

Choosing a Future:



A New Economic Vision for Ottawa

Final Report
ICF Consulting
August 2000

The Ottawa Partnership
Partenariat économique Ottawa

Choosing a Future: A New Economic Vision for Ottawa

Final Report

**Prepared by:
ICF Consulting
60 Broadway
San Francisco, CA 94111**

August 2000

Project Management for the Ottawa Economic Generators Initiative:

Region of Ottawa-Carleton
Economic Affairs Office
Réjean Chartrand, Project Director
Robert McCallum, Project Manager

Project Consulting Team:

ICF Consulting

Ted Lyman, Project Director
Economic Strategy Group
San Francisco, California
415-507-7282
tlyman@icfconsulting.com

FoTenn Consultants

Robert Tennant
Ottawa, Ontario

WEFA Canada

Dale Orr
Ottawa, Ontario

Funded By:



Region of Ottawa-Carleton



Ontario Ministry of Economic
Development and Trade
Office for Urban Economic Development

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About the Economic Generators Initiative

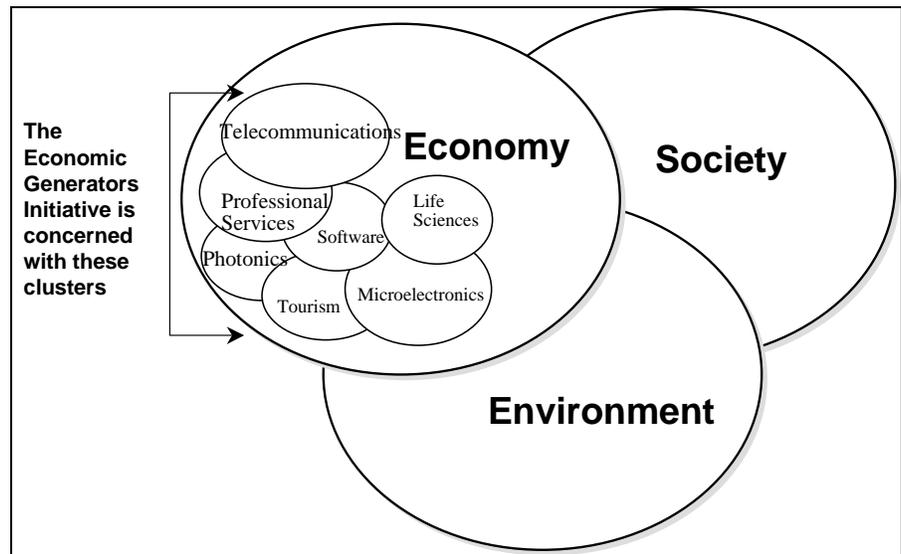
TOP's mandate is to provide leadership and advice, at a strategic level, on action required to improve and grow Ottawa's economy.

The Ottawa Partnership (TOP) is a group of private and public leaders who are committed to advancing the local economy. TOP emerged in 1999 from an agreement between Ottawa's economic agencies on the need for a board to ensure co-ordination and alignment of activities. TOP's mandate is to provide leadership and advice, at a strategic level, on action required to improve and grow Ottawa's economy.

The Economic Generators Initiative has been launched to ensure that the region keeps its collective eye on the "drivers" of the economy and to make sure everything possible is being done to sustain the current prosperity. The focus is on Ottawa's economy, with attention also paid to the broader community (e.g. quality of life), local society (e.g. quality jobs), and the environment (e.g. clean air, water) where those areas link to economic performance.

Figure 1. Focus of the Economic Generators Initiative

The focus is on Ottawa's wealth creating economy, with attention also paid to the broader community where those areas link to the region's economic performance.



Shortly after its formation, TOP's leaders decided to focus its initial attention on the region's "economic generators"—those parts of the economy that are the primary creators of the region's economic wealth. Thus, TOP's first priority has been the preparation of a strategic plan for development of the engines that fuel Ottawa's economy—the clusters of industries, their primary suppliers and supporting institutions, that together export goods and services and

bring new money into the community. These clusters drive most of the overall growth of the region. Their success is key to improving income levels and the standard of living of residents.

Strategic planning must be a continuous process. The Economic Generators Initiative is a first step forward.

The Economic Generators Initiative is, in a sense, a step forward on a longer journey of strategic planning for economic development. Strategic planning must be continuous process, one that builds on past plans and links to other planning elements while looking ahead to the future. By planing for the future in this way, Ottawa's leaders can rest assured that they are doing all that is possible to build a vibrant, sustainable community for all residents.

The Ottawa Partnership

Co-Chairs:

Rod Bryden**

Chairman
SC Stormont Corporation
(Member at Large)

Bob Chiarelli

Chair
Region of Ottawa-Carleton

Members:

Kirk Mandy*

President and CEO
Mitel Corporation
(Member at Large)

Diane Desaulniers

President
Groupe Vision Management
(Member at Large)

Gilles Patry*

Vice Rector Academic
University of Ottawa
(representing Ottawa's
post-secondary institutions)

Bob Gillett

President
Algonquin College
(representing Ottawa Centre for Research
and Innovation)

Otto Heberlein

General Manager
Sheraton Hotel
(representing Ottawa Tourism and
Convention Authority)

Adam Chowaniec

President and CEO
Tundra Semiconductor
(representing Ottawa Economic
Development Corporation)

Peter Morand*

President
Peter Morand and Associates
(representing Ottawa Life Sciences Council)

Jim Orban*

Vice President Sales and Marketing and
Assistant to the Publisher, Ottawa Citizen
(representing Ottawa Board of Trade)

Dan Beamish

Councillor
Region of Ottawa-Carleton

Jean-Marc Trottier

General Manager Passenger Sales
Air Canada
(representing Regroupement des gens
d'affaires)

Ian Bromley*

Special Advisor
Ministry of Economic Development and
Trade

** Steering Committee Chair

* Steering Committee Member

1. Ottawa's Economic Development Challenge

Ottawa is quickly emerging as one of Canada's—indeed one of North America's—most dynamic economies. Unemployment rates are near record lows, employment rates are near record highs, and per capita income is the highest ever recorded in the region. This current prosperity is largely due to particularly strong global markets for many of the technology-intensive goods produced in Ottawa.

Of course, today's economic performance cannot be taken for granted. Rapid market shifts, new foreign competition and fast changing technology challenge Ottawa's economy, as they do any regional economy. To ensure that today's economic prosperity is sustained, strategic planning is necessary to understand and prepare for external threats.

By acting on the basis of sound economic analysis, leaders will be doing all that is possible to keep the region's economy agile and adaptable to the external environment.

With this report, Ottawa's leaders have for the first time a key element for economic development that is based on analyses of how the economy actually works. The recommendations herein stem from collaborative processes and direct input from a wide range of leaders in the region, several hundred in total. Because so many leaders have been involved in the work, the region is at a high state of readiness to implement the plan.

By acting strategically, on the basis of sound economic analysis, leaders will be doing all that is possible to keep the economy agile and adaptable to the external environment. Ottawa is not alone in acting strategically to develop its economy. In regions ranging from Silicon Valley to Singapore, Malaysia and Austin Texas, leaders are also using public policy and private sector initiative in new ways to build economies that ensure high quality jobs and growing incomes. The lesson from these and other places is that leaders can choose their economic future and work within the locale to change the way the economy is structured and the way it performs. This report shows how Ottawa can do what leaders in some of the most dynamic economies in the world are doing to create prosperity for firms, quality jobs for workers, and improved living standards for all.

Shifting to a New Model—Cluster-based Economic Development

New economic growth comes not from the attraction of cost-sensitive firms, but from the creation and growth of high performance firms.

Many regions are responding to the challenges of today’s “new economy” by shifting to a new approach referred to as cluster-based economic development. As illustrated in Figure 1-1, the goal of economic development only a decade or so ago was largely the attraction of industrial plants and corporate offices, by offering incentives ranging from outright tax relief to rent free buildings, new access roads, and job skill training. In the old model, economic development professionals promoted their regions’ cost advantages and lobbied for policy initiatives to reduce business costs. But because most communities in North America were competing for new investment using the same incentive-based approach, the result was a zero-sum game. Firms were moving around seeking low costs, but there was too often too little net economic growth. Many firms attracted to the original incentives simply moved to regions when even better offers were made or when the clock ran out on the original promises.

Figure 1-1. A New Approach to Economic Development

Economic Development in the Old Economy		Economic Development in the New Economy	
• Goal:	<ul style="list-style-type: none"> ◆ More jobs the only goal ◆ Plant Attraction 	<ul style="list-style-type: none"> ◆ High Quality Jobs ◆ Globally-competitive, High-value Added Companies 	
• Approach:	<ul style="list-style-type: none"> ◆ Tax Incentives ◆ Pure Focus on Business Costs ◆ Infrastructure-driven ◆ Regional Marketing/Promotion 	<ul style="list-style-type: none"> ◆ Build specialized Economic Foundations ◆ Comprehensive Economic Strategy 	

Clusters are sets of competing and complementary export-based industries and firms which are linked together by formal and informal relationships.

It is increasingly clear that new economic growth comes not from the attraction of cost-sensitive firms (often paying relatively low wages), but from the creation and growth of high performance firms. High performance firms are those that not only pay higher wages but are also market-leaders capable of constantly innovating new products and services. Moreover, today’s most advanced regions are focusing not simply on developing individual firms, but on developing clusters of firms.

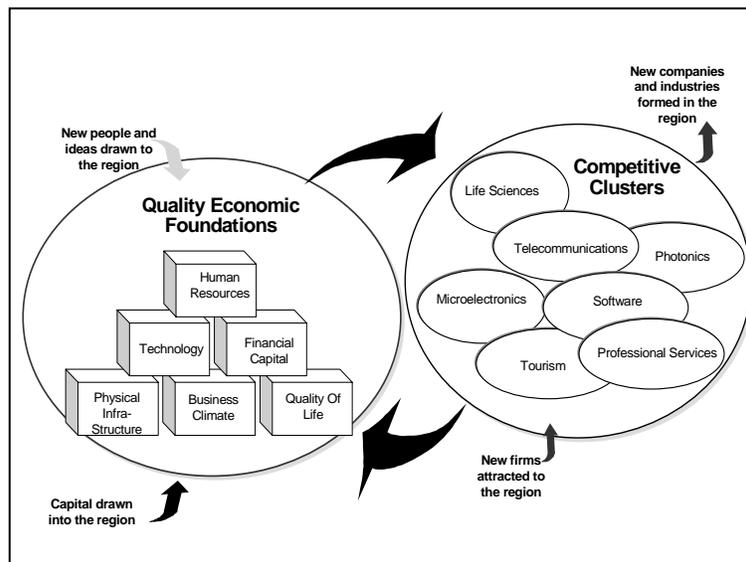
Clusters are sets of competing and complementary export-based industries and firms which are linked together by formal and informal relationships, such as from buyer-supplier relationships and shared reliance on a region's workforce. Clusters are viewed as "economic generators" because cluster firms, by selling their products or services outside the region, generate new economic wealth for the region. This wealth works its way through the region, essentially fuelling the remainder of the economy.

The first way cluster-type economies can be supported and strengthened is through public policies that make local institutions, such as universities and colleges, and city planning and works departments, more responsive to the needs of cluster firms. Economic development in the new economy is increasingly strategic, focused on improving local inputs and on building industry clusters; the objective of economic development today is the generation of high quality jobs from globally competitive, high value added companies.

Clusters are viewed as "economic generators" because cluster firms, by selling their products or services outside the region, generate new economic wealth for the region.

A second strategic thrust of leading regions is to build economies that exhibit a vital cycle of growth and development (see Figure 1-2). Examples of self-reinforcing, vital cycle economies are found in the cluster-type economies of California's Silicon Valley (computer-based) and Hollywood (entertainment-based). Vital cycle-type economies also include Singapore, Penang, Malaysia (computer peripherals), the Oxford/Cambridge region of the U.K. and several other high tech regions worldwide.

Figure 1-2. Vital Cycle



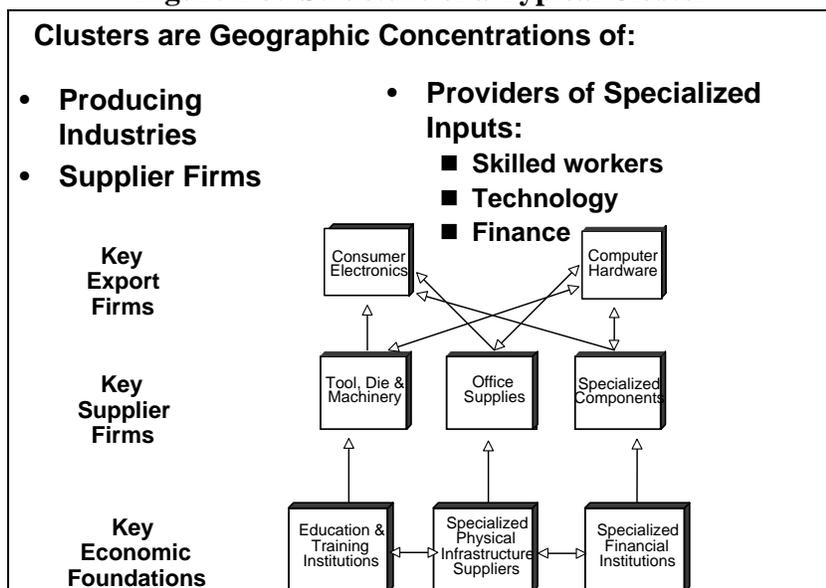
To be competitive, economic clusters require specialised and responsive economic foundations.

To be competitive, economic clusters require specialised and responsive economic foundations (i.e., public and private institutions that provide the critical inputs needed by clusters in order to be competitive). These foundation institutions, mostly in the public sector, provide firms with:

- Skilled and adaptable workers
- Access to technology and technical know-how
- Access to financial capital
- An advanced physical infrastructure
- A competitive business climate
- High quality community life

Figure 1-3 illustrates the structure of a typical economic cluster.

Figure 1-3. Structure of a Typical Cluster



When a region’s clusters are competitive, firms contribute to the tax base of the public sector foundation institutions (e.g., universities, colleges, and local governments). With a solid source of tax revenue, public sector institutions are, in turn, able to provide the critical inputs needed by the clusters to remain competitive. This symbiotic relationship between competitive clusters and their foundation providers creates a “vital cycle” of growth and development. Regions with a vital cycle economy find that new investment is attracted to the economy, new firms are created, and talented workers are attracted to the area. This constant flow of new investment and people is the source of innovation that keeps the economy globally competitive and moving forward.

Ottawa's Cluster Economy

Economic analysis has shown that Ottawa has seven clusters in its economy today, each at a different point in their life cycle. There are also at least two “seed clusters” now taking shape in the region. Ottawa's clusters include:

Ottawa has seven clusters in its economy today, each at a different point in their life cycle.

Mature Clusters

- **Telecommunications Equipment** - Ottawa's most mature cluster, Telecommunications Equipment, includes R&D, design and manufacturing of a wide variety of conventional, and increasingly state-of-the-art equipment. One of the fastest growing in North America, Ottawa's Telecommunications cluster is even outpacing the cluster's recent growth in Silicon Valley. New entrants into the local cluster include some of the world's largest and most successful telecommunications firms.
- **Microelectronics** - Microelectronics is also a mature cluster. It includes semiconductor design and computer and electronic component manufacturing. While smaller than many other microelectronic clusters in North America with a greater manufacturing base, Ottawa's cluster has seen healthy growth since 1988.
- **Software and Communications Services** - Key specialisations exist in communications, government software, internet security, remote sensing and a growing array of similar software segments. When compared to other software regions in North America, however, Ottawa's growth is still less than that in Austin or Raleigh-Durham—two comparable cities that have the world's fastest growing software clusters.
- **Professional Services** - Ottawa's Professional Services cluster includes legal, technical, and consulting services. These and related activities are expanding rapidly as niche markets open for highly specialised, knowledge-based professional services for government and industry.
- **Tourism** - Ottawa is a major Canadian tourism destination, drawing people to a wide array of attractions—arts, culture, festivals and business. Tourism has long been a feature of the Ottawa economy and is poised to grow rapidly with the expansion of this industry worldwide.

Emerging Clusters

- **Life Sciences** - This is a relatively new technology cluster on the Ottawa scene. It includes medical devices, biotechnology, pharmaceuticals and an array of other life sciences activities. All segments are experiencing growth, some very rapid.
- **Photonics** - Once a supplier industry to the region's telecommunications cluster, the photonics cluster in Ottawa (including optoelectronics and imaging) is rapidly emerging as an exporter to the world. Some firms have tripled their employment in the past year.

“Seed Clusters”

Only one private sector job in four is found within the seven clusters, but these jobs generate the private sector income that fuels the rest of the economy.

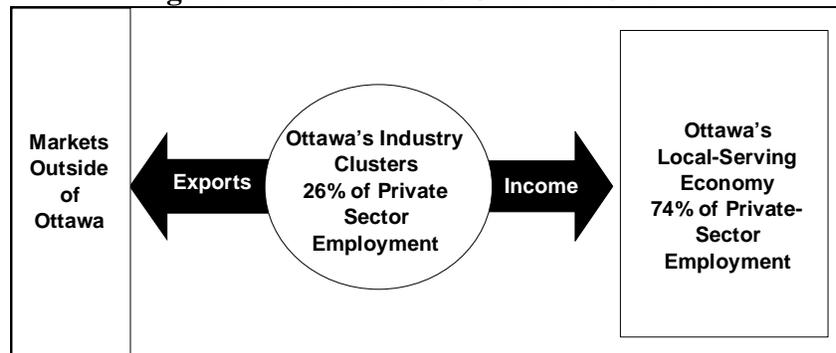
The analysis also shows that Ottawa is developing at least two “seed clusters.” These are recently (or slowly) emerging concentrations of employment in specialized fields. Seed clusters need to be monitored and as market forces begin to stimulate employment, Ottawa's leaders will need to consider policy interventions or private sector initiatives to accelerate cluster growth.

- **New Media (e.g., film and entertainment)** - There is increasing evidence of a growing concentration of employment in this cluster, a pattern similar to that being seen in other technology centres in North America. New media is emerging at the “intersection” of several sectors including computer hardware, software, printing and publishing and entertainment.
- **Environmental Technologies** - This cluster is emerging in fields including environmental clean up and new environmental protection technologies such as membrane technology. In Ottawa, the presence of key R&D institutions has had a strong positive effect on the growth of this seed cluster.

Figure 1-4 illustrates the wealth-generating role Ottawa's seven clusters play in the economy. Only one private sector job in four is found within the seven clusters. Because these jobs are associated with the sale of products or services outside the Ottawa economy, they generate essentially all of the economic wealth for the region. While Federal government payments into the Ottawa region have the same effect, government activity is not viewed as economic activity nor is it subject to strategic

intervention as is the local market economy.

Figure 1-4. The Role of Ottawa's Clusters

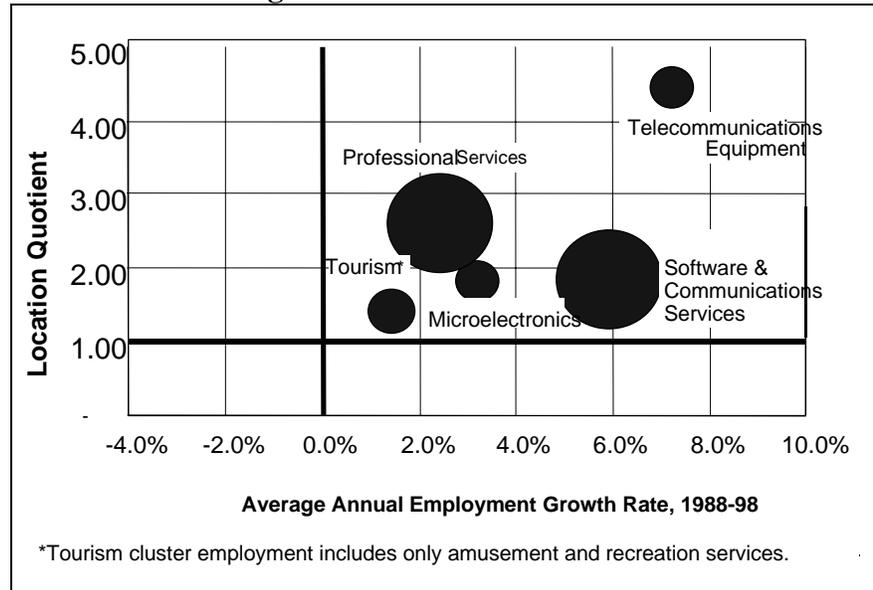


Ottawa needs to focus its attention on making these seven clusters globally competitive.

The economic development strategy that emerges from this analysis suggests that Ottawa needs to focus its attention on these seven clusters, as well as on the seed clusters, taking all steps plausible to ensure that they are competitive. As long as they can compete and develop with, or ahead of the market, Ottawa will generate wealth, which will work its way through the rest of the region's economy and keep it prosperous.

Figure 1-5 shows that Ottawa's clusters are performing well against competing regions in two dimensions. First, they are growing faster than the Ottawa economy overall. Second, they have significantly higher levels of employment concentration than the rest of the economy (a higher "location quotient" means the region's competitive advantages are resulting in higher employment concentrations relative to the rest of the economy). (Two clusters are not illustrated in the figure below, Life Sciences and Photonics, due to lack of comparable data.)

Figure 1-5. Ottawa's Clusters



Each of the above cluster's characteristics and performance are discussed in detail later in this report.

Ottawa's economic development challenge is to transition its economy from today's "high tech" base to a diversified economy driven by constantly evolving technologies and traded services.

