

Acknowledging the Gaps in Our Knowledge Economy: A Call for Clear Thinking on High Tech in Nova Scotia

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Foreword by Brian Lee Crowley, AIMS President

There is no part of the world that does not wish to participate in the knowledge economy. India, China, South Africa and Singapore are just some of the societies in the developing world that have hitched themselves to this engine of economic growth, while the controversy swirling around the idea of “outsourcing” in the US election campaign signals the anxiety in the world’s richest society about their continuing ability to compete effectively in this area.

Nova Scotians, too, are asking themselves what strengths and weaknesses they bring to the table in the ceaseless battle for competitive advantage at the place where technology and international trade meet. One attempt to assess the positioning of Nova Scotia in this regard has been the Report Card of NovaKnowledge, a respected NGO that speaks on behalf of

much of the knowledge economy in the province. But while the Nova Knowledge Report Card makes a valuable contribution to understanding the knowledge economy here, it only scratches the surface of the issues we need to understand and respond

to. That is why AIMS, using the Report Card’s original analysis as a starting point, is offering an additional fresh perspective on the issues Nova Scotians need to come to grips with if they’re serious about having the knowledge economy flourish here. •

Executive Summary

The 2003 edition of NovaKnowledge’s *Nova Scotia Knowledge Economy Report Card* understandably interprets the economic data in the most positive light possible, perhaps in an attempt to persuade readers outside the province that Nova Scotia’s knowledge economy is performing better than it is. Nova Scotians, however, might find a more objective analysis of economic indicators will make it easier to make the right decisions with respect to improving their knowledge economy performance. For example:

- The Report Card states that “Nova Scotia’s economy pays an added premium to the well educated, in comparison with national standards.” In fact, average earnings for university graduates in Nova Scotia are 18 percent lower than for those in Canada.
- The Report Card refers to outmigration of highly educated workers without pointing

out how severe the problem really is: a net 15 percent for university graduates across all disciplines, and far higher in the pure and applied sciences; moreover, the situation is predicted to get worse.

- The Report Card cites strong job creation, glossing over the highly significant weakness in the creation of jobs in industries with above-average earnings, where Nova Scotia performs at 10 percent of the national average.
- The Report Card states that “Nova Scotia’s service sector is relatively productive in a Canadian context,” even though the province lags the Canadian average in every category except one, by almost 20 percent across all industries and in one case by more than 50 percent.

Open debate, objective measurement, and collective action on the challenges facing Nova Scotia’s economy are the best ways to contribute to positive action to meet those challenges.

Introduction

Since 1998, NovaKnowledge has been publishing its flagship product, the *Nova Scotia Knowledge Economy Report Card*.¹ As its website indicates, the Report Card's intent is to "define...and monitor...the progress of Nova Scotia's knowledge economy." Congratulations are due to NovaKnowledge for addressing underlying indicators of performance as a means of measuring economic health. Objective measurement can provide an excellent starting point, allowing serious commentators and practitioners to understand the critical, fundamental issues and to address them positively and efficiently. Although I take careful aim in this paper at several of the conclusions drawn in the Report Card and suggest that, in fact, some of its analysis is incomplete and may be inaccurate, I applaud the underlying intent.

Shakespeare's Prince Hamlet asked "whether 'tis nobler in the mind to suffer the slings and arrows of outrageous fortune, or to take arms against a sea of troubles, and by opposing, end them." In his case, vacillation led to destruction. In the case of Nova Scotia's economy, the alternatives are not as clearly defined — we could continue to lag national and international standards for a long time if we choose to do so. However, to address the areas of opportunity and improve Nova Scotia's economic situation represents an exciting and worthwhile challenge. The starting point is a clear understanding of our state of affairs — what exactly is swimming in our "sea of troubles"?

In attempting to provide understanding, the 2003 Report Card addresses many key issues. In several cases, however, it either stops short of reaching conclusions or arrives at ones that are highly questionable and, in one case, quite misleading. In this paper, I analyse key issues the Report Card raises, and make suggestions that may provide better starting points for understanding Nova Scotia's current situation and, ultimately, encouraging economic growth. In doing so, I am guided by a simple rule when dealing with long-range, complex issues: "think strategically and measure."

Critique of Important Themes in the Card

Wage and Salary Comparisons

In its summary, the 2003 Report Card starts with apparent good news, attempting to "bust the myth" that well-educated Nova Scotians are much better off if they leave the province. The Report Card refers to the earnings differential between university graduates and high school graduates in the province, which it says is 9 percent larger in Nova Scotia than the national average. As the Report Card says, "In fact, Nova Scotia's economy pays an added premium to the well educated in comparison with national standards."

