucoin, Greg Ells, Candice Ennis
Williams, Stephen Tomblin

Saturday 23 September

10.00am – 12.00am Panel Private Meeting

N.B. People consulted during the pre-visit (16-18 August) are as follows (order of meeting)

Elizabeth Beale (Atlantic Provinces Economic Council); Colin MacLean (Nova Scotia Community College); Jeffrey Friesen & Doug Robertson (Atlantic Canada Opportunities Agency); Robert Berard (Mount Saint Vincent University); Peter Halpin (Atlantic Association of Universities); Wayne Doggett (Government of Nova Scotia); Mike Tipping (Dalhousie University, Student Union); Sara Jane Snook (Springboard); Rob Greenwood (Memorial University); Lynn Bowen Avery (Atlantic Provinces Community College Consortium); Ray Dillon (St. John's Board of Trade); Lana Payne (N&L Federation of Labour); Bruce Hollett, Rachelle Cochrane (Government of Newfoundland and Labrador); Corrine Dunne (College of North Atlantic); Glen Blackwood (Marine Institute); David Moores, Yvonne Hardy, Tim Power (Atlantic Canada Opportunities Agency, and the Government of Newfoundland and Labrador); Stephanie Dalton (Memorial University, PhD Student); Eddy Campbell (VP Academic, Memorial University); Axel Meisen (President, Memorial University); Elizabeth Lawrence (City of St. John's)