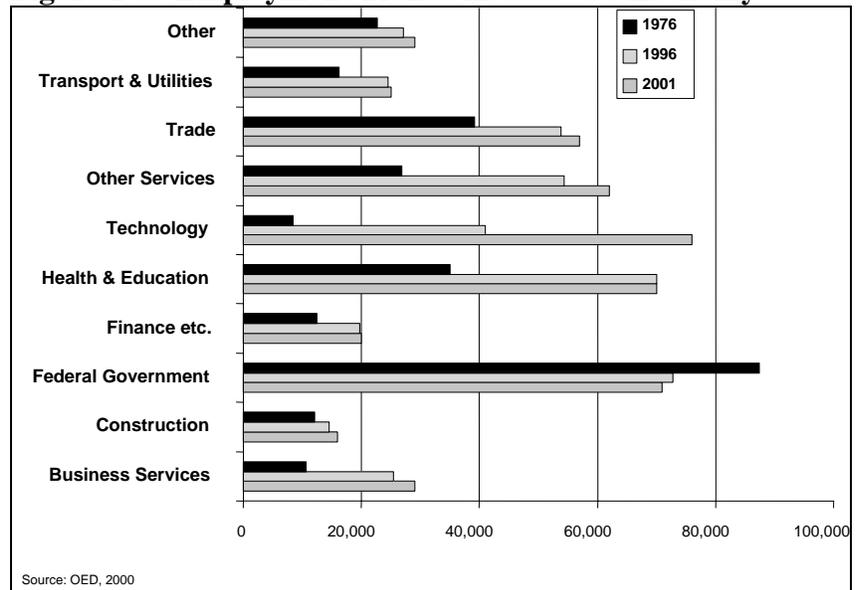
Ottawa's Economic Development Challenge – A New Economic Vision

This report finds that Ottawa has an excellent opportunity to build on its economic successes over the past few years and to create one of North America's most dynamic economies. Yet, as this report will show, there are plenty of areas that will need fresh new thinking and creative solutions if today's economic prosperity is to be sustained.

Ottawa's economic development challenge is to transition its economy from today's "high tech" base to a different kind of economy—a diversified economy driven by constantly evolving technologies and traded services (tourism, professional services). The structure of Ottawa's economy has already shifted from one largely based on government employment to one where high tech employment dominates (see Figure 1-6).

With its private sector growing fast, Ottawa's economy is already becoming more diversified. But Ottawa's leaders should avoid becoming complacent with its still two-part, high tech and government economy. Further economic diversification should be sought for at least three reasons:

Figure 1-6. Employment Trends in Ottawa's Economy



- *Uncertain government employment--* Federal government employment will always be susceptible to policy shifts outside the control of local leaders. Going forward, Ottawa should seek to manage, to the extent possible, its own economic destiny and not be comfortable with employment based on Federal government priorities.
- *Uncertain technology employment--* Many high tech centres have seen their economies (precipitously) slow as markets have shifted (Boston's mainframe-dominant computer sector was decimated with the growth of personal computers whose manufacturers were in California and Texas). Having a high tech economy, unless it is significantly diversified, does not insure against market or technological shifts.
- *Uncertain external economic conditions--* Economic integration worldwide will keep regional economies off balance (consider how fast Seattle's aerospace cluster faced difficulty when the "Asian flu" hit those markets). And with the relentless pace of technology change, uncertainties in the external environment will only grow. To ensure long term economic prosperity, Ottawa needs to move beyond high tech and build a diversified, dynamic economy that is able to quickly respond to the external environment.

Ottawa's leaders need to articulate a new economic vision for the region.

In effect, Ottawa's leaders need to articulate a new economic vision for the region. A new vision can shape economic development strategies and guide policy makers. It can align the mandates and programs of economic development agencies. And if the vision is widely shared private sector investment decisions can be shaped as well.

Can local leaders expect new economic vision and implementation strategies to affect the structure and performance of a regional economy? Two decades of experience have shown that the answer is yes. The case of Austin Texas is instructive (see Exhibit 1-1).

Exhibit 1-1. The Case of Austin Texas

Only 20 years ago Austin was a “government town” with an economy not unlike Ottawa’s 10 years ago. As the capital of Texas, government was the dominant employer. Almost all of the remaining employment was in sectors that were highly dependent on the presence of government agencies. But Austin had the state’s flagship research university and there were a few large technology firms located in the city.

In the early 1980s local leaders decided to capitalize on the presence of the University and these firms and build a Silicon Valley-type economy. In effect, they chose an economic future and set about changing the fundamental economic structure of the region. A formal strategic planning process led to an array of new private sector initiatives such as private endowments of 38 University “chairs of excellence.” New public policies were adopted to build research parks. New partnerships were formed between the Chamber of Commerce and state and local government to build “smart infrastructure” for high technology firms. High priority was placed on attracting technology-intensive companies and government R&D laboratories.

By 1985 Austin was emerging as one of the most technologically advanced economies in the U.S., and by 1995 venture capital was flowing into the community at rates second only to Silicon Valley, as the success of smaller, entrepreneurial firms became apparent to money managers in New York and Silicon Valley.

Key Features of Austin’s Strategy:

- A compelling vision of a new kind of economy
- Public-private “buy-in” to the vision and economic development teamwork
- Strategies designed to realize the vision
- Action initiatives designed to implement the strategies
- Sustained effort, even in the face of political and economic challenges

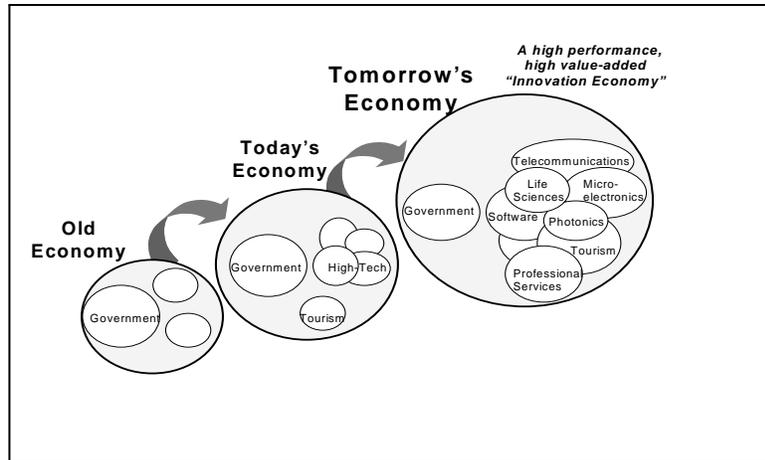
Today Austin is among North America’s leading economies. New jobs are of high quality. Incomes are rising fast. Unemployment is very low. And most observers would agree that while Austin has changed a lot in the past 20 years, it is still a “livable” city.

Even though Ottawa has made one economic transition, from a government economy to today’s high tech economy, new thinking and strategies will be required to keep the economy moving forward. This report finds that Ottawa has the potential (and the need) to make one more economic transition—from a high tech economy to a knowledge-based, higher value-added

and higher productivity economy. We term this new economic vision an *Innovation Economy* (see Figure 1-7).

Figure 1-7. A New Economy for Ottawa

This report finds that Ottawa has the potential (and the need) to make one more economic transition—from a high tech economy to an “Innovation Economy”.



Features of an Innovation Economy include:

- *Structure*—Ottawa’s next economy would have an array of increasingly competitive clusters, with new clusters constantly emerging.
- *Key inputs*—The driving force would be knowledge and information linked to entrepreneurship and enterprise development.
- *Performance*—With strong knowledge inputs, Ottawa’s clusters would be at the higher end of the value chain for each cluster. Several companies in each cluster would be among the leading firms in the industry. Tax contributions of competitive firms would keep public sector foundations strong, creating a vital cycle of economic growth and development.
- *Adaptability*—Strong, and increasingly specialised and responsive foundation institutions (e.g., universities, colleges, technology centres, local government) would keep cluster firms adaptive, able to innovate new products, new services, and new business models ahead of the market.
- *Jobs*—High-performing firms would create high quality jobs paying higher than average wages.
- *Community life*—With attention to quality of life and social equity, Ottawa would see high quality sustainable development.

An Innovation Economy would be a “self-regenerating” economy in the sense that a constant “vital cycle” of economic activity would be brought into the region. Such an economy would generate from within the region, a larger, talented workforce, more investment capital, more firms, and more jobs of higher quality.

Strategies for Developing Ottawa’s Innovation Economy

Going forward, the region’s economic development agencies should seek a balance between generalised industrial recruiting, “growing from within”, and the retention of existing firms. Three specific strategies are suggested:

An Innovation Economy will be a diversified cluster-based economy.

Strategy #1—Accelerated Cluster Development—More Competitive Firms, Deeper and Broader Clusters

An Innovation Economy will be a diversified cluster-based economy. To build a strong cluster economy will require Ottawa’s economic development agencies to focus on enhancing the competitiveness of the clusters that are taking shape today and on building up the seed clusters. Cluster-based economic development should become the dominant approach to economic development in Ottawa. Toward this end, the region’s economic development agencies should develop a better understanding of the markets cluster firms are in and key market success factors. Building on market intelligence, the agencies should target their industrial attraction efforts in ways that will deepen and broaden the clusters. This means focusing on attracting firms that complement the clusters, especially suppliers to cluster firms. The presence of local suppliers can both reduce the costs of business for the larger firms as well as provide another source of business intelligence to the region because supplier firms are often particularly well connected to market trends. Accelerated cluster development will bring more dynamism into the economy, which in turn will spur the innovation of new industries. In this way, Ottawa’s Innovation Economy will be able to constantly re-generate itself.

Strategy #2—Enhance Economic Foundations

Building an Innovation Economy will require public policies designed to ensure that clusters have access to the essential inputs for cluster competitiveness.

Building an Innovation Economy will require public policies designed to ensure that clusters have access to the essential inputs for cluster competitiveness. Among the most important inputs will be:

Human Resources—A knowledge-based, high value added Innovation Economy will require that cluster firms have access to a skilled and adaptable workforce which, in turn, will require that workforce development agencies and institutions are aware of, and can respond to, the needs of cluster firms. Workforce development programs in the future should be designed around the specific needs of Ottawa’s clusters.

Technology—Access to technology and technical know-how has been a feature of the region’s economy for decades. Going forward, Ottawa’s clusters will need continuing access to the resources of science and technology institutions such as the NRC and the CRC. But facing funding constraints, Ottawa’s public S&T institutions will need to find new ways of providing value to the clusters. The idea of “technological listening posts” is developed later in the report.

Finance—Traditional debt financing by local banks has played an important role in the expansion and modernization of firms in Ottawa. In the future, non-traditional equity financing will be increasingly important (see subsequent section on venture capital). While conventional banks will still play an important role, the financing needs of the Innovation Economy will increasingly fall more heavily on mechanisms such as venture capital firms and angel investors.

Physical Infrastructure—Good highways, utilities and land for industrial development will remain important to the economy in whatever way it develops. But advanced voice and data infrastructure, specialized airport facilities and other transportation systems will increasingly be the critical infrastructure for economic growth.

Strategy #3—Balance Economic Growth with Social Equity and Environmental Sensitivity

Ottawa enjoys a reputation as an extremely livable city—one built on a human scale with a wide array of arts and cultural amenities. Sustaining such quality of life advantages must be a part of the region’s overall economic development strategy.

Sustaining Ottawa’s quality of life advantages must be a part of the region’s overall economic development strategy.

Can Ottawa expand its economy while maintaining its unique livability? Other fast-growing communities are working hard to find the balance between economic growth, social equity and sensible environmental protection. Addressing the “digital divide” is one part of the challenge. Ottawa has significant numbers of underemployed people whose resources must be tapped if the region’s full complement of human capital is to be leveraged. Another part of the challenge is ensuring access for all residents to the kind of education and job skill training needed by an Innovation Economy. A related issue is increasing wages in the high tech clusters that tend to drive up the cost of living in the entire community, affecting those whose skills or employment are in other sectors. Creative solutions to these particularly difficult issues will be found in the area of education, skill training, and retraining for all. In short, equity can only be achieved by taking more advantage of the still untapped human capital in the community.

A clean environment that supports wide-ranging recreation and leisure amenities will be important. Because building an Innovation Economy will require the retention and attraction of highly educated, talented people, Ottawa will need to do all that is possible to make the community a very attractive place to live and work. Every region is trying to attract this kind of human capital. Talented people are mobile; they will move to places that offer not only good job opportunities, but also a high quality of life.

Ottawa already faces pressure to open more land for industrial development and housing. By pursuing a strategy of social inclusion and smart growth, in balance with the purely economic strategies above, leaders will be doing all that they can to ensure that Ottawa grows in sustainable ways.

Conclusion

Ottawa has the potential to become one of North America's most dynamic economies and one of its few Innovation Economies. To do so will require focused public policy, private sector initiative and new partnerships between the public and private sectors. By articulating a vision, securing community-wide commitment to the vision, and pursuing the three-part strategy outlined above, Ottawa will be doing all that is possible to build an economy that will pay the highest dividends to its residents.

The remainder of this report outlines: the performance of the economy today, cluster analyses, key features of the region's economic foundations, recommended "flagship" initiatives, and implementation recommendations including future roles of key economic development agencies.

2. Overview of Ottawa's Economic Performance

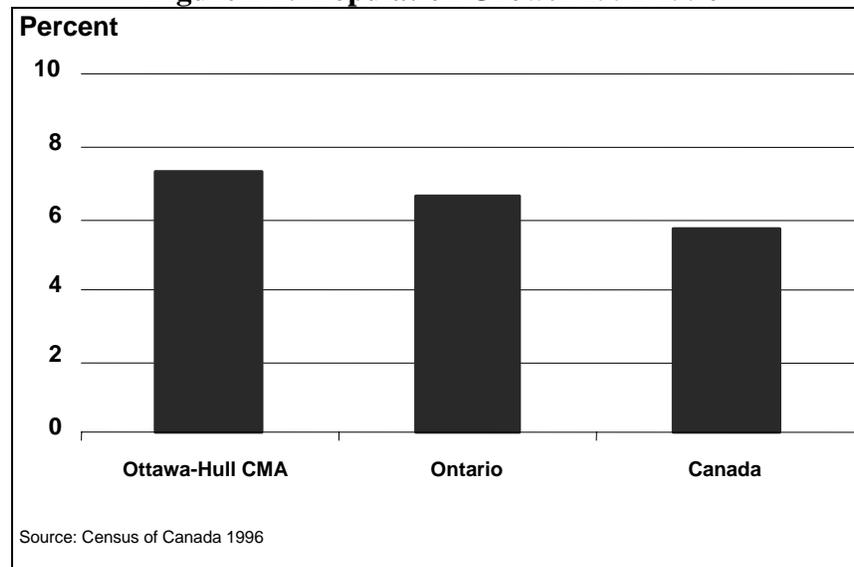
An economy with competitive clusters will exhibit job and population growth, low unemployment, and high and rising personal incomes.

The ultimate outcome of an economy with competitive clusters, is a healthy bottom line: job and population growth, low unemployment, and high and rising personal incomes. In this section we assess the recent and past performance of Ottawa's economy. It is well known that the area's economy fell on hard times along with the rest of the country during the recession of the early 1990s. The effects of federal fiscal consolidation that followed added to Ottawa's economic troubles. However, the data show that Ottawa's economy has rebounded strongly in recent years. As a result, residents enjoy a standard of living and quality of life that rivals that of any other community in Canada.

Growing Population

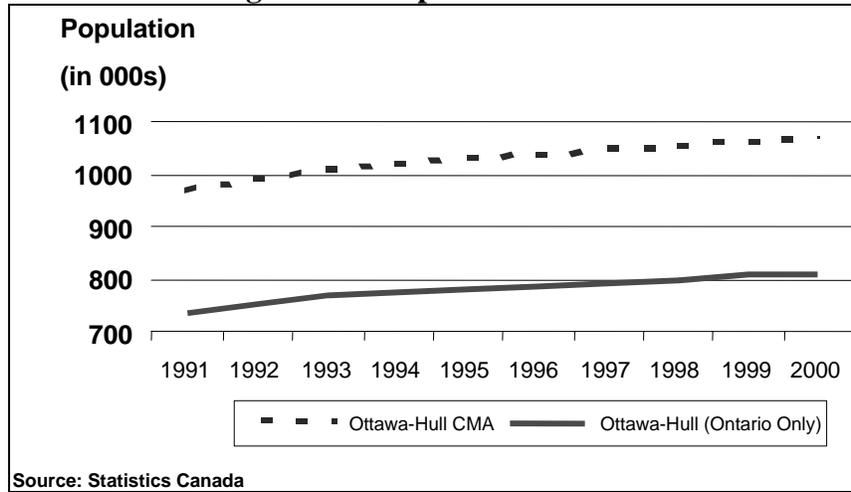
Ottawa's population grew at a relatively strong pace during the 1990s. Between 1991 and 1996, the population in the capital region grew by 7.3%, outpacing the rate of population growth in both Ontario and Canada overall (see Figure 2-1).

Figure 2-1. Population Growth 1991-1996



Population data for 1997 and 1998 as well as preliminary population estimates for 1999 suggest that the population is growing slightly faster on the Ontario side of the Ottawa-Hull Census Metropolitan Area (CMA).

Figure 2-2. Population Growth

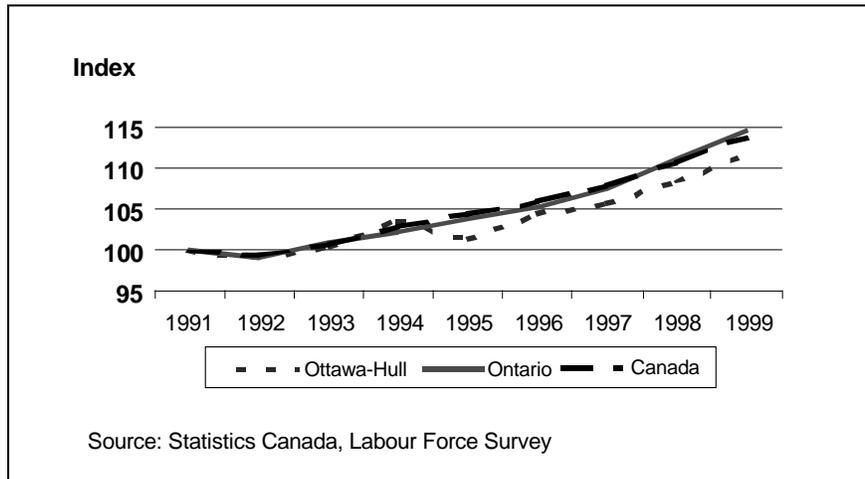


Job Growth Surpassing the Canadian Average

High technology employment is soon to surpass government employment; federal jobs will remain a cornerstone of the economy with some forecasts of modest growth.

Although high tech will soon be the largest employer in the Ottawa area, historically, the federal government has been the dominant employer. While the government continued to scale back after 1995, private-sector job growth strengthened due in large part to the booming high tech industry. As a result, employment growth in Ottawa has caught up with that of Ontario and Canada (see Figure 2-3). The government’s fiscal situation having improved, public sector employment is expected to contribute to the strength in Ottawa’s job market in the years ahead.

**Figure 2-3. Employment Growth in the 1990s:
(1991 = 100)**



Falling Unemployment Rate

The region's unemployment rate is below 6%, significantly below Canada's unemployment rate.

The unemployment rate in the Ottawa-Hull area peaked at almost 10% in 1995, but has fallen steadily since then with the strong rate of employment growth (see Figure 2-4). Today, the region's unemployment rate is below 6%, significantly below Canada's unemployment rate. Ottawa's job market is one of the hottest in the country and is expected to continue to be, given that a number of high tech companies have committed to expanding their operations in the region. Therefore, we would expect to see further progress in lowering the area's unemployment rate in 2000 and beyond.

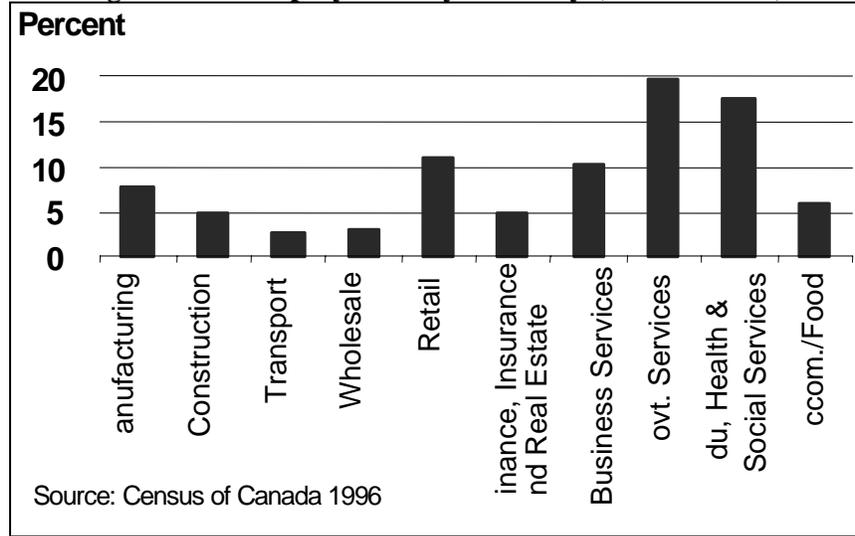
Figure 2-4. Unemployment Rate (Ottawa-Hull)



Advanced Industrial Structure

Employment in the Ottawa area is more heavily concentrated in service and knowledge industries than it is in Canada as a whole. There is a high percentage of jobs in business services, government services, education, health and social services in the Ottawa-Hull region as shown in Figure 2-5. Historically, Ottawa has depended less on basic manufacturing employment than many other Canadian cities, and this remains the case today.