¹ For more information on NovaKnowledge and copies of its Report Cards, see website <http://www.novaknowledge.ns.ca>.

This statement may be true, but it is relevant only if Nova Scotia's university graduates are interested in the amount of their compensation compared with that of the province's high school graduates. Data from the 2001 Census indicate the misleading nature of the Report Card's apparent good news. In fact, average earnings of all Canadian workers are 19.2 percent higher than those in Nova Scotia, while average earnings of university graduates across Canada are 18.2 percent higher than in Nova Scotia (see Table 1).

Job Creation/Outmigration

If university graduates in Nova Scotia are not well off relative to those in Canada as a whole, a contributing factor could be the low rate at which challenging and highly paid jobs are created in the province. Indeed, as the Report Card points out (in its Figure 17, "Job creation strong, more balance needed"), Nova Scotia is creating jobs in industries with above-average earnings at one-tenth the rate of the rest of Canada.

Given the serious issues of compensation and the creation of challenging jobs, the question must then arise: how is the province doing in terms of retaining its university graduates? The Report Card refers to "out-migration of highly skilled, highly educated engineers and scientists" and provides a reference to the

Survey of 1999 Maritime University Graduates in 2001, published by the Maritime Provinces Higher Education Council (MPHEC 2003).

Detailed examination of the MPHEC survey reveals highly disturbing data not brought out in the Report Card. Two years after

Table 1: Nova Scotia and Canada Salary Comparisons, 2001 Census

	Canada	Nova Scotia	National Advantage
All workers	\$31,757	\$26,632	19.2%
High school certificate and/or some post-secondary	\$25,477	\$20,553	24.0%
University certificate, diploma or college	\$48,648	\$41,146	18.2%
Premium for university over high school	90.9%	100.2%	

graduation, 22 percent of graduates who were originally from the Maritime provinces had left the region. When taking into account the movement of graduates into the Maritimes from elsewhere in Canada, the net loss was 15 percent, up from 6 percent three years earlier. In some professional areas, the losses of graduates originally from the Maritimes were dramatically higher: 39 percent of graduates in engineering and applied science, 35 percent of those in mathematics and physical sciences, and 32 percent of those in fine and applied arts.

Clearly, Nova Scotia faces a major challenge in retaining its university graduates, which has a correspondingly negative impact on economic performance. To quote from the MPHEC report: “The net loss of university graduates from the region is already an important public policy issue; it is likely to warrant even greater attention over the coming decade.” MPHEC predicts the problem will worsen in the foreseeable future.

In Figure 7 of the Report Card, “The pessimists are wrong about higher education,” 42 percent of Nova Scotians polled by Corporate Research Associates believed that career opportunities were worse in Nova Scotia than elsewhere in Canada, while 52 percent believed opportunities were the same or better. In the caption to the figure, the Report Card states that “we tend to be...wrongly pessimistic...about job prospects for university graduates in this province.” Based on salary information and job creation statistics, it appears that the pessimists are wrong only if university graduates are prepared to work in industries with below-average earnings and to be paid substantially less than they would be elsewhere in Canada. The retention statistics clearly show that graduates themselves are voting with their feet.

Immigration to Nova Scotia shows a similarly disturbing trend. According to Figure 21, “Nova Scotia’s share of immigration falling,” in 1996 Nova Scotia attracted 1.7 percent of Canada’s immigrants; in 2002, the number was 0.6 percent, a two-thirds reduction. (Nova Scotia represents approximately 3.3 percent of Canada’s population, so per capita we are well below the national average.) In addition, according to Nabiha Atallah of the Metropolitan Immigrant Settlement Association, an estimated 62 percent of immigrants arriving in Nova Scotia during the 1990s left again within the decade.

The economic environment in Nova Scotia appears to be neither

challenging and fulfilling for our university graduates nor attractive as a destination for immigrants.

Productivity

Productivity is a key issue facing Canada as a whole and Nova Scotia in particular. Canada’s productivity is 82 percent of that of the United States, and Nova Scotia’s is 82 percent of that of Canada, meaning that Nova Scotia’s productivity is only 67 percent of the US level.

Figure 13 of the Report Card presents comparisons by industry group, with the caption “Nova Scotia’s service sector is relatively productive in a Canadian context.” The figure reveals, however, that only one service sector within Nova Scotia’s economy is more productive than the Canadian average, and only by four percent. All other areas lag — by as much as 50 percent in the case of administrative/business services. Clearly, Nova Scotia has a serious problem with productivity.