Figure 2-5. Employment by Industry (Ottawa-Hull)

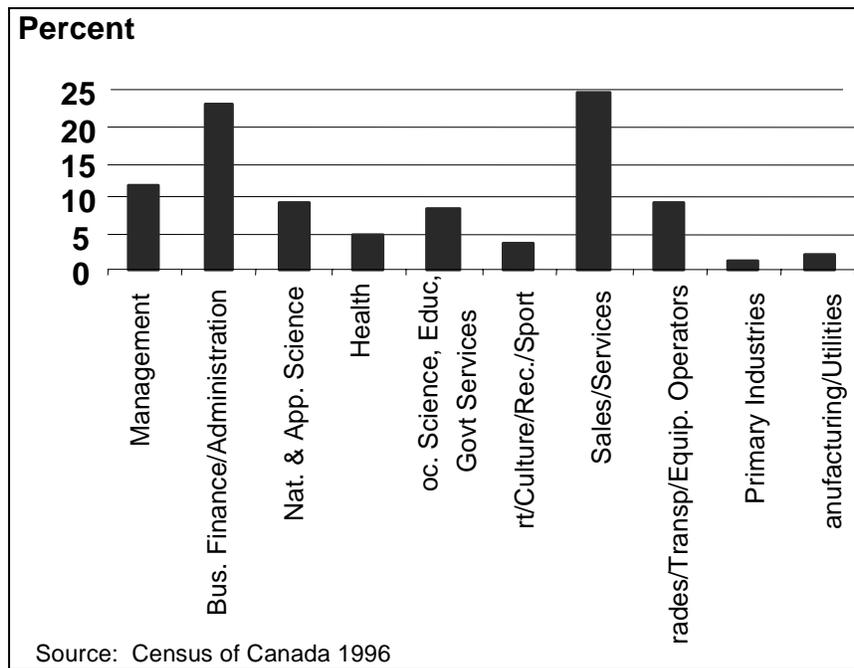


Knowledge-Based Occupational Structure

Ottawa's workforce is heavily concentrated in knowledge and information intensive occupations.

Employment in the Ottawa area is not only concentrated in service and knowledge industries; the jobs also tend to be of high quality, demanding and rewarding substantial educational attainment. There are high concentrations of jobs in business finance and administrative occupations, as well as in management, natural and applied science, and social science education and government (see Figure 2-6). These types of occupations are knowledge and information intensive, and reflect Ottawa's role as a major Canadian knowledge centre.

Figure 2-6. Employment by Occupation (Ottawa-Hull)

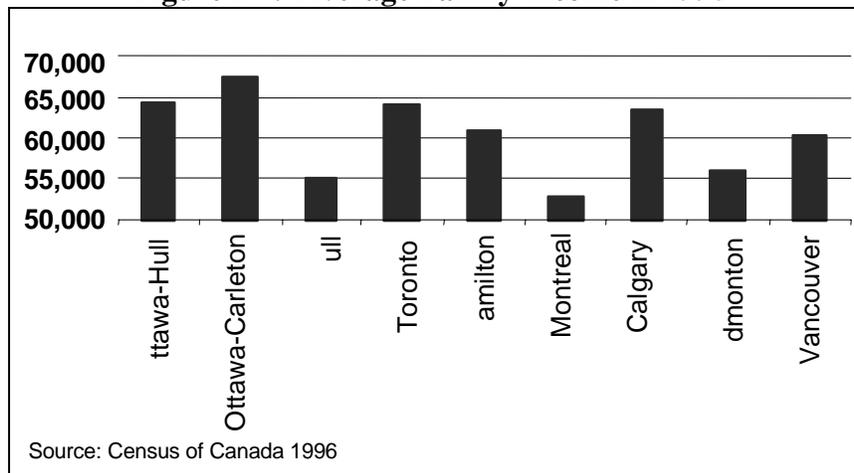


High Family Income

Ottawa's average family income is the highest of Canada's metropolitan areas.

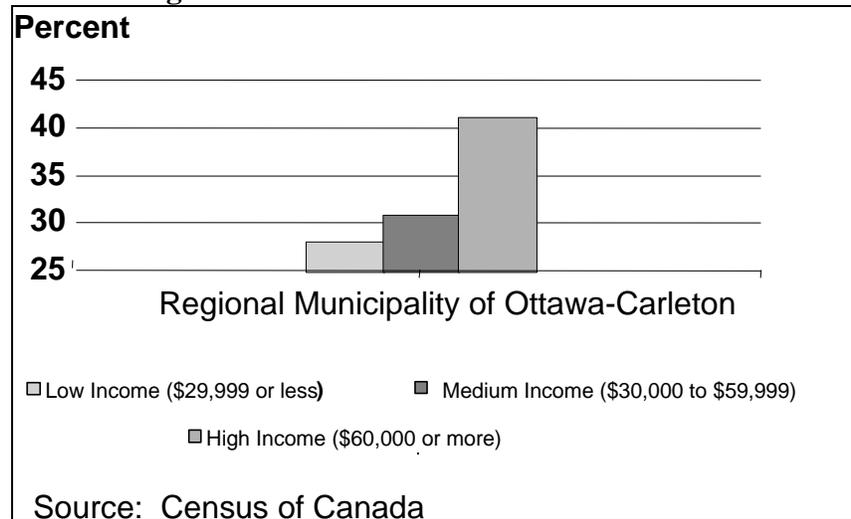
The average income of families in the Ottawa area compares favourably with that of other major Canadian cities (see Figure 2-7). The average family income for the Ottawa-Hull CMA in 1995 was \$64,243. When the Quebec portion of the Ottawa-Hull CMA is excluded, average family income jumps to \$67,355. This is the highest of all the major centres in Canada.

Figure 2-7. Average Family Income in 1995



Looking at the income distribution we can see that there is a high proportion of high-income families in both the Regional Municipality of Ottawa-Carleton (RMOC) and in the Ottawa-Hull CMA. In the RMOC, more than 40% of households earn in excess of \$60,000 per year (see Figure 2-8).

Figure 2-8. Household Income Distribution



Strong Investment and Building Activity

High demand for office space, particularly in the west-end of Ottawa, has driven the vacancy rate to 3% in July 2000, from 7.4% in 1998. Ottawa's vacancy rate is one of the lowest among Canada's major business centres. There is essentially no office space available in the west, especially in Kanata.

There are three major office tower construction projects at the pre-leasing stage in the downtown core. Construction on another downtown office project has recently started. In the suburbs, particularly in the west-end, new construction of office space to house expanding high-tech companies should continue. In the east-end, Gloucester is seeing significant new office complex and light manufacturing projects coming on-line.

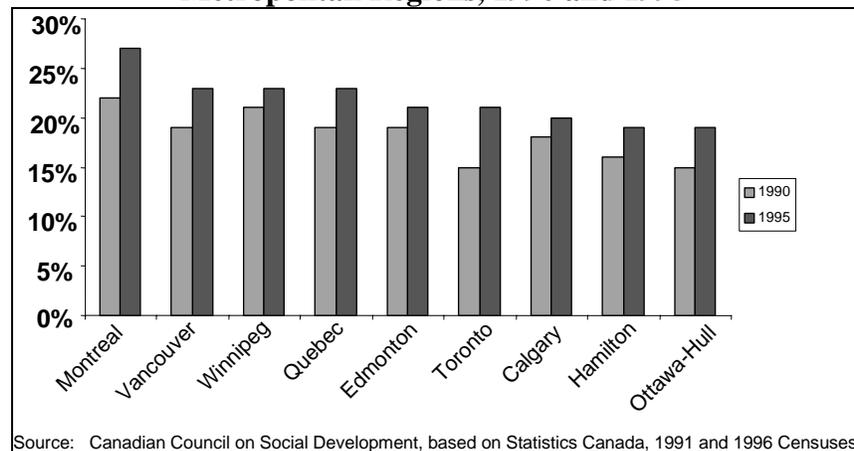
Social Opportunity in Ottawa's New Economy

A key component of sustainable growth in Ottawa is the progressive incorporation of the full labour force into the regional economy.

A key component of sustainable growth in Ottawa is the progressive incorporation of the full labour force into the regional economy. Without broad inclusion, a region will not only fail to fully leverage its human resources, but could also experience a range of adverse social and economic consequences including an increased need for government subsidies, neighbourhood decline, and an erosion of support for regional government and local institutions.

The incidence of poverty in the region is a good measure of how fully a region's population participates in the economy. As shown in Figure 2-9, in 1995 (the most recent year with data available), the Ottawa-Hull CMA had the lowest poverty rate of all the large CMAs in Canada (at 18.8%). The region has not been immune, however, to recent surges in urban poverty rates during the nineties. As with most large metropolitan regions in Canada, poverty rates rose significantly in the early 1990s.

Figure 2-9. Poverty Rates in Large Canadian Metropolitan Regions, 1990 and 1995



There is mounting evidence that the changing structure of the economy is creating imbalances between labour demand and supply.

Some observers of social trends feel that the 2001 Census will indicate a decline in poverty rates, both in Ottawa and across Canada, based on the strong economic performance of the past several years.

The next question is who are the impoverished, those not benefiting equitably from Ottawa's prosperity? Studies show that recent immigrants tend to be fairing worse than other Canadians. In Ottawa, 63.7% of the immigrant population were living in

poverty in 1995. New immigrants often face language and cultural barriers to employment. Many experience discrimination. And many lack skills and take low-skill, low-paying jobs. Ottawa's aboriginal population also tends to be left out of the region's economic success. Just over half of the region's aboriginal people live in poverty. Other groups that tend to have higher poverty rates include other visible minorities and people with disabilities.

There is little doubt that the income benefits from technology-led growth are unevenly distributed within the region.

There is mounting evidence that the changing structure of the economy is creating imbalances between labour demand and supply. Many of the jobs that were lost in Ottawa during the recession of the early 1990s were associated with the federal government. However, since the mid-1990s, growth in Ottawa's high technology sector has far outpaced the growth in federal government employment. The result is that many experienced and skilled people, and others with potential in a time of great prosperity, are being left behind. A recent report, *Ottawa's Hidden Workforce*, estimated that as many as 30% of Ottawa's working-age adults are unemployed or under-employed. Under-employment is notoriously difficult to analyse, but there is little doubt that the benefits from technology-led growth are unevenly distributed within the region—meaning Ottawa's growth is potentially sub-optimal, and public support for growth is not all it can be.

Going forward, Ottawa will need to push economic opportunity more deeply into the community while it works to develop more, and higher quality jobs overall.

Anecdotal evidence from high technology industry indicates that, while there is a preference for hiring young university graduates with training in computer or electronics fields, there is increasing success seen in efforts such as the VITESSE program, which has worked to retrain 450 computer literate scientists and non-computer engineers for jobs in the microelectronics and telecommunications equipment industries. Ottawa will need to duplicate such success stories across its array of high technology clusters, and for a broader number of technology-related occupations. Its training institutions and programs must restructure and innovate to fully utilise Ottawa's impressive human resources base and make the benefits of its cluster economy available to all.

Conclusion

The Ottawa region's economy struggled in the early 1990s as the country entered into a recession. In 1994, the federal government embarked on a mission to eliminate its deficit. The resulting cutbacks led to layoffs of public servants and the unemployment rate shot-up. Since then, however, the regional economy has staged a remarkable come back as evidenced by the data presented above. Some of the key conclusions are:

- In recent years, growth has been fuelled by the rapidly expanding high tech sector. As a result, there has been strong employment growth, with many of the jobs being created in occupations that are high paying, but require highly skilled individuals.
- The continued expansion of the high tech industry in the region raises concerns about the availability of skilled labour. Therefore, looking ahead, key challenges lie in the region's ability to attract, retain and especially retrain workers in the region.
- Family income is among the highest in the country while the cost of living is made relatively modest by the relative affordability of housing in Ottawa and by Ontario's relatively low income tax burden. A relatively low cost of living will be one of the region's key selling points in attracting and retaining workers.
- Because of the growth in private sector employment, particularly that associated with high technology industries, Ottawa's poverty rate is substantially below that of other large Canadian metropolitan areas. However, there is evidence that labour shortages exist side-by-side with underemployment.

It is clear from the analysis above that Ottawa's economy is growing rapidly and restructuring. This evidence and more to follow suggests that the region is successfully re-inventing itself as a centre of dynamic private sector excellence. Yet, the economic picture is darkened by unacceptable poverty rates and the underemployment of too many residents. Going forward, Ottawa will need to push economic opportunity more deeply into the community while it works to develop more, and higher quality jobs overall.

3. Ottawa's Clusters

This section reviews the analysis and outcomes of the collaborative strategy process undertaken by seven industry cluster groups as part of the Economic Generators Initiative. ICF Consulting diagnosed the structure and competitive position of Ottawa's clusters, and led private- and public-cluster leaders through a strategy-forming process.

The Economic Generators Initiative is not just a study but is actually developing clusters through a collaborative strategy process.

The cluster working groups were charged with building on the consultants' work and identifying the key competitive challenges shared by cluster members. They were asked to identify specific, attainable initiatives to address those challenges. The initiatives were not proposed in a vacuum, and the consultants were not simply asking for input. Rather, those who proposed an initiative were required to further develop a concept and identify an implementation "champion". In this way, the Economic Generators Initiative is not just a study but is actually developing clusters through a collaborative strategy process. The initiative is fostering civic leadership, and promoting a shared approach to an economic development strategy.

Telecommunications Equipment Cluster

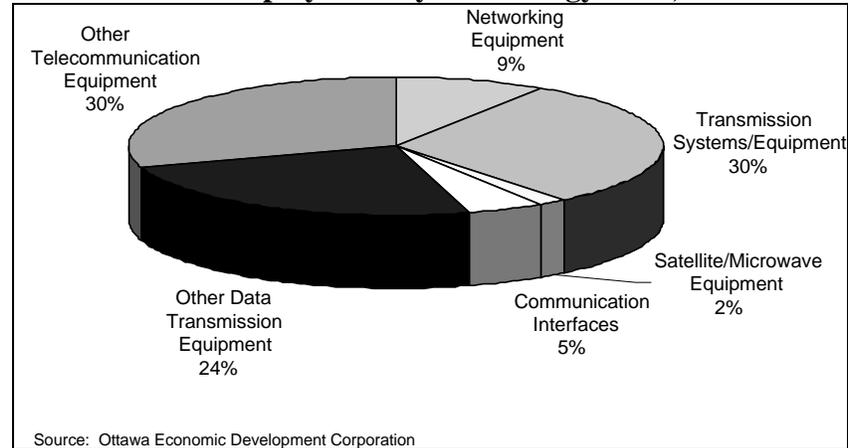
Telecommunications has been at the forefront of technology sectors driving Ottawa's "New Economy." Many of the world's major players in the telecommunications industry, including companies such as Nortel, Newbridge (now Alcatel), and Mitel which are known around the world, are major players in the Ottawa region. U.S. based Cisco Systems, along with Finland's Nokia, have recently emerged as players in the region's telecommunications cluster. With more than 100 firms, the telecommunications sector employs approximately half of Ottawa's high tech workforce and covers a wide range of technical activities, from the assembly of basic telephone hand sets to highly sophisticated digital switches.

Ottawa's Telecommunications Equipment cluster strengths include: networking equipment, transmission systems, satellite/microwave equipment, communication interface devices, and similar technologies.

The Telecommunications Equipment Cluster is defined as those firms engaged in, or linked to the production of telecommunications equipment—networking equipment, transmission systems, satellite/microwave equipment, communication interface devices, and similar technologies. With the current explosion in the use of both the Internet and wireless communication devices such as cellular telephones and handheld electronic organisers, innovative telecommunications

equipment is in high demand. Figure 3-1 shows the structure of the cluster by employment in each technology area.

Figure 3-1. Structure of Ottawa’s Telecommunications Cluster Employment by Technology Area, 1999



Ottawa’s Telecommunications Equipment Cluster is competitive with some of the most dynamic telecommunications centres in North America.

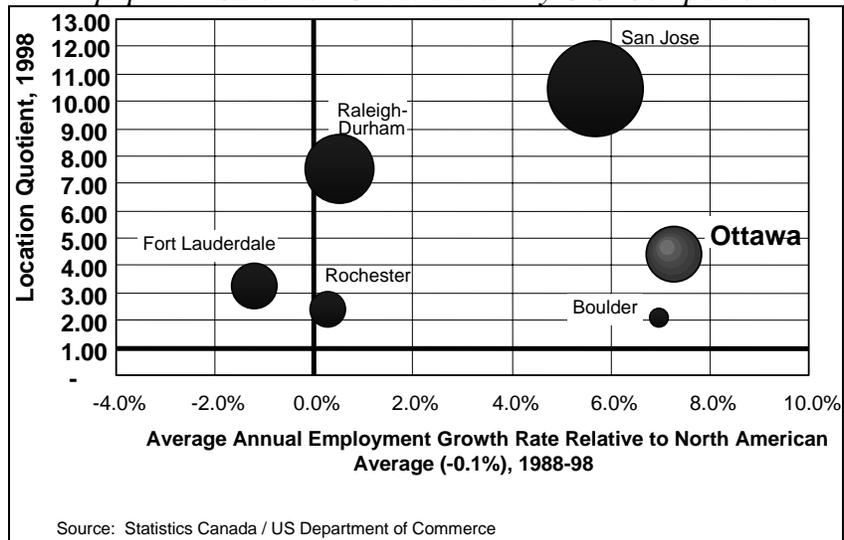
The cluster’s primary strength lies in its technological sophistication; therefore, the cluster operates near the highest level of the “value chain”. Other clusters in North America, such as the Raleigh-Durham Research Triangle area of North Carolina, combine considerable manufacturing with local R&D work; therefore the cluster operates at lower levels of the industry’s value chain. Ottawa’s strong R&D emphasis makes it unusual among leading cluster centres. Ninety percent of Canada’s industrial telecommunications R&D takes place in Ottawa. The region’s wealth of engineers, software developers and other technical skills is an invaluable cluster resource, as is the presence of an array of public research labs, including the Communications Research Centre (CRC) and the National Research Council’s (NRC) Institute for Information Technology. These labs, often in strategic collaboration with local, private firms have produced many of the cluster’s key innovations, many of which have been successfully commercialised in fields such as interactive information access, multimedia, information organisation, wireless communications and personal communication systems. CRC and NRC have also created incubator facilities to assist in early stage growth and development of start-up technology firms.

Not only is the Ottawa region the nucleus of telecommunications in Canada, its Telecommunications Equipment Cluster is competitive with some of the most dynamic telecommunications centres in North America. The

“growth-share matrix” shown in Figure 3-2 is a common way of indicating the competitiveness of regional industry clusters. The relative size of the circle indicates regional employment, relative to other regions. The position of the circle on the horizontal axis indicates the employment growth rate of the cluster, relative to the North American average. Any circle to the right of the thick vertical line is growing faster than the North American average and is, in effect, gaining “market share”. The position of the circle along the vertical axis indicates the level of concentration, or “critical mass”, of cluster employment in the region; the higher the number, the more pronounced is the existing competitive advantage of the region. Clearly, the healthiest and most competitive clusters are then large circles in the upper-right quadrant.

Figure 3-2 shows that, over the ten years from 1988 to 1998, Ottawa’s telecommunications cluster has grown faster than any other region shown and approximately 7% faster than the average growth rate of the comparable cluster in North America. It also shows high employment concentration, but not yet that of Raleigh-Durham or San Jose. However, the cluster has been growing more rapidly in Ottawa than in Silicon Valley over the past decade—obviously is a very positive sign for the future.

Figure 3-2. Growth Share Matrix for Telecommunication Equipment Clusters: Ottawa and Key U.S. Competitors



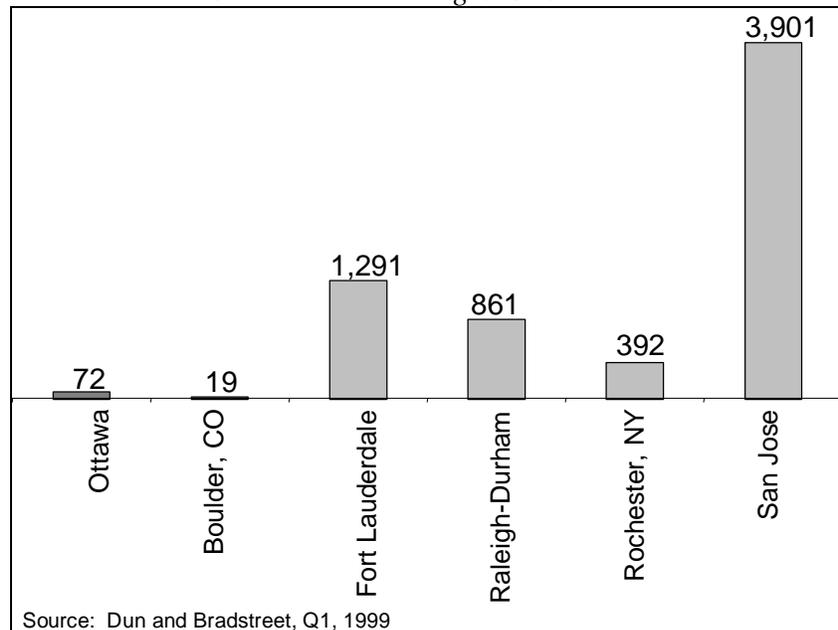
The basis of this strength lies in both the strong technical roots in the region as well as more recent dynamics. For example, Nortel Networks is not only the largest company in the cluster

and easily the largest technology company in Canada, it is growing at historic rates. Today, Nortel accounts for approximately 20% of all industrial R&D expenditures in Canada, and hires a third of all Masters and Ph.D. graduates in electrical engineering and computer science from Canadian universities. A large share of Nortel's world-wide R&D employees is based in Ottawa, and consequently the cluster has developed substantial technological resources from which product and process technologies can be expected to emerge to keep cluster firms competitive well into the future.