In the professional/scientific/technical sector, for example, Nova Scotia scores at 85 percent of the national average, down from 95 percent in 1997, despite greater investment in technology than the national average. As revealed in Figure 10 of the Report Card, “Investing in technology: Nova Scotia moves ahead,” Nova Scotia invests in technology at a rate of 8.6 percent of gross domestic product (GDP) versus a national average of 8.0 percent. Given that significant investment, why is the province not more productive?

The Report Card observes that “it is important to note that there is no direct link between hard work and productivity, which is measured by GDP created per hour of work. Labour productivity is linked instead to capital investments in plant, technology, and equipment.” Hard work and productivity are so often coincident, at least in my experience, that I would suggest a link can be inferred. The second part of the observation is precisely the question that the Report Card avoids in the face of our high levels of investment.

One study commissioned by the Nova Scotia government and ACOA suggests that Nova Scotia may lag in terms of productivity for a number of significant reasons (O’Farrell 1990). The study found that, compared with competitive companies in New England, Nova Scotia firms had invested in newer equipment but for an outdated technology, productivity was lower, costs were higher, and quality in many cases was unacceptable.

In the introduction to a recent paper published by the Atlantic Institute for Market Studies, Charles Baillie, at the time chairman and chief executive officer of TD Financial Group, was quoted as observing that Americans enjoy a standard of living some 30 percent higher than that of Canadians, and he challenged Canadians to find ways to close the productivity and standard-of-living gaps with the United States (Crowley 2002). Nova Scotia must take up that challenge; a good place to start would be to acknowledge the seriousness of the problem, something the Report Card fails to do.

How do we couple the university-driven R&D to the economy? Unless we can close the loop and gain benefit, perhaps the investment would be better directed elsewhere

Workers in Nova Scotia earn substantially less than the national average, with university graduates behind by more than 18 percent

Commercialisation of Investment

As noted above, Nova Scotia does not appear to be getting adequate returns on its investment in technology. At the same time, as Figure 3 of the Report Card (“Universities drive research in Nova Scotia”) reveals, levels of investment in research and development (R&D) are relatively high, ranking third in the country, with university investment the highest in Canada as a percentage of GDP. The question then arises: how do we couple the university-driven R&D to the economy? Unless we can close the loop and gain benefit, perhaps the investment would be better directed elsewhere.

The Report Card states, “Locally owned small and medium-sized firms are generally not R&D driven, and international companies with Nova Scotia operations tend to support R&D activity elsewhere.” If that is the case, perhaps we need to assess the most appropriate areas in which to invest, and focus more on them to provide measurable returns to the economy.

Venture Capital

The level of venture capital investment is a significant indicator of the economic health of a province. The Report Card, in its Figure 8 (“Nothing ventured”), places Nova Scotia eighth out of the 10 provinces in terms of such investment as a percentage of GDP, with an investment level that is just 20 percent of the Canadian average. On its own, however, the measure of venture capital provides little in terms of useful knowledge, and must be supported by insight into underlying contributing factors.

For example, McMahon and Rowlands (1996) argue with respect to Atlantic Canada that “[t]wo main impediments stand in the way of a more active venture capital market: the [excess] availability of subsidized government financing and a fractured and difficult securities regime.” Venture capital investment levels point to a number of environmental issues that must be addressed before increases can be expected.

Education

Figure 4 of the Report Card (“Nova Scotia a leader in university education”) shows that the percentage of 18- to 24-year-olds who are enrolled in university is substantially higher in Nova Scotia than in Canada as a whole. One could, however, question the value of the investment in university education in light of the exodus of university graduates cited above. For example, should the province continue to invest in the education of engineers when nearly 40 percent of graduates leave within two years?

Looking past university enrolment, the participation rate of 18- to 24-year-old Nova Scotians in colleges and vocational schools is actually much lower than in Canada as a whole. Combining participation in both university and college/vocational schools, the rate for Nova Scotia is 42 percent versus a national figure

of 45 percent and on this basis, Nova Scotia lags the Canadian average in terms of participation in post-secondary education.

One bright spot, as the Report Card’s Figure 5 (“Higher education is also ‘hire’ education”) shows, is that Nova Scotians with a university degree are more likely to hold a job than those with a degree in Canada as a whole, but only by one or two percent. Employment for those with a post-secondary certificate or diploma, however, lags the Canadian average by eight percent.