The cluster's growth can also be explained, in part, by the "critical mass" phenomenon. The presence of a few large firms and a growing number of small firms, with R&D institutions nearby, are drawing multinational firms. Firms like Cisco and Nokia want to be in Ottawa to be close to the sources of innovation and other factors for success in the telecommunications marketplace. Both firms are expanding in the region and both are seeking to hire hundreds of new workers. Cisco has already reserved office space for further expansions. These firms, and surely more to follow, need to be in Ottawa to be close to "the action." In this way, the Telecommunications Equipment companies are showing how the clustering phenomenon plays out within regional economies.

Figure 3-3 shows the total employment in Ottawa telecommunication equipment firms formed since 1994, along with competing clusters. Figure 3-3 confirms the relatively small impact that new telecommunication companies have had on the Ottawa cluster, and consequently the importance of the existing major companies in spearheading growth. U.S. clusters such as Silicon Valley are very successful in not only generating, but in nurturing and growing start-ups, while regions like Fort Lauderdale have successfully attracted branch manufacturing plants from more high-cost regions.

Figure 3-3. Employment in Telecommunications Equipment Companies Founded Since 1994: Ottawa and Leading U.S. Clusters

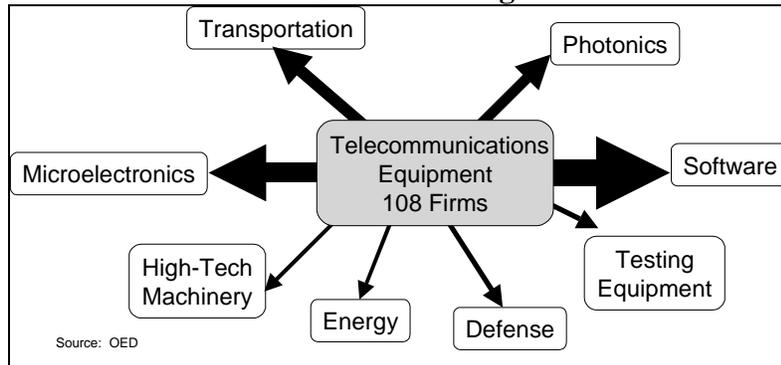


The trend in Ottawa entrepreneurship, however, is more positive. Local entrepreneurs are increasingly finding opportunities within the telecommunications sector. While still in short supply, venture capital is becoming available and the investment environment in the region is improving. As discussed in more detail in the following section, the average venture capital deal in Canada jumped from \$1.5 million in 1998 to \$2.75 million in 1999. While this amount still pales in comparison to the U.S. average of more than \$10 million/deal, the increase is nevertheless impressive. Clearly, Ottawa has caught the attention of venture capitalists, including a growing number of U.S. investors. In the last two years, 35 U.S.-based venture financing firms invested in Ottawa.

The Telecommunications Equipment Cluster is performing well in the Ottawa region and will be a strong economic force in the future.

Another feature of the telecommunications cluster is the emerging trend of firms in other technology fields interacting (and integrating) with telecommunications firms, as illustrated in Figure 3-4. Most of Ottawa's telecommunication equipment firms are linked technologically with another cluster field. Software and microelectronics are especially common fields of cluster interaction, but telecommunications-photonics linkages are growing fast (not too surprising since photonics technologies emerged from telecom applications).

Figure 3-4. Telecommunications Equipment Cluster Linkages



In sum, the Telecommunications Equipment Cluster is performing well in the Ottawa region and will be a strong economic force in the future. It has earned a reputation as a world leader in the field, especially in research and development. But the cluster has not created new telecommunications equipment companies at the same rate as some other cluster regions, although this appears to be changing. With the history of government labs and large companies spinning off new companies, who have in turn created other spin-offs, this cluster's pattern of development reflects the potential of even more broad-based, home-grown cluster development.

Key Cluster Challenges

Despite many achievements, the cluster continues to face challenges that constrain it from achieving its full competitive potential. The following outlines the cluster's key challenges related to fundamental foundations: human resources, financial resources, business climate, physical infrastructure, technology resources, and quality of life in the Ottawa region.

The challenges listed here were identified by a working group comprised of representatives from a broad array of cluster segments: private, public and academic sectors. This interaction between individuals associated with the cluster's producers, suppliers, and economic institutions fostered true 'cluster thinking' and focused on the priority concerns noted below that need to be addressed:

Human Resources: Cluster leaders report a wide array of human resources challenges ranging from the attraction of management

talent to developing appropriate skills at lower levels of the jobs spectrum, with the greatest need for experienced technical people. These challenges arise from a number of circumstances. First, markets for the cluster's products are exploding and all firms are struggling to meet demand. Second, Ottawa has historically had a shortage of experienced senior managers, a legacy of the region's government-dominated economy. And third, there is simply a major mismatch between the new needs of companies and the skills of job seekers.

Technology Resources: Even though firms are doing more R&D themselves, cluster leaders recognise the need for further developing links with the region's leading science and technology institutions. Leaders also felt the cluster would benefit from specialised facilities and programs at area universities and colleges that would allow faculty and students to have access to the most recent technological advances, providing, in turn, new sources of human capital for cluster firms.

Financial Resources: The relatively low level of entrepreneurship within the cluster is due, in part, to the historical presence of a few very large firms. Now, with markets exploding and with more than 100 telecommunications-related firms in the region, leaders feel that entrepreneurship in the cluster can be improved. Steps are required to better co-ordinate angel and early stage investors and to get more small business mentors involved in supporting new enterprises. A challenge specifically related to financial resources is the need for better access to conventional financing for exports and for plant modernisation and expansions. Cluster leaders feel that local bankers are not as knowledgeable of the fast-changing technology field as they should be and thus do not understand today's financing requirements.

Business Climate: Because Ottawa does not yet enjoy a widespread reputation as a centre for business and technology, human resource recruiters sometimes find it difficult to attract the most talented graduates. Talented candidates apparently see limited value in having "Ottawa" on their resume. Instead they pursue job opportunities in other more established centres. The region's international reputation is improving though, especially as the international business media picks up stories of large companies in the region acquiring firms in the U.S., Europe, the Middle East and Asia.

Physical Infrastructure: A growing challenge for the cluster is overcoming a shortage of industrial space and land zoned for development. Leaders report that infrastructure of all kinds, especially land, transportation and utilities for this and the other technology clusters is seriously stressed.

Quality of Life: Some leaders feel that the shortage of qualified personnel may be related to an unfavourable perception by job seekers of quality of life in the Ottawa region. Issues that leaders discussed focused on tax rates relative to competing centres.

Proposed Cluster Initiatives

Cluster leaders have proposed three action initiatives.

In response to the challenges facing the cluster, several initiatives were proposed by cluster working group members. Some initiatives recommended by the group are related to proposed “flagship” initiatives discussed in the following section. Cluster participants have committed to work on both cluster-specific initiatives as well as on flagship implementation teams.

1. Design and Launch a Cluster-Specific Financing Initiative

Challenge: Many cluster leaders perceive that early stage financing is very scarce in the region and that what risk funding is available is not easily accessible.

General Approach: Develop mechanisms for matching qualified business opportunities with sources of equity financing. Compile, disseminate and maintain a list of local funding resources, including angel investors, venture capital firms, business incubators, and relevant government programs.

Sources of Leadership: OED. Link to Igniting Enterprise flagship action team.

Potential Champion(s): Co-chairs of all technology clusters, private sector investors.

Potential Source of Funding: Private sector investment community, NRC/IRAP through public-private sector cost sharing formula.

2. Develop and Implement a Comprehensive Skills Training Initiative

Challenge: There are too few skilled and available workers in the management, technical and sales/marketing domains, specifically: senior, middle, and operational management, engineering, scientist/technologists, technicians, systems engineers, sales, marketing and support personnel. Skill shortages are seen in essentially every area. If this problem is not addressed comprehensively, the cluster's future could be at risk.

General Approach: Survey firms to identify key skills required across cluster firms and compile database of skill needs linked to information on relevant education and training programs in the region. Build on existing education and training programs where possible or implement new training modules customised to needs of cluster. Existing programs to build on include: Vitesse and the Technology Resource Initiative, industry-specific community college programs and private sector IT schools.

Sources of Leadership: Cluster working groups, local universities, colleges, private institutions, and larger telecom companies. Link to "Reskilling Ottawa" Flagship action team.

Potential Champion(s): OCRI, working with cluster co-chairs and top leaders of educational institutions.

Potential Source of Funding: HRDC, Ministry of Education, Ministry of Energy, Science and Technology, Federal Smart Communities.

3. Develop and Implement A Human Resources Attraction Co-operative

Challenge: Attracting qualified workers is simply the highest priority of cluster leaders.

General Approach: Establish a Human Resources Attraction Co-operative. The co-operative will exploit the combined recruiting resources of individual cluster firms. The initiative envisions a comprehensive database within Ottawa region websites (see "Gateway Ottawa" Flagship Initiative), with links to relevant high-tech companies, industry associations and academic

institutions.

Sources of Leadership: OED; Co-chairs of key cluster working groups. Link to the “Gateway Ottawa” flagship action team.

Potential Champion(s): Co-chairs of key clusters.

Potential Source of Funding: Private and public sector funds through cost sharing formulae.

Microelectronics Cluster

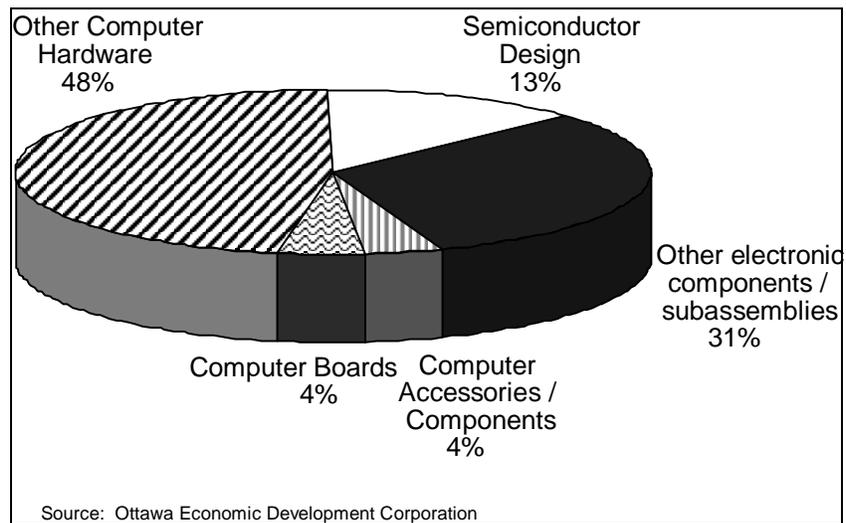
Another key source of the science and technology-based economic development driving Ottawa’s economy is microelectronics technology. As is the case with telecommunications, this field’s emergence in Ottawa stems largely from the presence of the region’s government laboratories and universities. Growth is also coming from expansion and spin-offs from the region’s home-grown technology firms.

Ottawa’s Microelectronics Cluster is highly diversified. The cluster includes semiconductor and electronic component design, with some manufacturing, as well as computer hardware design and manufacturing and applications for defence and private industry. Figure 3-5 illustrates the structure of the cluster.

Figure 3-5. Microelectronics Cluster:

Employment by Technology Area, 1999

The cluster includes: semiconductor and electronic component design, with some manufacturing, for defence and private industry.



Several leading international semiconductor companies have their headquarters in Ottawa, a distinctive feature of this cluster. Figure 3-6 shows this concentration of headquarters operations compared to headquarters-type operations in several peer regions. The implication is that this cluster is not dominated by branch-plants, as is the case with most of the world's other microelectronics centres. While having smaller employment, the cluster is largely under local control suggesting that local executives make strategic moves (facility expansions, supply chain development).

Some large, world-class companies have recently chosen to expand to Ottawa, for example Cadence Design Systems, suggesting that foreign investment in the cluster is increasing. Location decisions of this kind illustrate how a critical mass of leading firms and a presence of a skilled and productive workforce, when combined with high quality of life, can attract new investment to the region.

Ottawa's Microelectronics Cluster is supported by national initiatives such as the Strategic Microelectronics Consortium (SMC) and the Canadian Microelectronics Corporation (CMC), two key organisations advancing the microelectronics industry in Canada. Located in Ottawa, the SMC is a not-for-profit national industry association that works to articulate a national strategy for the cluster. The CMC, also a not-for-profit organisation, is dedicated to facilitating strategic alliances between the microelectronics industry and Canadian universities and educational institutions. By serving as a lynchpin tying together firms and universities and by providing educational institutions with the latest technological advances, the CMC fosters cutting-edge research and helps to ensure production of well-trained graduates.

Figure 3-6. Locally-Headquartered Companies' Share of Total Microelectronics Cluster Employment, 1999

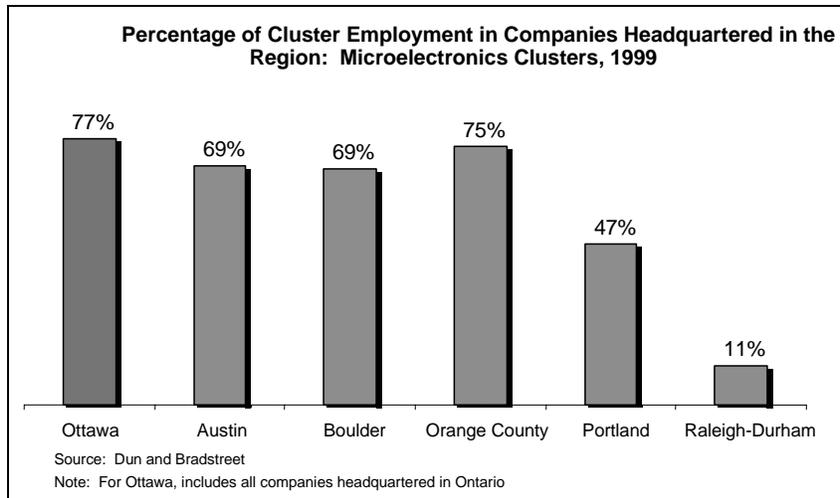
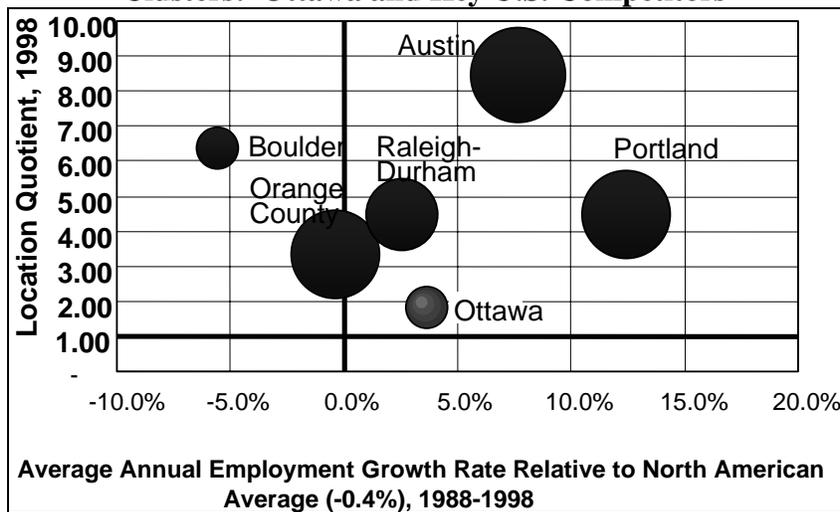


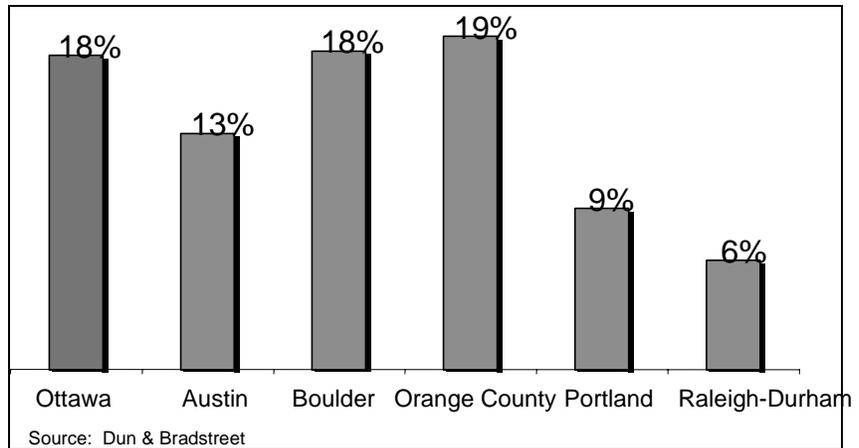
Figure 3-7. Growth Share Matrix for Microelectronics Clusters: Ottawa and Key U.S. Competitors



One key strength of Ottawa's microelectronics cluster has been its ability to spawn new companies.

One key strength of Ottawa's microelectronics cluster has been its ability to spawn new companies. As Figure 3-8 indicates, a relatively high share of cluster employment is in companies that are less than five years old.

Figure 3-8. Share of Cluster Employment in Companies Founded Since 1994: Microelectronics Clusters



The electronic components industry, a major part of the cluster, exhibits one of the highest total factor productivity growth rates when compared to all other sectors in the Canadian economy. This is because the cluster is closely tied technologically to the telecommunications equipment and photonics industry.

As markets grow for these clusters and as the growth in wireless digital communications and Internet applications increases Ottawa's Microelectronics Cluster is poised for long term growth. Going forward, the challenge is to take full advantage of market growth and change. As a means of developing this cluster Ottawa's economic development agencies should focus on recruiting both primary and supplier firms in the cluster. The region's development agencies should also focus on developing new, entrepreneurial start-ups and nurturing their success by making sure the new firms have access to local inputs they will require to succeed (e.g., skilled workers, venture finance).

Key Cluster Challenges

The Microelectronics Cluster working group identified a set of key challenges similar to those associated with other high tech clusters in the region.

Human Resources: The cluster needs more qualified workers at all levels. Workers with masters' degrees and chip design experience are in especially high demand, as are trained and experienced engineering managers and business managers. Cluster leaders also pointed to the limited local pool of senior management skills due to the government dominance of the regional economy. This fact limits opportunities for start-up companies in the cluster.

Finance: Ottawa is viewed by most interested U.S. venture capitalists as a relatively uncharted territory with excellent technology capabilities but weak, unseasoned management teams. Consequently, U.S. venture capitalists focus more on investment opportunities in more familiar territory. Cluster leaders feel that these investors do not recognise Ottawa's potential to support investments that can mature into very successful companies. There is growing evidence, however, that U.S. venture capital is finding its way to the region (see next section).

Physical Infrastructure: Growth pressures affect nearly every category of infrastructure. Inadequate access to high-speed broadband telecommunication services is a growing challenge. Cluster leaders report that DSL is unavailable in many places, making sophisticated "telecommuting" difficult which, in turn, adds to the cluster's difficulty attracting skilled workers.

Marketing: Leaders feel that Ottawa does not enjoy international visibility or a reputation as a centre for microelectronics innovation, negatively affecting the region's ability to attract investment capital and skilled labour.

Business Climate: While, on average, tax rates are somewhat higher than those in the U.S., the perception of large disparities creates another challenge where it comes to attracting investment and people. Both the Federal and Ontario budgets in 2000 took steps to improve the overall tax situation but leaders believe that more action is required.

Institutional Reform: As with all high tech clusters, change occurs at a very quick pace, and cluster leaders feel that government institutions are not responding fast enough to the New Economy. Government labs have been key to the cluster's growth but going forward, firms will need to develop new relationships with these institutions. And officials of the institutions will need to find new ways of supporting the needs of the cluster for access to technical know-how.

Proposed Cluster Initiatives

Cluster leaders have proposed four action initiatives.

The cluster working group focused on several action initiatives designed to address the above and other critical challenges. The group's early-stage incubation and marketing initiatives are linked to the broader "Igniting Enterprise" and "Brand Ottawa"

flagship initiatives.

1. Incubate Early-stage Microelectronics Firms

Challenge: Need to address relative scarcity of programs that assist and support early-stage microelectronics firms.

General Approach: Customise NRC/ IRAP program and similar federal and provincial programs to meet the needs of small and medium sized firms within the Microelectronics Cluster.

Sources of Leadership: OED/Ottawa Entrepreneurship Centre, OCRI, NRC/IRAP.

Potential Champion(s): Entrepreneurship Centre, cluster co-chairs working with relevant programs of OCRI, OED.

Potential Sources of Funding: NRC/IRAP, other relevant and provincial programs.

2. Link Cluster Firms to U.S. Venture Capital Sources

Challenge: Need to overcome the relatively low visibility of Ottawa as a place of good investment opportunities among American venture capitalists.

General Approach: Showcase and capitalise on success stories of American financed start-ups in order to attract more American early stage venture capital. Raise visibility through a grassroots ‘services network’ comprised of non-competing professional service providers (accountants, bankers, lawyers, etc), an ‘electronic clipping service’, and a targeted U.S. VC marketing campaign.

Source of Leadership: OED, co-chairs of all technology clusters.

Potential Champion(s): Co-chairs/representatives of all technology clusters.

Potential Sources of Funding: Public-private sector cost sharing formula.

3. Market Ottawa Microelectronics

Challenge: Need to overcome low visibility of Ottawa as a high-tech centre, especially as a centre of excellence in

microelectronics-related technology, which is impeding the region's ability to attract talent, foreign direct investment, and venture capital.

General Approach: Use sophisticated communications techniques to “brand” and market Ottawa as a microelectronics centre of excellence. Link with “Brand Ottawa” flagship and design a sub-brand focused on microelectronics.

Sources of Leadership: OED

Potential Champion(s): Cluster co-chairs/members

Potential Source of Funding: Private and public sector cost sharing formula

4. Develop Cluster-specific, Near-term Strategic Action Plan

Challenge: Need to “deepen” the cluster by attracting to the region a semiconductor manufacturing plant, a test-bed facility, and related facilities. The objective of this initiative is to build a stronger critical mass in the region to spur more inward investment as well as more local entrepreneurship.

General Approach: Develop a strategic plan to build on past attraction campaigns and co-ordinate focussed, public and private sector efforts, especially marketing efforts.

Potential Source of Leadership: OED, Cluster co-chairs, cluster working group.

Potential Champion(s): Cluster co-chairs/members.

Potential Sources of Funding: Federal/provincial programs and private sector through cost-sharing mechanisms.

Software and Communications Cluster

Ottawa's Software and Communications Services Cluster provides an array of packaged software, software and information technology (IT) services, as well as certain telecommunication services to domestic and international markets. Cluster growth has been a function of growing market demand as well as the evolution of the region's technology products. Markets for IT services and consulting have evolved

Ottawa's Software and Communications Services Cluster offers an array of

packaged software, software and information technology (IT) services, as well as certain telecommunication services to domestic and international markets.

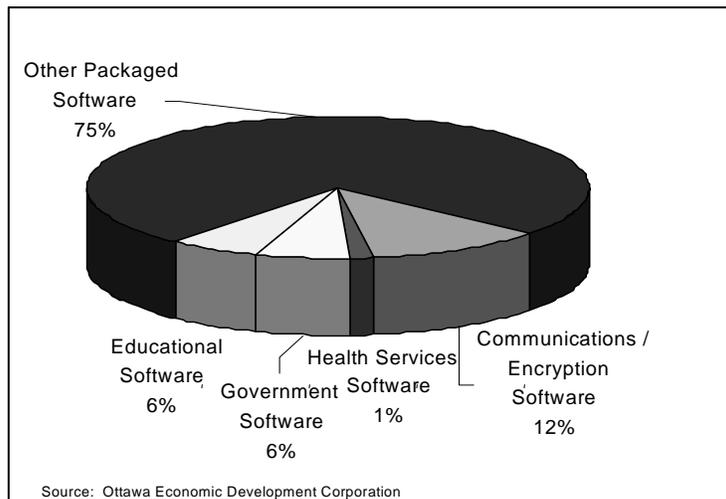
with the spread of the Internet. In this context, the software and communications cluster has been able to harness existing strengths in other advanced technology fields to meet the emerging opportunities worldwide in the fast-changing software and communications fields.

The success of Ottawa's software and communications cluster is another example of the strength of home-grown business expansions. Like the region's other advanced technology sectors, the cluster can attribute some of its success to long-standing local institutional resources (e.g., CRC, NRC).

Software Products

Many of Ottawa's software firms are among the largest in Canada. Corel, which specialises in business, graphics and Internet software, has a worldwide reputation. Cognos, another large software firm, is known for its business intelligence software. Hundreds of smaller and younger firms also contribute to the burgeoning software industry in the region. As Figure 3-9 indicates, the structure of Ottawa's software industry closely reflects the cluster's strength in other knowledge-intensive activities in the region such as government and education.

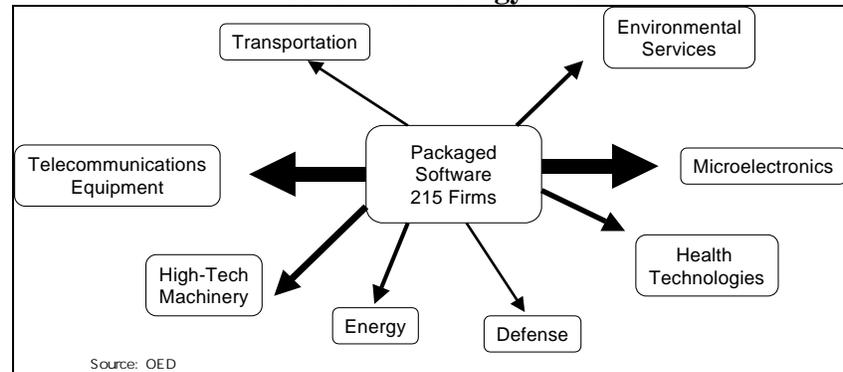
Figure 3-9. Ottawa's Packaged Software Industry: Employment by Technology Area, 1999



Software development is a growing business line for technology firms typically associated with other clusters. Linkages between the region's producers of software packages and the telecommunications and microelectronics clusters are particularly strong. Nortel Networks, at the forefront of the

global revolution in telecommunications, develops software that allows telecommunications service providers to better manage the increasing demand placed on the local telephone network by Internet users. Figure 3-10 illustrates the kinds of interaction among software and other technology clusters in Ottawa. The width of the arrow indicates the degree of interaction.

Figure 3-10. Number of Software Companies also Working in Other Technology Areas



A small but growing segment of Ottawa’s Software and Communications Services Cluster is multimedia software. As this segment grows, new media could well be one of Ottawa’s “seed clusters.”

A small but growing segment of Ottawa’s Software and Communications Services Cluster is multimedia software. A number of multimedia applications used in the \$1 trillion world-wide industry originated in the Ottawa region, in part, through the efforts of the NRC and other public research institutions who have contributed to the development of technologies in the field. The focus of this segment has increasingly been on 3D imaging and mapping, as well as colour image applications for graphic arts and motion pictures, digital animation and editing, among other multimedia systems. As this segment grows, new media could well be one of Ottawa’s “seed clusters.”

IT Consulting

IT consulting firms provide assistance with telecommunication and computing technologies and/or perform system integration services. Such services may include software engineering, information security, project support services, Internet web design, network design, computer communications network design, and data processing services. More than 100 firms provide these services throughout the Ottawa region.

Communication Services

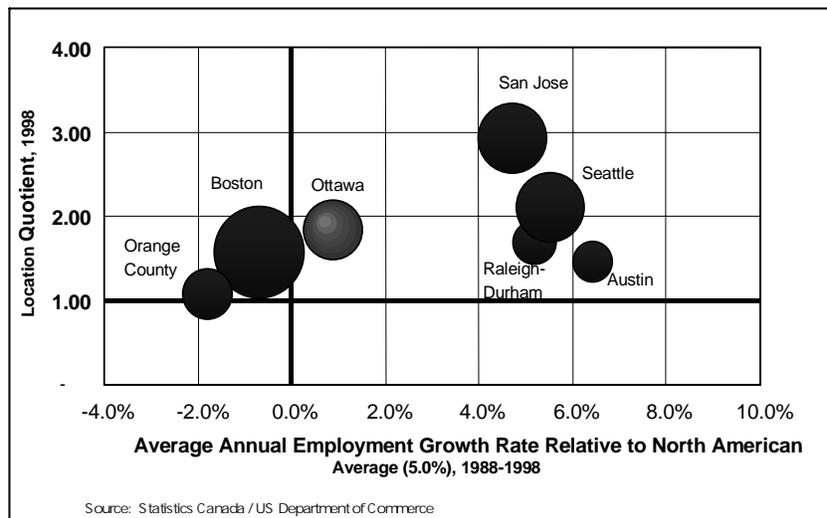
This segment of the cluster includes providers of technologies

and services related to Internet and Intranet applications. Markets include customers within Ottawa as well as outside the region. The Internet-access segment has approximately 30 local Internet service providers.

Ottawa's R&D institutions have played an important role in communications services as they have in other technology clusters. For example, CRC and Communications and Information Technology Ontario (CITO) have been involved in research related to Internet development tools, especially as they pertain to global search networking, information access technologies, and interpersonal communications over the Internet.

With markets growing worldwide this cluster can be expected to grow. However, it may not be on the steep growth trajectory seen in some other software centres. San Jose, Seattle, Raleigh-Durham and Austin are North America's leading software regions and all are growing faster than Ottawa (see Figure 3-11). While the analysis suggests slower growth than other software centres, it also shows that employment concentration is higher than many other regions suggesting that Ottawa has local competitive advantages not enjoyed by other regions (e.g., the presence of a large government market).

Figure 3-11. Growth Share Matrix for Software and Communications Services Clusters: Ottawa and Key U.S. Competitors



The challenge for Ottawa's software cluster will be to

One reason for the relatively slower growth rate is that the level of local entrepreneurship is substantially lower than that in

accelerate employment growth by enhancing entrepreneurship in the cluster and working to create new companies to fill growing niches in the cluster's many segments.

competitor regions like Silicon Valley. In some respects this is due to the presence of very large, well-established companies like Cognos, but it also reflects the still limited penetration of venture capital investment in the cluster. The challenge for Ottawa's software cluster will be to accelerate employment growth by enhancing entrepreneurship in the cluster and working to create new companies to fill growing niches in the cluster's many segments. Ottawa's software entrepreneurs should look especially closely at opportunities in the expanding Internet security and GIS markets where companies like Entrust and others are finding success. These are also areas on which Industry Canada is focusing attention. And with each of the region's clusters expected to grow significantly over the next few years, opportunities should emerge to meet changing cluster needs for specialised packaged software and IT services.

Key Cluster Challenges

Critical issues identified by the Cluster Working Group included the following:

Human Resources: Workforce development is the cluster's top priority. Facing widespread shortages of management talent and enterprise management skills, cluster leaders are concerned that the region is at risk of becoming a smaller, second or third "tier" cluster in North America's growing software industry.

Financial Resources: As is the case with all the technology clusters, software leaders felt particularly strongly that cluster firms lack sufficient access to early stage capital. Knowledge among local equity investors of the local software scene is felt to be insufficient to spur conventional VC-type investments. Rather than later stage VC, cluster leaders felt that start-up firms in the cluster need to develop angel investors because local venture capital firms may lack confidence in Ottawa's software entrepreneurs. A related challenge is the fact that outdated enterprise evaluation models in use by most investors make it difficult to assess the value of new software firms.

Business Climate: The current capital gains tax code makes it difficult to attract venture investment from individuals. (This challenge was articulated before the 2000 Federal budget that at least addressed the capital gains tax.)

Institutional Reform: Leaders feel that there is a shortage of college graduates with the training needed by the cluster. Colleges and universities programs may not be optimal as related

to the fast changing needs of this cluster.

Marketing: *Leaders feel that more can be done to promote, or brand, Ottawa as a centre of software excellence. The region's rapidly growing and successful software cluster does not receive enough visibility in other parts of the Canada, let alone in global markets.*

Proposed Cluster Initiatives

The Cluster Working Group identified several priority actions to respond to the above challenges.

Cluster leaders have proposed four action initiatives.

1. Enhance Industry-University Linkages to Attract and Retain University Professors

Challenge: Need to address the problem of university professors being lured from their teaching careers by offers of higher income in the private sector. This initiative should focus on attracting and retaining talented professors (especially in key disciplines such as software engineering and photonics). It should also aim to increase research funding for the computer sciences at Ottawa-area Universities. Toward this end, steps should be taken to reach out to local firms likely to need the additional technical support available from local universities.

General Approach: Enhance and expand industry-university linkages focused on supplementing professors' salaries with consulting agreements with private industry. Use new sources of income for professors as inducements for them to remain in the area, and to attract professors from other regions.

Sources of Leadership: OCRI, Cluster co-chairs working with leaders of Carleton, University of Ottawa, other universities and colleges.

Potential Champion(s): CEOs of large firms, University of Ottawa, Carleton University, colleges.

Potential Source of Funding: No new funding needed.

2. Create Mechanisms for Linking Training Needs to Training Systems

Challenge: Build mechanisms for linking evolving

education/skill needs to educational institutions for “just-in-time” training.

General Approach: Enhance collaborative relationships between the educational/training institutions and the cluster. Create a mechanism that keeps cluster leaders abreast of changing industry skills needs and supports continuous changes to specialised training modules. Initiate a pilot project with a large firm. Conduct an Internet-based survey of software firms in order to gauge skills needs.

Sources of Leadership: OCRI, Ottawa’s post secondary education/training institutions.

Potential Champion(s): OCRI, SHRC (Software Human Resource Council).

Potential Source of Funding: HRDC, city, education/training institutions with private sector matching funds.

3. Design and Launch an Ottawa Software Portal

Challenge: Raise the visibility of the software cluster; enhance ability to attract talent and investment, enhance local and international networking. Link to “Gateway Ottawa” and “Brand Ottawa” flagship initiatives.

General Approach: Create a web portal providing Software cluster-specific information and business opportunities, focusing on *investment, companies, products, and people*. Create links to restaurants, hotels, attractions and local news in existing pages like www.ottawa.com, www.ottawabusinessjournal.com, www.ottawaonline.com and others.

Sources of Leadership: OED, Software Cluster working group.

Potential Champion(s): OED; partnership between the Software Cluster co-chairs.

Potential Source of Funding: Public-private sector cost sharing formula, in-kind services from cluster.

4. Prepare Videotape Showcasing Ottawa and Designed to Attract Software Developers to Ottawa

Challenge: *In order to attract skilled workers to Ottawa, steps*

are required to enhance the visibility of the region as a centre of software excellence. Because software developers are often young people, Ottawa should integrate into the “brand” its nightlife and recreation opportunities.

General Approach: *Prepare a short video documentary (working with a news media company) showcasing the industry, and the high quality of life in Ottawa. The focus would be to highlight the significant advantages of Ottawa for software entrepreneurs and developers (and for other technologies) vis-à-vis Silicon Valley. Potentially titled “A Tale of Two Valleys,” with strong marketing the documentary could be of interest to TV networks as well as new media outlets such as a well-advertised web site.*

Sources of Leadership: *OED, Cluster leaders with good television media contacts, City of Ottawa.*

Potential Champion(s): *OED, Co-chairs of all technology clusters.*

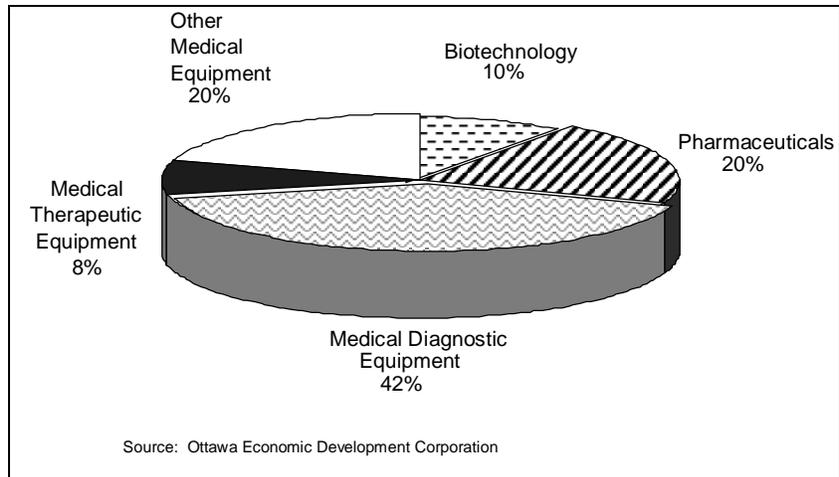
Potential Source of Funding: *Large technology firms, City of Ottawa.*

Life Sciences Cluster

With its broad base of public S&T institutions and small but growing number of firms, the Ottawa region is becoming one of Canada’s centres of excellence in the life sciences. The region boasts cutting-edge research and new product development in the fields of medical diagnostic equipment, therapeutic equipment, implants/prostheses, biotechnology, pharmaceuticals, and a range of electromedical applications. This cluster has strengths across an array of technologies in the human, animal and agricultural sciences. Figure 3-12 illustrates the structure of the sector in Ottawa.

*Figure 3-12. Ottawa’s Life Sciences Cluster:
Employment by Technology Area, 1999*

The region's life sciences cluster is diverse, and includes firms in the fields of medical diagnostic equipment, therapeutic equipment, implants/prostheses, biotechnology, pharmaceuticals, and a range of electromedical applications.



This cluster, like Ottawa's other high technology clusters, draws much of its strength from the technical excellence found in the region's world-class research centres. There are more than 40 specialised life sciences research institutes in the region, many of which are closely linked to cluster firms.

Local universities and university-affiliated hospital research centres further contribute to the strength of the cluster. The University of Ottawa, with its highly ranked medical program, along with Carleton University, offer excellent undergraduate and graduate training in health sciences, engineering, business administration, information technology and other fields related to the life science cluster. Algonquin College and La Cité Collegiale also offer certification and job skill training programs supporting the cluster.

The Ottawa Life Sciences Council (OLSC) is the dominant source of cluster leadership in the region. OLSC is a not-for-profit development corporation promoting excellence in the cluster by providing networking activities, consortia building, technology development, company financing assistance, cluster advocacy, and cluster marketing programs. OLSC has taken the lead to plan the establishment of a life sciences business incubator. Government funding to initiate the incubator is forthcoming. Overall, OLSC plays a key role in fostering cluster development through strategic partnerships between companies, investors, academia and government S&T institutions.

Cluster leaders report that the life sciences industry employs 18,000 local residents, about 3,000 of them in life sciences companies and the rest in related supplier firms and

institutions. Like the other technology clusters, many jobs require highly developed skills and pay high wages. Employment in the cluster is expanding at between 15% and 20% annually, with much of the expansion occurring in start-up companies. Between 1995 and 1997, for example, 27 new companies were formed.

As seen in Figure 3-12, biotechnology firms account for only 10% of cluster employment. However, this segment holds much of the potential for cluster growth. Throughout Canada, the biotechnology industry is growing rapidly. From 1994 to 1996, revenues from biotechnology-related commercial activity rose from \$353 million to \$1.1 billion, an increase of over 200% during the period. Most of the growth resulted from the formation of new biotechnology companies. From 1994 to 1996, the number of biotechnology firms in Canada more than doubled, from 121 to 224 firms.

Most of the growth can be attributed to global market trends. A key trend is the movement towards biology-based solutions to technological challenges where solutions were once found in chemistry. Global economic trends also help explain the recent success of the biotechnology businesses. Worldwide, there are limited resources to support further improvements in agricultural productivity. This, coupled with the world's growing population and increasing purchasing power, add to the demand for the adoption of new biotechnology solutions, agricultural technologies in particular. In this context, the strategy for developing the region's life sciences cluster is to build especially strong relationships between cluster firms and government sources of R&D.

Key Cluster Challenges

The Cluster Working Group identified a number of priority challenges to cluster competitiveness.

Human Resources: Cluster leaders see a need to aggregate information on the job skill training needs of cluster firms as well as mechanisms for communicating this information better and faster to local universities and colleges. A related problem is that the cluster's specific training needs are not easy to link to government education/training funding or certification requirements. Efforts are needed to develop a cluster-specific "cross-walk" between cluster needs and the services offered by government programs.

Financial Resources: Key to the continued growth and creation of new companies is access to early-stage, private investors. Leaders feel that managers in the cluster need to become more business savvy in order to compete better for available venture capital.

Marketing: Cluster visibility is not as good as it could be—the industry does not enjoy a well defined image in the marketplace. At least partly as a result, market penetration is less than it could be and marketing costs are higher than it could be if the region were better known as a centre of excellence. Moreover, the cluster’s image could be significantly enhanced if there were a well established life sciences firm in the region as an “anchor tenant”.

Cluster leaders have proposed four action initiatives.

Proposed Cluster Initiatives

To begin to address the challenges above, the cluster working group outlined four specific initiatives. The challenges above, and the action initiatives below that are related to marketing and early-stage financing are closely linked to the “Brand Ottawa” and “Ignite Enterprise” flagship initiatives.

1. Design New Mechanism for Financing Young Companies—Life Sciences Investor Network

Challenge: *The challenge is the same for all technology companies—access to early-stage financing to accelerate the growth of new business formations in the cluster.*

General Approach: *Develop a life sciences investor network to facilitate investment in start-up life science companies with high potential for growth, wealth creation, and overall job creation. Identify potential life science angel investors and explore their requirements and expectations. Develop mechanisms and a standardised format for investors to receive funding requests from start-ups. Educate and assist entrepreneurs in the investment process and addressing investment issues.*

Sources of Leadership: *OLSC, OED.*

Potential Champion(s): *OLSC, OED.*

Potential Source of Funding: *Public-private sector cost*

sharing formula.

2. Create Pilot Plant Manufacturing Incubator

Challenge: Become a world leader in life sciences-related production processing. Create the means for quickly launching new “product-ready” and “market-ready” firms. Enhance technology commercialisation overall.

General Approach: Create a pilot plant production incubator facility. Focus the facility’s mission on developing a set of core processing competencies with the objective of developing a critical mass of small and medium-size enterprises with products ready for commercialisation. Related objectives include:

- Creating, as an integral part of the incubator, a self-sustaining “service enterprise”.
- Developing the business infrastructure to improve commercialization for emerging technologies and processes.
- Developing the requirements of such a facility based on private sector needs (with survey).
- Assembling a steering committee comprising NRC/IRAP, NRC Process Institute, and private sector representatives, including commercialisation consultants.
- Targeting short-term market products to garner national attention.
- Developing a short list of potential candidates.

Sources of Leadership: OLSC, with NRC, private sector leaders.

Potential Champion(s): NRC in partnership with private sector leaders.

Potential Sources of Funding: NRC/IRAP, NSERC, Industry Canada.

3. Implement Targeted Marketing and Communications Plan

Challenge: Life Science firms face the same challenge of other technology clusters, the need for more visibility in the market place. Leaders also want to step-up efforts to promote the life sciences and their beneficial impacts on the region (e.g., source of good jobs) where more community support would prove helpful to cluster development.

General Approach: Brand and market Ottawa as a life sciences centre of excellence. Link with “Brand Ottawa” flagship and design a sub-brand focused on life sciences accomplishments and roles.

Source of Leadership: OED.

Potential Champion(s): OLSC, Cluster co-chairs/members.

Potential Source of Funding: Private and public sector cost sharing formula.

4. Develop New OLSC Resources Plan

Challenge: OLSC’s leaders feel strongly that the organisation needs a more stable source of funding. The job of cluster development is large and new resources will be required for OLSC to achieve meaningful success in cluster development.