Human Resources Practices and Company Growth

The Report Card rightly notes that, in the face of outmigration and the continuing demand for skilled people, the ability to attract and retain good employees is a key issue for companies in Nova Scotia. The Report Card’s emphasis on human resources practices is well founded, and I endorse its conclusion that “effective [human resources] practices provide a positive return on investment.”

The CALL to Action

One of the most important features of the Report Card is its “CALL to Action,” comprising four objectives: Commercialization of research; Attitude; Leadership; and Lifelong learning. It is difficult to argue with many of the suggestions in the CALL to Action, but at the same time, it is difficult to see what directions and tangible benefits are being called for. Without specific measurements that reflect underlying economic forces and/or end results of value, the CALL lacks focus.

What to Do?

A critical starting point in any strategy for improvement is to measure critical success factors so that programs can be structured to address underlying economic forces that will produce the desired results. To be meaningful, however, the measurements must be analysed for internal consistency and connected to the performance of the economy as a whole. The Report Card presents a number of indicators, but does not accurately place them in the context of economic performance.

Conclusion

In concept, the 2003 *Nova Scotia Knowledge Economy Report Card* represents an excellent step toward understanding the current state of the province’s economy. In execution, however, the Report Card does not address the serious nature of the

challenges Nova Scotia faces.

The fact remains that workers in Nova Scotia earn substantially less than the national average, with university graduates behind by more than 18 percent. The province has a significant problem in its inability to create jobs in industries with high earnings, and it is experiencing a net outflow of university graduates at an unsustainable rate. Moreover, the province's productivity is low and must be improved if it is to be competitive in a world economy.

The Report Card, though useful, stops well short of providing the kind of analysis that can help point the way to address our challenges. Only when Nova Scotians are willing to grapple with the issues can we expect appropriate action to be taken.

Appendix: Example Programs

Examples of challenges successfully met in other parts of the world can provide lessons for Nova Scotia. One such example is Ireland's reversal of the emigration of its people; the other is the commercialisation of investment in Ontario. Each lends itself to top-level metrics driven by underlying program directions.

Migration

Ireland's experience indicates what can be done with respect to migration. After a long history of mass emigration, Ireland was able to turn its economy around, largely through a series of measures based on decreasing tax rates, to the point that people are striving to immigrate. Former Irish prime minister John Bruton has stated: "In Ireland's case, our full economic potential was not achieved for a long time. Generations of Irish people had to emigrate, never to return.... Now, thanks to our success, instead of having to bid up wages to recruit staff, expanding firms in Ireland find that they can recruit among the Irish abroad" (McMahon 2000, 5). The lesson from the Irish example: it appears outmigration can be reversed, but only by correcting underlying economic circumstances.

Commercialisation of Investment

In 1987, the Ontario government started the Ontario Centres of Excellence (OCE) program, aimed at connecting university research with industry. One of the centres, Manufacturing Research Centre of Ontario, determined that research must have an industry target to qualify for OCE funding. Today, 17 years later, the program continues with the OCE in manufacturing, Materials and Manufacturing Ontario (MMO), supporting a similar concept. According to its website, MMO expresses "a commitment to co-determination, the process by which MMO, the universities, industry and government will work together to determine and develop priorities, programs and projects. The process of co-determination will precede and lead to research funding."²

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Author's Biography

Jim Retallack was raised in Dartmouth, N.S., leaving in 1965 for undergraduate studies at Acadia University. He holds a BSc in mathematics and physics from Acadia, an MASc from the University of Waterloo, and a PhD in electrical engineering from the University of Southampton.

Dr. Retallack joined Nortel in Ottawa in 1979, migrating from product development through manufacturing to general management of two business units in Australia between 1989 and 1991. Remaining in Australia after leaving Nortel, Dr. Retallack established the Acadia Management Group (AMG) as a consultancy focused on commercialisation of technology-based product and service concepts. Returning to Nova Scotia in 2000 with Telcordia Technologies, Dr. Retallack re-established AMG Inc. in 2001 and continues to pursue commercialisation opportunities wherever possible.

Dr. Retallack has extensive research experience, with 15 publications for referenced technical journals and conferences, and three patents on telecommunications equipment. He maintains an intense interest in the performance of Nova Scotia's economy, particularly the knowledge-based component, believing that we can and should exploit our lifestyle advantages to enhance our economic performance.

² Materials and Manufacturing Ontario; see website at <http://www.oce-ontario.org/centres/mmo/howweare.html>.



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