General Approach: Presently, OLSC’s base funding is from RMOC. OLSC leaders feel that they can leverage four times RMOC’s contribution from private and public sector sources. Recently, OLSC has been able to supplement government funding with revenues from conferences and projects. However, these non-traditional funding sources are not guaranteed. OLSC’s leaders feel that new funding is required to support staff resources at the Ottawa Biotechnology Incubation Centre as well as three additional OLSC staff. Solutions to this problem will require creative thinking on the part of OLSC, its members and government. OLSC feels that the need for additional base funding will decrease as new sources of funding are tapped.

Sources of Leadership: *OLSC, TOP.*

Potential Champion: *Prominent member of OLSC.*

Potential Source of Funding: *Unclear, pending discussions noted above.*

Photonics Cluster

Ottawa’s Photonics Cluster encompasses an array of technologies related to the commercial application of light, including fibre optics, lasers, and optoelectronics, imaging, optical processing of information, and related applications.

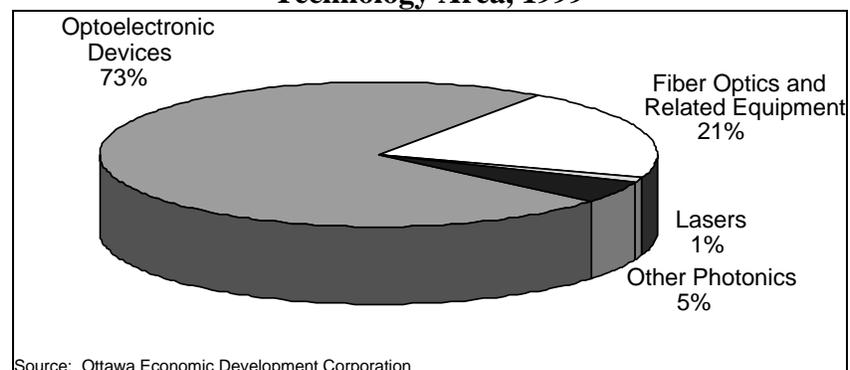
Ottawa's Photonics Cluster encompasses an array of technologies related to the commercial application of light.

These technologies are central to the growth and evolution of the telecommunications, information technology, and microelectronics industries. Photonics, also sometimes called optoelectronics, represents a set of fundamental technological innovations that can dramatically improve the performance of a whole range of information and communication technologies in the future.

The worldwide demand for fibre-optic gear is growing rapidly and Ottawa's Photonics Cluster is especially well positioned for continued growth. Optical technology is evolving quickly and investment is exploding to meet a seemingly insatiable demand for advanced communications technology (\$3.6 billion has been invested in networking start-ups in the first quarter of 2000). Ottawa's industry leaders, seeing this potential, have taken the initiative to form the Ottawa Photonics Cluster (OPC), dedicated to the advancement of the industry (the Imaging Technology Organisation has recently merged with the OPC further strengthening the cluster's institutional capacity). The growth of photonics is a sign that Ottawa's economy is restructuring to include "next-generation" industries that will be the source of new jobs well into the future.

Ottawa's telecommunication equipment companies have been involved in photonics for several years and many of the region's photonics firms have spun out of local firms. More recently, however, new photonics-specific companies have been formed in the region as both local suppliers and producers for markets outside the region. Figure 3-13 shows the structure of Ottawa's Photonics Cluster by employment in each technology field.

Figure 3-13. Ottawa's Photonics Cluster: Employment by Technology Area, 1999



Technological synergy between telecommunications, microelectronics and photonics is strong and is one key reason why Ottawa leads the country in the growth of this cluster.

Technological synergy between telecommunications, microelectronics and photonics is strong and is one key reason why Ottawa leads the country in the growth of this cluster. In the past four years, cluster employment in the Ottawa-Hull region increased by approximately three-fold. JDS Uniphase is the largest and fastest growing photonics firm, but there are other key players as well. Depending on how employment is counted, segments of the large telecom firms and the photonics-specific firms combined employed more than 20,000 Ottawans in 1999. Small photonics firms are also growing but their employment pales in comparison to the employment at large, well-established firms.

From a strategic perspective, the Ottawa Photonics Cluster should pursue its current work plan while taking additional steps to harness the existing competitive advantages of the region (e.g., growing venture capital, private sector innovation, government supported science and technology). Competitiveness in the future will depend on achieving two results simultaneously--rapid market penetration and new product innovation to meet fast changing demands. From a national perspective, photonics industry leaders have taken steps to organise private and public cluster organisations for the purpose of fostering improved communication, strengthening links with local universities and research centres, and providing support to start-up companies.

Key Cluster Challenges:

The Photonics Cluster shares many challenges similar to other high tech clusters in the Ottawa region. Members of the Photonics Cluster working group identified the following:

Human Resources: Workforce development is a top priority. The supply of workers with the skills needed by the Photonics Cluster, especially software programmers and developers, is limited. Small companies are particularly challenged, as they must compete with the large companies for skilled employees.

Marketing: As new as it is, there is too little general awareness of the photonics markets, the industry and its critical issues.

Non-technical descriptions of the industry are needed and these must be communicated to the local and greater business community as well as worldwide. Overall, Ottawa's excellence in photonics needs to be better known to the rest of the world.

Institutional Reform: While the region has enjoyed a number of successful technology transfer initiatives over the years, cluster leaders feel a need to improve the ways that the region brings together photonics companies and public R&D institutions for the purpose of sharing ideas, joint R&D projects and efforts toward commercialising photonics technologies.

Proposed Cluster Initiatives

The OPC, participating in the Economic Generators Initiative as a Cluster Working Group, has outlined a number of initiatives designed to address priority concerns:

Cluster leaders have proposed six action initiatives.

1. Develop Human Resources

Access to a skilled and adaptable workforce is at the top of the cluster's priority list of concerns and will require comprehensive efforts if it is to be adequately addressed; three related efforts are under development by the OPC:

- *Development of a Skilled Workforce*

Challenge: Address the problem of a "skills mismatch" in the workforce (well educated people without the specific skills needed by industry).

General Approach: Design and deliver a "re-skilling" program for the region's underemployed, immigrant University graduates; build on the VITESSE model.

Sources of Leadership: VITESSE (Canada) Reskilling Inc., universities, and industry.

Potential Champion(s): A prominent University executive has agreed to be the champion.

Potential Source of Funding: Ontario Strategic Skills Initiative, private sector, and student fees.

- *Attract and Retain Academics/Professors*

Challenge: Strengthen basic and applied research at local universities, building the infrastructure (especially the professorate) required to service the increase in undergraduate/graduate students stemming from the growth of the high tech sectors.

General Approach: Partner with industry and seek industrial commitments to access leveraged government funds through existing Federal and Provincial programs.

Potential Sources of Leadership: Universities and Colleges working with OPC.

Potential Champion(s): Prominent University executive (working with OPC) has agreed to be the champion.

Potential Source of Funding: Specific Federal and Provincial government programs (e.g., CFI, ORDCF), private sector.

- *Increase Supply of Technologists*

Challenge: Ensure that the region has sufficient technologists to service local existing and emerging demand, especially for the Photonics Cluster.

Potential Sources of Leadership: Algonquin College, Photonics Research Ontario.

Potential Champion(s): Members of the cluster have agreed to be the champions.

Potential Source of Funding: Ontario Strategic Skills Initiative.

2. Launch Comprehensive Marketing and Communications Plan

Challenge: Enhance cluster visibility; current low visibility impedes the ability to attract talent, foreign direct investment, and venture capital.

General Approach: Brand and market Ottawa as a photonics centre of excellence. Link with “Brand Ottawa” flagship and design a sub-brand focused on photonics.

Potential Source of Leadership: OED, with the photonics cluster working group.

Potential Champion(s): Cluster co-chairs/members.

Potential Source of Funding: private and public sector cost sharing formula.

3. Plan and Implement Key Cluster Events

Challenge: Work to build better base of knowledge and broader understanding of the cluster through cluster-sponsored events within the region.

General Approach: Implement a series of events, including: career fairs, lecture series, annual industry conference and gala. Participate in other events such as the Ottawa Venture Capital Fair.

Potential Source of Leadership: OPC, OCRI, cluster firms.

Potential Champion(s): OPC event committee.

Potential Source of Funding: Sponsorships, membership fees, revenue generated from events.

4. Develop Funding and Membership Plan for the OPC

Challenge: Ensure funding and use funds to strengthen OPC; build organization into a powerful force for industry advocacy and development.

General Approach: Develop a funding and membership plan for the OPC. Develop information on membership benefits, types of membership and annual fees.

Source of Leadership: OPC.

Potential Champion(s): OPC.

Potential Source of Funds: OPC members, membership fees.

5. Develop Technology Road Map

Challenge: Keep cluster leaders abreast of photonics-related technology development and on the cutting edge of innovation.

General Approach: Develop a Canadian Photonics Technology Roadmap.

Potential Source of Leadership: OCRI, Photonics Research Ontario, Industry Canada. Other institutions (CITO, NRC, CRC) have agreed to support the initiative as founders.

Potential Champion(s): Member of OCRI/PRO working with members from Industry Canada, IBIS Research.

Potential Source of Funding: Contributions from founders to cover startup costs and subscription fees to cover operating costs.

6. Develop Strategic Plan for the Cluster

Challenge: Establish a vehicle for continuing the process of identifying and addressing challenges and opportunities.

General Approach: Prepare a strategic plan for the OPC. Use existing vision, mission and strategies as a launching point. Identify gaps. Develop strategic planning process.

Potential Source of Leadership: OPC.

Potential Champion(s): Member of OPC has agreed to be champion.

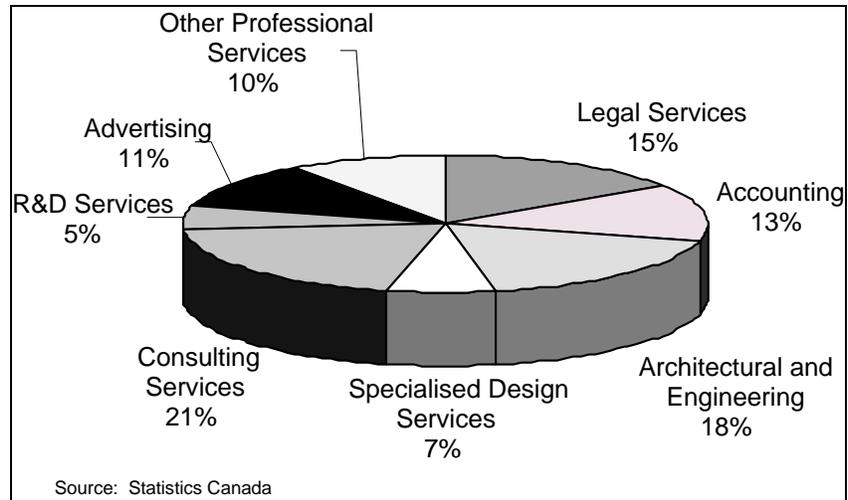
Potential Source of Funding: Pro-bono

Professional Services Cluster

The Professional Services Cluster in Ottawa includes a broad range of “knowledge services”, illustrated in Figure 3-14 below. As Ottawa’s economy has restructured the Professional Services cluster has both grown and changed its market focus. Government was once essentially the main client for firms in this cluster. But with the growth of the high technology sector, the cluster has grown to serve an increasingly diverse client base.

Figure 3-14. Structure of Professional Services Cluster, 1998

The Professional Services Cluster in Ottawa includes a broad range of “knowledge services” including legal, accounting, architecture and engineering.



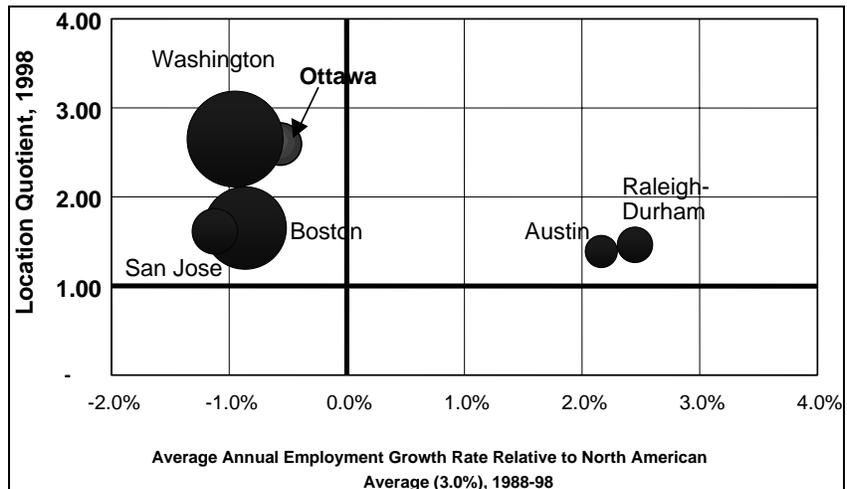
High technology firms rely on the Professional Services Cluster for support in areas including mergers and acquisitions, intellectual property rights, IPOs, equity investments, stock options, etc. Consultants provide input on marketing strategies, systems and procedures and solutions for a range of firm-specific strategic and operational issues. Architectural and engineering firms provide clients with an array of design and engineering services.

Professional service firms are major users of, as well as agents for, technological innovations. They often serve as the impetus for new technological developments. Many service firms also play an important role in disseminating technical know-how, in effect, “cross fertilizing” the region’s economy. Some even develop new technologies themselves, through R&D activities. Figure 3-15 benchmarks the region’s cluster performance against some of its competitor regions in the U.S. Law firms, accounting firms and consulting firms are growing slowly, if at all, in most large metro regions. Instead, professional services employment is shifting from larger to smaller cities as firms establish new offices in new markets.

In the case of Ottawa, the Professional Services Cluster is increasingly serving the region’s other cluster firms, especially from the high tech clusters. In this context, Ottawa’s Professional Services Cluster is likely to see growth at essentially the same rate expected from the other clusters.

Figure 3-15. Growth Share Matrix for Professional Services

Clusters: Ottawa and Key U.S. Competitors



Key Cluster Challenges:

Key challenges identified by the Cluster Working Group include:

Marketing: Leaders feel that their cluster needs to become better organized in order to develop a clear voice and send a clear message to both local clients and the local community more broadly. This is, in part, the challenge of gaining access to potential clients in the region. But the larger issue is the cluster's image. Leaders feel that much more can be done to build a "brand" image of excellence and integrity.

Financial Resources: Financing for business formation and expansion is an issue that affects essentially every cluster. Leaders of the Professional Services Cluster feel that Ottawa needs a "transformation" in banking so that financing needs of the New Economy are better met. More attention to the needs of small and mid-sized enterprises is critical.

Physical Infrastructure: There is a sense among this cluster's architect, engineering and land development segments that the Region has unreasonably complex planning and permitting procedures that make for slow and unnecessarily expensive approval processes.

Vision, Creativity and Entrepreneurship: Cluster leaders feel that there is a pervasive lack of vision and entrepreneurial thinking in

many cluster segments, a legacy tied to “old line” conservative law and accounting firms. The cluster needs to foster creativity and celebrate entrepreneurship.

Cluster leaders have proposed key action initiatives.

Proposed Cluster Initiatives

The following initiatives were developed by participants during the Professional Services Cluster working group meetings. Two initiatives are closely related to flagship initiatives, “Global Learning Centre” and “Brand Ottawa”. Implementation of these initiatives should be through the flagship initiative implementation process.

1. Establish a Global Learning (Training) Centre

Challenge: Ottawa has the opportunity to capitalise on the presence of its many education and training institutions, for three reasons. First, the region has an array of excellent education and training institutions, several of which are enjoying widespread recognition in the marketplace. Second, markets are growing for non-traditional, “short course” corporate education and training. Finally, Internet and related technology is rapidly changing delivery mechanisms for education and training. Ottawa is positioned to take advantage of its strengths and these opportunities.

General Approach: This initiative should build on the presence of excellent post-secondary institutions and the emerging image of Ottawa as a centre of technological excellence. Innovative marketing initiatives (such as “branding” strategies) could establish Ottawa in the marketplace as a “Global Training Centre”. Market analysis will identify specific client needs while an analysis of new education and training delivery mechanisms will show others ways for Ottawa to find its best market niche. In a developmental way, steps would be taken to acquire or build appropriate facilities. (See the Global Learning Centre flagship initiative for additional information.)

Potential Sources of Leadership: From the Professional Services cluster, form a Global Learning Centre task force involving leaders from business, academia and government.

Potential Champion(s): Member of cluster working group.

Potential Source of Funding: Funding partnerships potentially involving: private sector, local and provincial government, and

post secondary institutions.

2. Branding and Marketing Ottawa's Professional Services

Challenge: Need to overcome low visibility of Ottawa as a professional services centre; what market visibility that exists for the cluster is far overshadowed by the visibility of the high tech and government sectors.

General Approach: Brand and market Ottawa as a centre of excellence for professional services (link to the "Brand Ottawa" flagship initiative). Conduct a survey of professional services capabilities in the region and identify niche expertise. Incorporate these findings in marketing materials and consider the publication of a newspaper supplement that explains what professional services are and why they are important to the economy.

Potential Sources of Leadership: OED, Cluster Working Group.

Potential Champion(s): Cluster co-chairs/members.

Potential Source of Funding: Private and public sector cost sharing formula.

3. Organise a Professional Services Cluster Network

Challenge: *While individual cluster segments are supported by their own associations, the broader cluster has no forum for addressing shared concerns and challenges and to support broad-based marketing of professional services.*

General Approach: *Create a professional services network-type organisation (perhaps modelled after the new Ottawa Photonics Cluster); its mission should be "cluster development"; and early activities should include membership development and targeted events, like an awards dinner. From this basis, the organisation could expand activities eventually becoming a cluster network-type organisation with broader goals.*

Potential Sources of Leadership: *Professional Services Cluster Working Group.*

Potential Champion(s): *Co-chairs of the working group.*

Potential Source of Funding: *Member fees.*

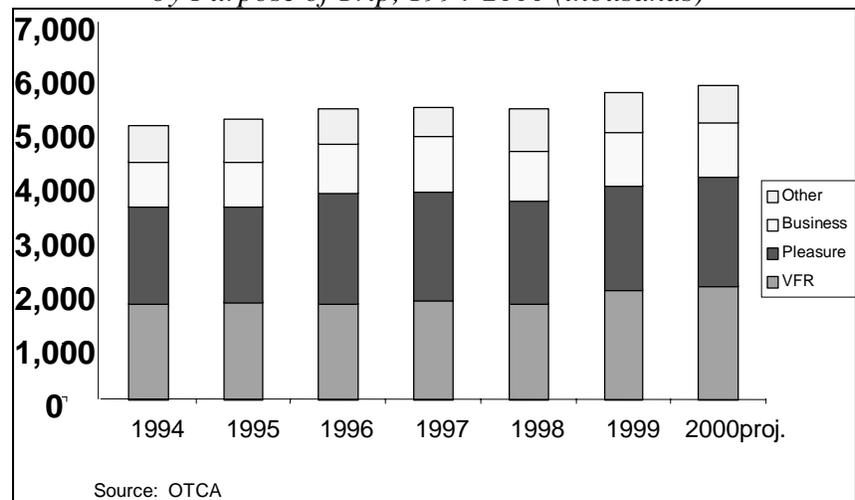
Tourism Cluster

With its variety of cultural and historical establishments, seasonal festivals, outdoor activities and growing international firms, Ottawa is one of Canada's premier destinations.

Almost six million people a year visit Ottawa, either for tourism or business. These visitors add more than \$800 million to the local economy annually. As Canada's capital city, Ottawa has a wide variety of cultural and historical establishments, seasonal festivals, and outdoor activities. The city has an abundance of hotels and restaurants and other traveller amenities that make for a comfortable and interesting stay for visitors of all kinds.

As illustrated in Figure 3-16, Ottawa's Tourism Cluster has seen steady growth (2.4% annually) since 1994, the turnaround year following the recession of the early 1990s. Growth in business travellers and Visiting Friends and Relatives (VFR) have led the way, with pleasure travel growing slightly slower and other markets remaining relatively flat. The region captures approximately 3% of Canadian tourism overall. However, it is stronger in particular markets. Ottawa captures nearly 6% of Canadian business tourism and nearly 4% of the country's VFR tourism.

Figure 3-16. Person-Visits to Ottawa-Hull by Purpose of Trip, 1994-2000 (thousands)

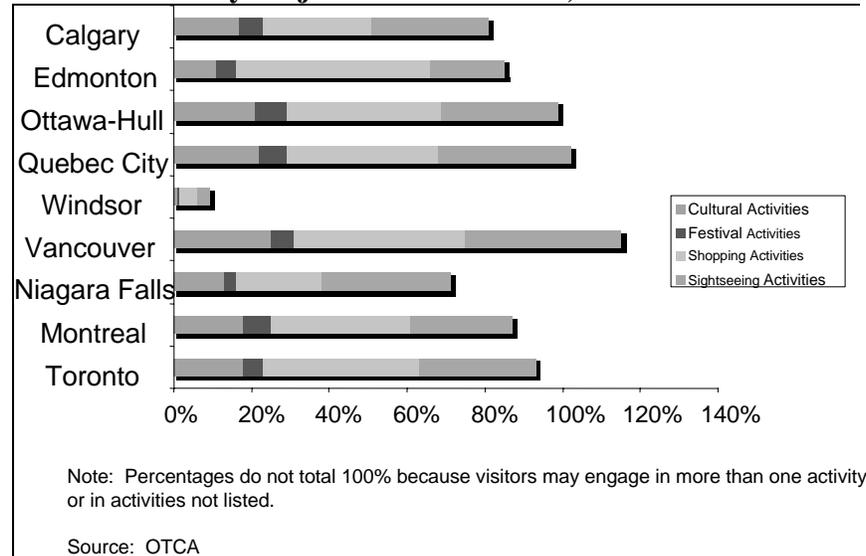


Pleasure Tourism

Approximately one third of all out-of-town visitors to Ottawa come for various recreational activities, with festivals being a primary attraction. In fact, Ottawa attracts more visitors for festivals than any other Canadian city.

Figure 3-17 illustrates the popularity of shopping, sightseeing, and cultural activities in Ottawa.

Figure 3-17. Tourism Activities by Major Canadian Cities, 1996

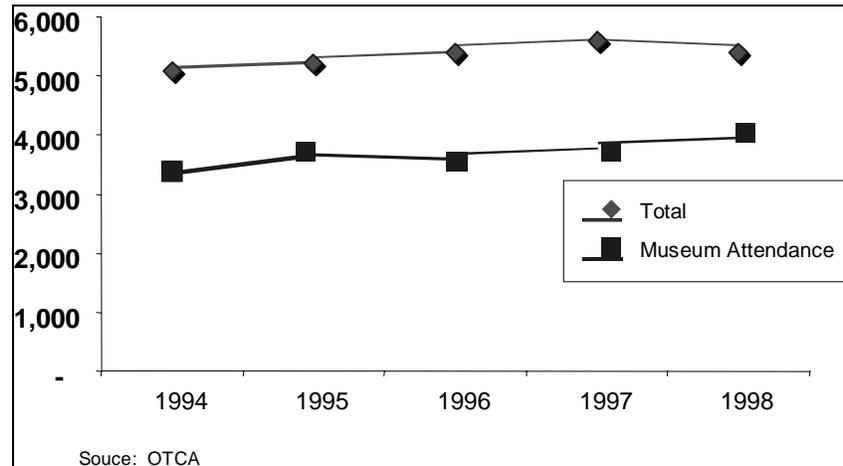


Ottawa’s many cultural institutions, including Parliament Hill, Rideau Hall, the Royal Canadian Mint and the National Gallery, are the largest attractions for pleasure tourists in the region. In 1998, 85% of all pleasure and VFR tourists who stayed in Ottawa at least one night visited at least one of these attractions. Figure 3-18 shows trends in total visitors and museum attendance.

In 1996, 35% of tourists to the region visited Casino de Hull but that figure dropped to 10% in 1998. The profile of Casino visitors may be changing, as is the case across North America. For example, in 1996 34% of visitors arrived by plane but two years later air arrivals had dropped to 17%. Today, Casino visitors are more likely to arrive by car, bus or train. Nevertheless, Casino visitors spend \$887 per visit on average (1998 data), considerably more than other non-Casino tourists who inject \$653 into the economy per visit.

Figure 3-18. Ottawa-Hull Total Visitors and

Total Museum Attendance (in 1000s)

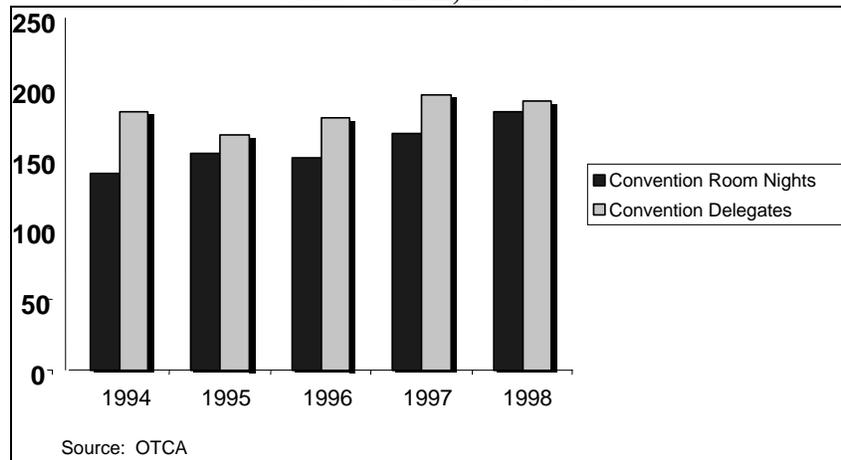


Business Tourism

Ottawa is one of Canada's leading convention centres. Almost 200,000 business delegates visit the city each year.

Approximately 25% of visitors to the Ottawa region come for business, spending more than \$150 million per year. With about 700 conventions taking place in the region's convention centres and hotels, almost 200,000 business delegates visit the city each year. Examples of Ottawa's facilities include the Ottawa Congress Centre, an 84,000 square foot convention space which accommodates nearly 5,000 persons, a 200-store shopping complex at Rideau Centre, and an array of entertainment amenities in the city's downtown. Lansdowne Park, the site of the annual Central Canada Exhibition, draws thousands of visitors for some of the region's most popular trade and consumer shows. Hotel occupancy is relatively high in the region, but Figure 3-19 shows slow growth and even recent decline in delegate visits, due in part to undersized convention facilities.

Figure 3-19. Number of Convention Room Nights in Ottawa-Hull, 1994-98



From a strategic perspective, Ottawa’s Tourism Cluster needs to focus on “product development,” while accelerating marketing efforts. An improved product will come from both improved packaging of the total visitor experience, as well as from adding new elements to the experience (e.g., new convention facilities, new festivals and celebrations). For marketing, steps are required to enhance the region’s image. Many tourism leaders feel that too many potential tourists still know too little about what the region has to offer.

Key Cluster Challenges:

More than 50 tourism leaders participated in the cluster working group process. Among the highest priority cluster challenges the group focused on include the following issues:

Physical Infrastructure: Moving the much discussed Convention Centre initiative forward is top of the list of priorities of this cluster. It is widely accepted that Ottawa has a shortage of convention space for business events. In addition, cluster leaders feel strongly that there is an insufficient supply of lower cost hotels and hostels for travellers, especially during the summer months.

Financial Resources: Convention centre expansion will require creative financing. All plausible creative solutions for

financing this expansion will need to be examined.

Marketing/Financial Resources: *Tourism needs new mechanisms to finance destination marketing. As new mechanisms are developed it will be important that smaller players are not excluded from financing opportunities.*

Marketing: *Marketing is a high priority issue for cluster leaders, as it is in most regions. Leaders are looking for more, and better marketing efforts. Working group members feel that professionals in destination marketing need to take better advantage of both general and specialised media and other widespread promotion resources.*

Customer Service: *Approaches to customer training need to be overhauled. Cluster leaders suggest a more efficient, “one-stop” customer training process. Developing and advancing new service concepts (leaders referred to ‘bundling of services’) could also enhance the region’s current approaches to customer service training.*

Proposed Cluster Initiatives

Tourism leaders agreed on several action initiatives, outlined here, that will begin to address the broad challenges faced by the cluster.

Cluster leaders have proposed seven action initiatives.

1. Launch a Convention Centre Campaign

Challenge: Steps are required to garner more broadly based community support for the expansion of the convention centre

General Approach: Existing and new information needs to be packaged and widely disseminated about the importance of conventions to the community and to the economy. Local media (mass media and specialised publications) must be encouraged to communicate this information. Special events such as presentations to business and other key community groups should be planned to advance the communications process.

Potential Sources of Leadership: Private sector, OED, OCRI, OTCA.

Potential Champion(s): Prominent member of Ottawa’s society, members of OTCA, OED, Ottawa Board of Trade, OLSC.

Potential Source of Funding: Federal, provincial and municipal sources: private sector contributions.

2. Design and Launch a “High Tech” Customer Service Program”

Challenge: Capitalise on the presence of high-tech in the region to enhance the competitiveness of tourism operators.

General Approach: Build a high-tech customer service database that is comprehensive, non-commercial, user-friendly and interactive and that provides a one-stop shopping service (based on San Jose’s City website). Create a centralised 1-800 service to access the database. Encourage partnership with industry in developing tools. This initiative can link into the smart city initiative.

Potential Sources of Leadership: OTCA, NCC, Tourism Cluster Working Group.

Potential Champion(s): Member(s) of cluster, OTCA.

Potential Source of Funding: City of Ottawa, private sector, NCC, BIAs, fees or commissions.

3. New Image of Ottawa in National Media

Challenge: Change the image of Ottawa carried by national media.

General Approach: A two pronged approach: “De-brand” Ottawa as synonymous with federal government, while re-branding it with a new image. Garner support for the need to de-brand by using an electronic clipping service to survey national print and electronic media. Work with newspaper and magazine publishers, editors, and others to change this pattern of referencing Ottawa. Link with “Brand Ottawa” flagship.

Potential Sources of Leadership: Clusters (including Tourism), OTCA, NAC.

Potential Champion(s): City of Ottawa.

Potential Source of Funding: City of Ottawa.

4. Financial Resources

Challenge: Need for supplementary funding for destination marketing to ensure sustained growth of the tourism and convention industry in Ottawa.

General Approach: Seek enabling legislation to permit municipalities to expand Ontario sales tax on commercial accommodation from 5% to 8% (hotel, apartment hotel, suite hotel, and B&B) within the newly created City of Ottawa boundaries. Use this supplementary funding for “product development”, promotion and other purposes.

Potential Sources of Leadership: OTCA, Tourism Cluster Working Group.

Potential Champion(s): OTCA, Tourism Cluster Working Group Member(s).

Potential Source of Funding: OTCA, City of Ottawa.

5. Design and Implement a “Pageantry Template” Initiative

Challenge: Heighten the awareness of Ottawa festivals. Create a sense of excitement and a “buzz” so as to increase the visibility, attendance, marketing and revenues for festivals and similar events.

General Approach: Create an easy, replicable “pageantry” template that establishes a plan of action for mobilising the whole community in support of festivals (in adopting themes, colours, symbols, logos), events and pageantries. Organise the community (museums, organisations, retail, restaurants, public agencies in charge of streets, bus shelters, lighting, and taxis) around specific roles, with instructions on deploying posters, banners, and other thematic materials in support of the festival. In parallel, develop merchandise (T-shirts, ball caps, and buttons) that adds to the “buzz” of particular events.

Potential Sources of Leadership: OTCA, with Tourism Cluster Working Group.

Potential Champion(s): Member(s) of cluster, NCC.

Potential Source of Funding: City of Ottawa, private sector, NCC, BIAs.

6. Enhance Tourism Stewardship

Challenge: Lack of business support for tourism related initiatives and events. Need for educating the community, especially the high-tech firms, about the role of tourism in enhancing the quality of life in Ottawa and the need to support tourism related organisations.

General Approach: In order to enhance the visibility of the tourism sector and its importance in the daily life of Ottawa, this initiative focuses on two elements. The first involves a series of presentations to the business community, in the form of breakfast meetings, luncheons, and presentations to professional and technical associations, as well as business gatherings. Second, develop an awards banquet coupled with a media campaign to celebrate the community leaders who support the tourism industry.

Potential Sources of Leadership: A partnership involving the OTCA, Board of Trade, Community Foundation of Ottawa-Hull, and the Tourism Cluster Working Group.

Potential Champion(s): Member of the cluster.

Potential Source of Funding: Some funds would be required for the compiling of statistics and information to support the case for the importance of tourism to the community. These funds could be garnered through contributions, a percentage of revenue from tourism events or the like. Individuals making the presentations would volunteer their efforts.

7. Build “Tourism Gateways”

Challenge: Lack of a regional tourist gateway to serve as a welcoming and information centre.

General Approach: Nearly 9 million vehicles travel on Highway 401 each year, creating an extensive market of visitors seeking travel information pertaining to Ontario East as well as the rest of the province. Create a tourist information centre at the 416/401 interchange to serve as a ‘gateway’ that will introduce visitors not only to various attractions and accommodation

options, but also to the flavour and character of the region, in particular three themes: heritage, adventure, and waterway. These themes will be present throughout the tourist information centre's architecture, landscape, and displays.

Potential Sources of Leadership: *OETA, OTCA, NCC, Ministry of Tourism, Tourism Cluster Working Group.*

Potential Champion(s): *Member of Working Group with members of OTCA, member of OETA, MEDT.*

Potential Source of Funding: *50% from the Province, 50% from Federal Government, City of Ottawa, and other Eastern Ontario partners.*

Implementation of Cluster Working Group Initiatives

Cluster leaders have proposed more than 30 cluster-specific initiatives. Most initiatives already have “champions”. Now, Ottawa needs to move this agenda forward by providing leadership and, in some cases, funding.

As the Economic Generators Initiative moves forward, each cluster working group will be encouraged to remain engaged in the process—looking to The Ottawa Partnership (TOP) for implementation guidance. Where the cluster working group action initiatives have common elements (e.g., “Brand Ottawa” and the Global Learning Centre Initiative of the Professional Services Cluster), they can be implemented through the “Flagship Initiatives” process discussed in Section 5. Action initiatives that are uniquely appropriate for the cluster working group to pursue will require that small action teams be formed and more detailed implementation plans developed. As discussed in Section 6—Agency Recommendations—responsibility for economic development among and between agencies will need to be adjusted. While this process goes on, the Cluster Working Groups should take the initiative to pursue all plausible avenues to secure leadership and resources for implementation.

3. *Ottawa's Clusters*

This section reviews the analysis and outcomes of the collaborative strategy process undertaken by seven industry cluster groups as part of the Economic Generators Initiative. ICF Consulting diagnosed the structure and competitive position of Ottawa's clusters, and led private- and public-cluster leaders through a strategy-forming process.

The Economic Generators Initiative is not just a study but is actually developing clusters through a collaborative strategy process.

The cluster working groups were charged with building on the consultants' work and identifying the key competitive challenges shared by cluster members. They were asked to identify specific, attainable initiatives to address those challenges. The initiatives were not proposed in a vacuum, and the consultants were not simply asking for input. Rather, those who proposed an initiative were required to further develop a concept and identify an implementation "champion". In this way, the Economic Generators Initiative is not just a study but is actually developing clusters through a collaborative strategy process. The initiative is fostering civic leadership, and promoting a shared approach to an economic development strategy.

Telecommunications Equipment Cluster

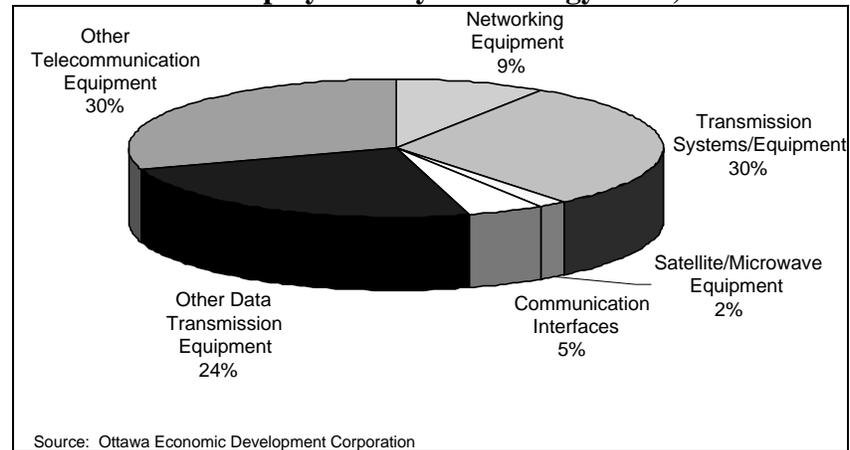
Telecommunications has been at the forefront of technology sectors driving Ottawa's "New Economy." Many of the world's major players in the telecommunications industry, including companies such as Nortel, Newbridge (now Alcatel), and Mitel which are known around the world, are major players in the Ottawa region. U.S. based Cisco Systems, along with Finland's Nokia, have recently emerged as players in the region's telecommunications cluster. With more than 100 firms, the telecommunications sector employs approximately half of Ottawa's high tech workforce and covers a wide range of technical activities, from the assembly of basic telephone hand sets to highly sophisticated digital switches.

Ottawa's Telecommunications Equipment cluster strengths include: networking equipment, transmission systems, satellite/microwave equipment, communication interface devices, and similar technologies.

The Telecommunications Equipment Cluster is defined as those firms engaged in, or linked to the production of telecommunications equipment—networking equipment, transmission systems, satellite/microwave equipment, communication interface devices, and similar technologies. With the current explosion in the use of both the Internet and wireless communication devices such as cellular telephones and handheld electronic organisers, innovative telecommunications

equipment is in high demand. Figure 3-1 shows the structure of the cluster by employment in each technology area.

Figure 3-1. Structure of Ottawa’s Telecommunications Cluster Employment by Technology Area, 1999



Ottawa’s Telecommunications Equipment Cluster is competitive with some of the most dynamic telecommunications centres in North America.

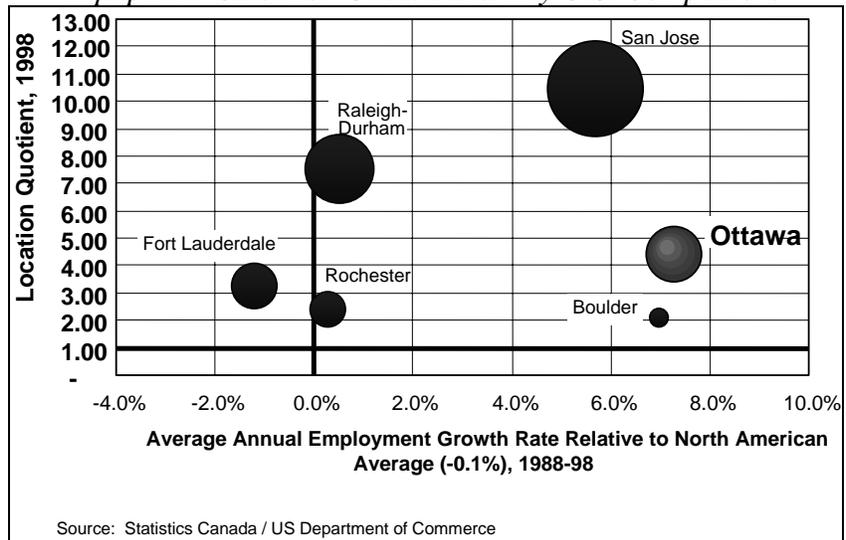
The cluster’s primary strength lies in its technological sophistication; therefore, the cluster operates near the highest level of the “value chain”. Other clusters in North America, such as the Raleigh-Durham Research Triangle area of North Carolina, combine considerable manufacturing with local R&D work; therefore the cluster operates at lower levels of the industry’s value chain. Ottawa’s strong R&D emphasis makes it unusual among leading cluster centres. Ninety percent of Canada’s industrial telecommunications R&D takes place in Ottawa. The region’s wealth of engineers, software developers and other technical skills is an invaluable cluster resource, as is the presence of an array of public research labs, including the Communications Research Centre (CRC) and the National Research Council’s (NRC) Institute for Information Technology. These labs, often in strategic collaboration with local, private firms have produced many of the cluster’s key innovations, many of which have been successfully commercialised in fields such as interactive information access, multimedia, information organisation, wireless communications and personal communication systems. CRC and NRC have also created incubator facilities to assist in early stage growth and development of start-up technology firms.

Not only is the Ottawa region the nucleus of telecommunications in Canada, its Telecommunications Equipment Cluster is competitive with some of the most dynamic telecommunications centres in North America. The

“growth-share matrix” shown in Figure 3-2 is a common way of indicating the competitiveness of regional industry clusters. The relative size of the circle indicates regional employment, relative to other regions. The position of the circle on the horizontal axis indicates the employment growth rate of the cluster, relative to the North American average. Any circle to the right of the thick vertical line is growing faster than the North American average and is, in effect, gaining “market share”. The position of the circle along the vertical axis indicates the level of concentration, or “critical mass”, of cluster employment in the region; the higher the number, the more pronounced is the existing competitive advantage of the region. Clearly, the healthiest and most competitive clusters are then large circles in the upper-right quadrant.

Figure 3-2 shows that, over the ten years from 1988 to 1998, Ottawa’s telecommunications cluster has grown faster than any other region shown and approximately 7% faster than the average growth rate of the comparable cluster in North America. It also shows high employment concentration, but not yet that of Raleigh-Durham or San Jose. However, the cluster has been growing more rapidly in Ottawa than in Silicon Valley over the past decade—obviously is a very positive sign for the future.

Figure 3-2. Growth Share Matrix for Telecommunication Equipment Clusters: Ottawa and Key U.S. Competitors



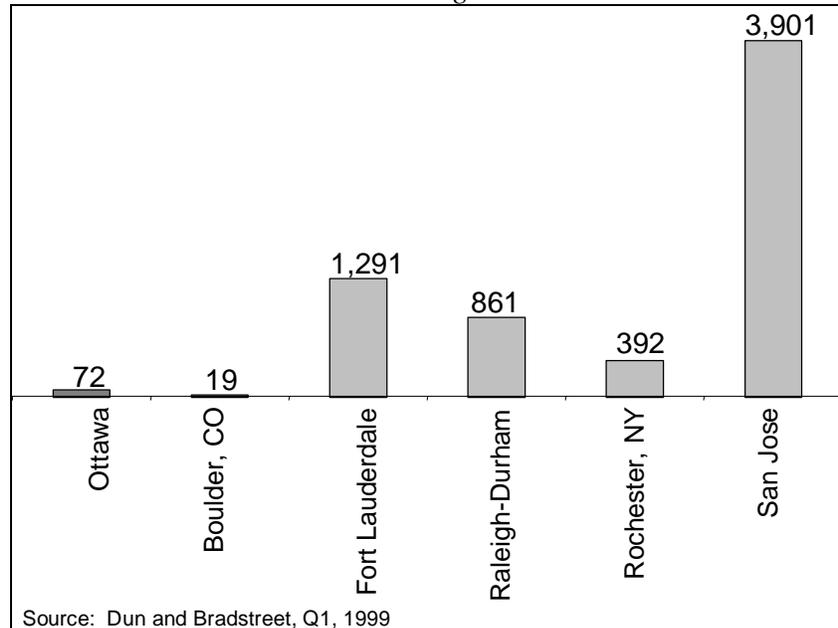
The basis of this strength lies in both the strong technical roots in the region as well as more recent dynamics. For example, Nortel Networks is not only the largest company in the cluster

and easily the largest technology company in Canada, it is growing at historic rates. Today, Nortel accounts for approximately 20% of all industrial R&D expenditures in Canada, and hires a third of all Masters and Ph.D. graduates in electrical engineering and computer science from Canadian universities. A large share of Nortel's world-wide R&D employees is based in Ottawa, and consequently the cluster has developed substantial technological resources from which product and process technologies can be expected to emerge to keep cluster firms competitive well into the future.

The cluster's growth can also be explained, in part, by the "critical mass" phenomenon. The presence of a few large firms and a growing number of small firms, with R&D institutions nearby, are drawing multinational firms. Firms like Cisco and Nokia want to be in Ottawa to be close to the sources of innovation and other factors for success in the telecommunications marketplace. Both firms are expanding in the region and both are seeking to hire hundreds of new workers. Cisco has already reserved office space for further expansions. These firms, and surely more to follow, need to be in Ottawa to be close to "the action." In this way, the Telecommunications Equipment companies are showing how the clustering phenomenon plays out within regional economies.

Figure 3-3 shows the total employment in Ottawa telecommunication equipment firms formed since 1994, along with competing clusters. Figure 3-3 confirms the relatively small impact that new telecommunication companies have had on the Ottawa cluster, and consequently the importance of the existing major companies in spearheading growth. U.S. clusters such as Silicon Valley are very successful in not only generating, but in nurturing and growing start-ups, while regions like Fort Lauderdale have successfully attracted branch manufacturing plants from more high-cost regions.

Figure 3-3. Employment in Telecommunications Equipment Companies Founded Since 1994: Ottawa and Leading U.S. Clusters

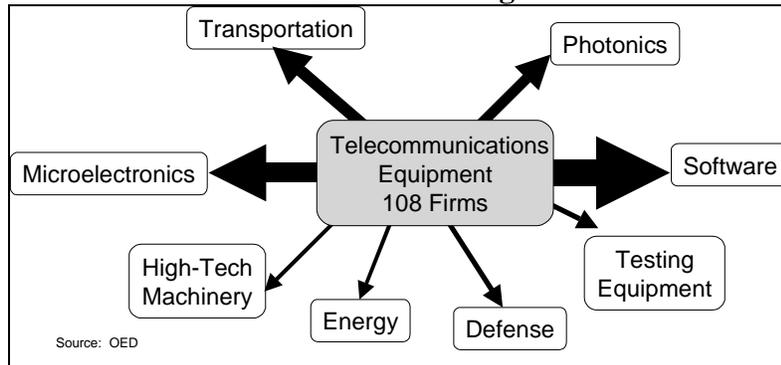


The trend in Ottawa entrepreneurship, however, is more positive. Local entrepreneurs are increasingly finding opportunities within the telecommunications sector. While still in short supply, venture capital is becoming available and the investment environment in the region is improving. As discussed in more detail in the following section, the average venture capital deal in Canada jumped from \$1.5 million in 1998 to \$2.75 million in 1999. While this amount still pales in comparison to the U.S. average of more than \$10 million/deal, the increase is nevertheless impressive. Clearly, Ottawa has caught the attention of venture capitalists, including a growing number of U.S. investors. In the last two years, 35 U.S.-based venture financing firms invested in Ottawa.

The Telecommunications Equipment Cluster is performing well in the Ottawa region and will be a strong economic force in the future.

Another feature of the telecommunications cluster is the emerging trend of firms in other technology fields interacting (and integrating) with telecommunications firms, as illustrated in Figure 3-4. Most of Ottawa's telecommunication equipment firms are linked technologically with another cluster field. Software and microelectronics are especially common fields of cluster interaction, but telecommunications-photonics linkages are growing fast (not too surprising since photonics technologies emerged from telecom applications).

Figure 3-4. Telecommunications Equipment Cluster Linkages



In sum, the Telecommunications Equipment Cluster is performing well in the Ottawa region and will be a strong economic force in the future. It has earned a reputation as a world leader in the field, especially in research and development. But the cluster has not created new telecommunications equipment companies at the same rate as some other cluster regions, although this appears to be changing. With the history of government labs and large companies spinning off new companies, who have in turn created other spin-offs, this cluster's pattern of development reflects the potential of even more broad-based, home-grown cluster development.

Key Cluster Challenges

Despite many achievements, the cluster continues to face challenges that constrain it from achieving its full competitive potential. The following outlines the cluster's key challenges related to fundamental foundations: human resources, financial resources, business climate, physical infrastructure, technology resources, and quality of life in the Ottawa region.

The challenges listed here were identified by a working group comprised of representatives from a broad array of cluster segments: private, public and academic sectors. This interaction between individuals associated with the cluster's producers, suppliers, and economic institutions fostered true 'cluster thinking' and focused on the priority concerns noted below that need to be addressed:

Human Resources: Cluster leaders report a wide array of human resources challenges ranging from the attraction of management

talent to developing appropriate skills at lower levels of the jobs spectrum, with the greatest need for experienced technical people. These challenges arise from a number of circumstances. First, markets for the cluster's products are exploding and all firms are struggling to meet demand. Second, Ottawa has historically had a shortage of experienced senior managers, a legacy of the region's government-dominated economy. And third, there is simply a major mismatch between the new needs of companies and the skills of job seekers.

Technology Resources: Even though firms are doing more R&D themselves, cluster leaders recognise the need for further developing links with the region's leading science and technology institutions. Leaders also felt the cluster would benefit from specialised facilities and programs at area universities and colleges that would allow faculty and students to have access to the most recent technological advances, providing, in turn, new sources of human capital for cluster firms.

Financial Resources: The relatively low level of entrepreneurship within the cluster is due, in part, to the historical presence of a few very large firms. Now, with markets exploding and with more than 100 telecommunications-related firms in the region, leaders feel that entrepreneurship in the cluster can be improved. Steps are required to better co-ordinate angel and early stage investors and to get more small business mentors involved in supporting new enterprises. A challenge specifically related to financial resources is the need for better access to conventional financing for exports and for plant modernisation and expansions. Cluster leaders feel that local bankers are not as knowledgeable of the fast-changing technology field as they should be and thus do not understand today's financing requirements.

Business Climate: Because Ottawa does not yet enjoy a widespread reputation as a centre for business and technology, human resource recruiters sometimes find it difficult to attract the most talented graduates. Talented candidates apparently see limited value in having "Ottawa" on their resume. Instead they pursue job opportunities in other more established centres. The region's international reputation is improving though, especially as the international business media picks up stories of large companies in the region acquiring firms in the U.S., Europe, the Middle East and Asia.

Physical Infrastructure: A growing challenge for the cluster is overcoming a shortage of industrial space and land zoned for development. Leaders report that infrastructure of all kinds, especially land, transportation and utilities for this and the other technology clusters is seriously stressed.

Quality of Life: Some leaders feel that the shortage of qualified personnel may be related to an unfavourable perception by job seekers of quality of life in the Ottawa region. Issues that leaders discussed focused on tax rates relative to competing centres.

Proposed Cluster Initiatives

Cluster leaders have proposed three action initiatives.

In response to the challenges facing the cluster, several initiatives were proposed by cluster working group members. Some initiatives recommended by the group are related to proposed “flagship” initiatives discussed in the following section. Cluster participants have committed to work on both cluster-specific initiatives as well as on flagship implementation teams.

1. Design and Launch a Cluster-Specific Financing Initiative

Challenge: Many cluster leaders perceive that early stage financing is very scarce in the region and that what risk funding is available is not easily accessible.

General Approach: Develop mechanisms for matching qualified business opportunities with sources of equity financing. Compile, disseminate and maintain a list of local funding resources, including angel investors, venture capital firms, business incubators, and relevant government programs.

Sources of Leadership: OED. Link to Igniting Enterprise flagship action team.

Potential Champion(s): Co-chairs of all technology clusters, private sector investors.

Potential Source of Funding: Private sector investment community, NRC/IRAP through public-private sector cost sharing formula.

2. Develop and Implement a Comprehensive Skills Training Initiative

Challenge: There are too few skilled and available workers in the management, technical and sales/marketing domains, specifically: senior, middle, and operational management, engineering, scientist/technologists, technicians, systems engineers, sales, marketing and support personnel. Skill shortages are seen in essentially every area. If this problem is not addressed comprehensively, the cluster's future could be at risk.

General Approach: Survey firms to identify key skills required across cluster firms and compile database of skill needs linked to information on relevant education and training programs in the region. Build on existing education and training programs where possible or implement new training modules customised to needs of cluster. Existing programs to build on include: Vitesse and the Technology Resource Initiative, industry-specific community college programs and private sector IT schools.

Sources of Leadership: Cluster working groups, local universities, colleges, private institutions, and larger telecom companies. Link to "Reskilling Ottawa" Flagship action team.

Potential Champion(s): OCRI, working with cluster co-chairs and top leaders of educational institutions.

Potential Source of Funding: HRDC, Ministry of Education, Ministry of Energy, Science and Technology, Federal Smart Communities.

3. Develop and Implement A Human Resources Attraction Co-operative

Challenge: Attracting qualified workers is simply the highest priority of cluster leaders.

General Approach: Establish a Human Resources Attraction Co-operative. The co-operative will exploit the combined recruiting resources of individual cluster firms. The initiative envisions a comprehensive database within Ottawa region websites (see "Gateway Ottawa" Flagship Initiative), with links to relevant high-tech companies, industry associations and academic

institutions.

Sources of Leadership: OED; Co-chairs of key cluster working groups. Link to the “Gateway Ottawa” flagship action team.

Potential Champion(s): Co-chairs of key clusters.

Potential Source of Funding: Private and public sector funds through cost sharing formulae.

Microelectronics Cluster

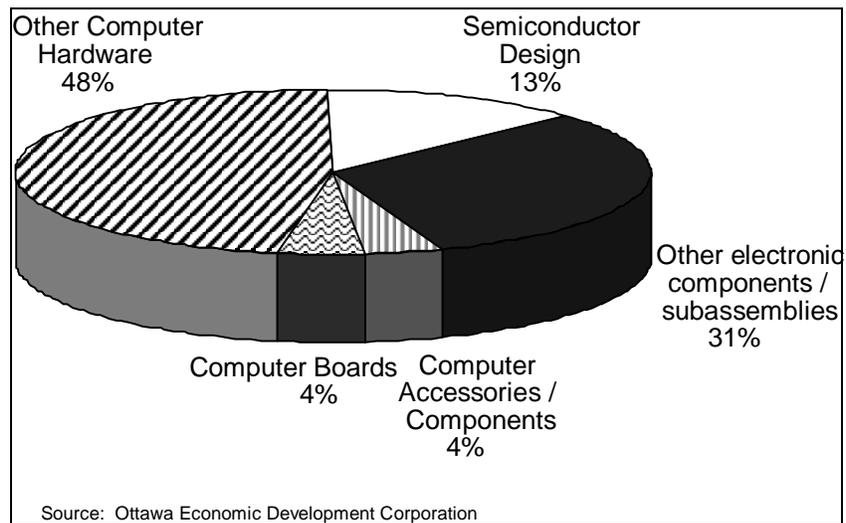
Another key source of the science and technology-based economic development driving Ottawa’s economy is microelectronics technology. As is the case with telecommunications, this field’s emergence in Ottawa stems largely from the presence of the region’s government laboratories and universities. Growth is also coming from expansion and spin-offs from the region’s home-grown technology firms.

Ottawa’s Microelectronics Cluster is highly diversified. The cluster includes semiconductor and electronic component design, with some manufacturing, as well as computer hardware design and manufacturing and applications for defence and private industry. Figure 3-5 illustrates the structure of the cluster.

Figure 3-5. Microelectronics Cluster:

Employment by Technology Area, 1999

The cluster includes: semiconductor and electronic component design, with some manufacturing, for defence and private industry.



Several leading international semiconductor companies have their headquarters in Ottawa, a distinctive feature of this cluster. Figure 3-6 shows this concentration of headquarters operations compared to headquarters-type operations in several peer regions. The implication is that this cluster is not dominated by branch-plants, as is the case with most of the world's other microelectronics centres. While having smaller employment, the cluster is largely under local control suggesting that local executives make strategic moves (facility expansions, supply chain development).

Some large, world-class companies have recently chosen to expand to Ottawa, for example Cadence Design Systems, suggesting that foreign investment in the cluster is increasing. Location decisions of this kind illustrate how a critical mass of leading firms and a presence of a skilled and productive workforce, when combined with high quality of life, can attract new investment to the region.

Ottawa's Microelectronics Cluster is supported by national initiatives such as the Strategic Microelectronics Consortium (SMC) and the Canadian Microelectronics Corporation (CMC), two key organisations advancing the microelectronics industry in Canada. Located in Ottawa, the SMC is a not-for-profit national industry association that works to articulate a national strategy for the cluster. The CMC, also a not-for-profit organisation, is dedicated to facilitating strategic alliances between the microelectronics industry and Canadian universities and educational institutions. By serving as a lynchpin tying together firms and universities and by providing educational institutions with the latest technological advances, the CMC fosters cutting-edge research and helps to ensure production of well-trained graduates.

**Figure 3-6. Locally-Headquartered Companies' Share of
Total Microelectronics Cluster Employment, 1999**

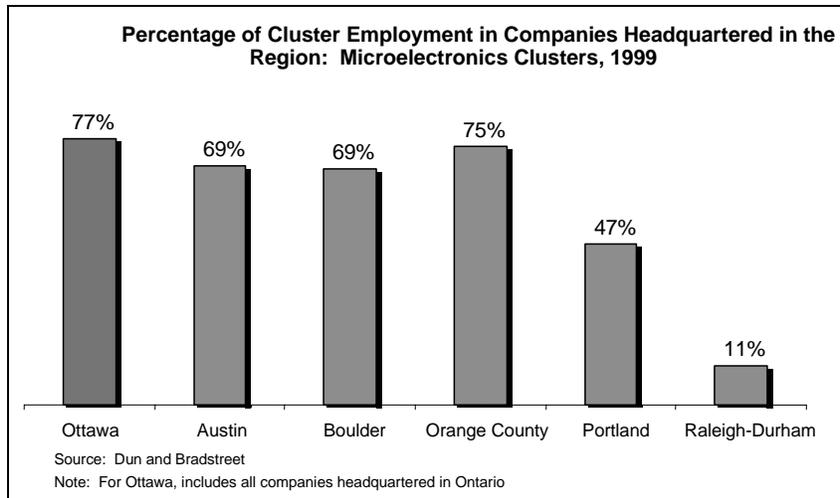
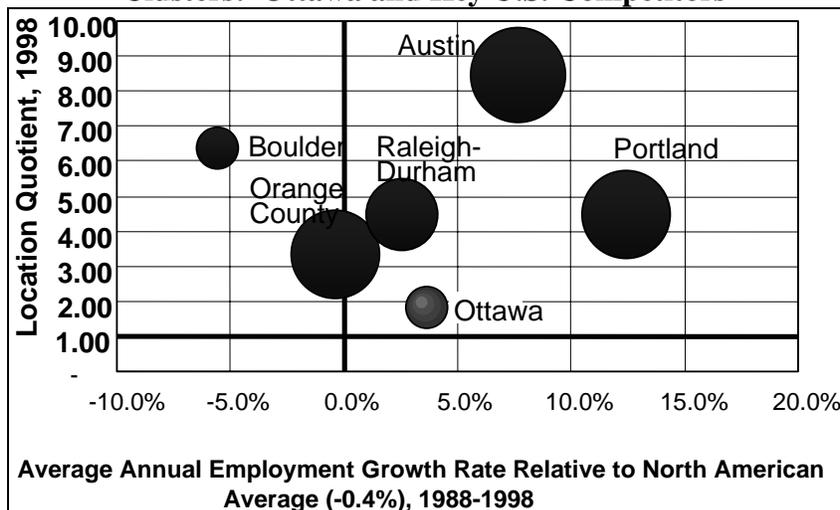


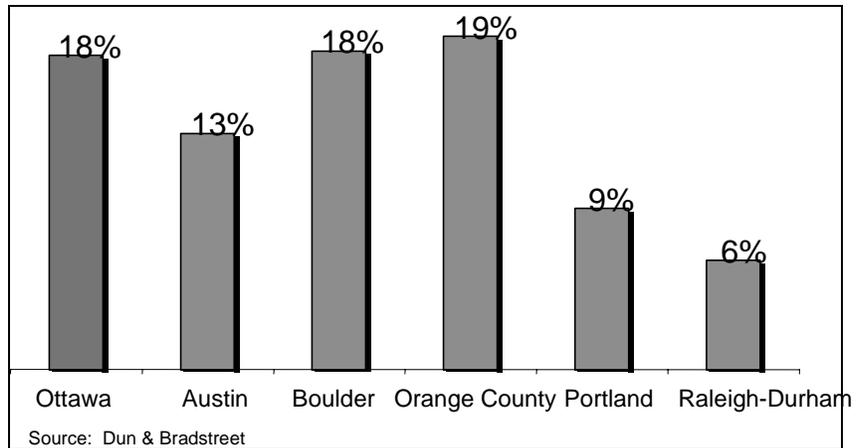
Figure 3-7. Growth Share Matrix for Microelectronics Clusters: Ottawa and Key U.S. Competitors



One key strength of Ottawa's microelectronics cluster has been its ability to spawn new companies.

One key strength of Ottawa's microelectronics cluster has been its ability to spawn new companies. As Figure 3-8 indicates, a relatively high share of cluster employment is in companies that are less than five years old.

Figure 3-8. Share of Cluster Employment in Companies Founded Since 1994: Microelectronics Clusters



The electronic components industry, a major part of the cluster, exhibits one of the highest total factor productivity growth rates when compared to all other sectors in the Canadian economy. This is because the cluster is closely tied technologically to the telecommunications equipment and photonics industry.

As markets grow for these clusters and as the growth in wireless digital communications and Internet applications increases Ottawa's Microelectronics Cluster is poised for long term growth. Going forward, the challenge is to take full advantage of market growth and change. As a means of developing this cluster Ottawa's economic development agencies should focus on recruiting both primary and supplier firms in the cluster. The region's development agencies should also focus on developing new, entrepreneurial start-ups and nurturing their success by making sure the new firms have access to local inputs they will require to succeed (e.g., skilled workers, venture finance).

Key Cluster Challenges

The Microelectronics Cluster working group identified a set of key challenges similar to those associated with other high tech clusters in the region.

Human Resources: The cluster needs more qualified workers at all levels. Workers with masters' degrees and chip design experience are in especially high demand, as are trained and experienced engineering managers and business managers. Cluster leaders also pointed to the limited local pool of senior management skills due to the government dominance of the regional economy. This fact limits opportunities for start-up companies in the cluster.

Finance: Ottawa is viewed by most interested U.S. venture capitalists as a relatively uncharted territory with excellent technology capabilities but weak, unseasoned management teams. Consequently, U.S. venture capitalists focus more on investment opportunities in more familiar territory. Cluster leaders feel that these investors do not recognise Ottawa's potential to support investments that can mature into very successful companies. There is growing evidence, however, that U.S. venture capital is finding its way to the region (see next section).

Physical Infrastructure: Growth pressures affect nearly every category of infrastructure. Inadequate access to high-speed broadband telecommunication services is a growing challenge. Cluster leaders report that DSL is unavailable in many places, making sophisticated "telecommuting" difficult which, in turn, adds to the cluster's difficulty attracting skilled workers.

Marketing: Leaders feel that Ottawa does not enjoy international visibility or a reputation as a centre for microelectronics innovation, negatively affecting the region's ability to attract investment capital and skilled labour.

Business Climate: While, on average, tax rates are somewhat higher than those in the U.S., the perception of large disparities creates another challenge where it comes to attracting investment and people. Both the Federal and Ontario budgets in 2000 took steps to improve the overall tax situation but leaders believe that more action is required.

Institutional Reform: As with all high tech clusters, change occurs at a very quick pace, and cluster leaders feel that government institutions are not responding fast enough to the New Economy. Government labs have been key to the cluster's growth but going forward, firms will need to develop new relationships with these institutions. And officials of the institutions will need to find new ways of supporting the needs of the cluster for access to technical know-how.

Proposed Cluster Initiatives

Cluster leaders have proposed four action initiatives.

The cluster working group focused on several action initiatives designed to address the above and other critical challenges. The group's early-stage incubation and marketing initiatives are linked to the broader "Igniting Enterprise" and "Brand Ottawa"

flagship initiatives.

1. Incubate Early-stage Microelectronics Firms

Challenge: Need to address relative scarcity of programs that assist and support early-stage microelectronics firms.

General Approach: Customise NRC/ IRAP program and similar federal and provincial programs to meet the needs of small and medium sized firms within the Microelectronics Cluster.

Sources of Leadership: OED/Ottawa Entrepreneurship Centre, OCRI, NRC/IRAP.

Potential Champion(s): Entrepreneurship Centre, cluster co-chairs working with relevant programs of OCRI, OED.

Potential Sources of Funding: NRC/IRAP, other relevant and provincial programs.

2. Link Cluster Firms to U.S. Venture Capital Sources

Challenge: Need to overcome the relatively low visibility of Ottawa as a place of good investment opportunities among American venture capitalists.

General Approach: Showcase and capitalise on success stories of American financed start-ups in order to attract more American early stage venture capital. Raise visibility through a grassroots ‘services network’ comprised of non-competing professional service providers (accountants, bankers, lawyers, etc), an ‘electronic clipping service’, and a targeted U.S. VC marketing campaign.

Source of Leadership: OED, co-chairs of all technology clusters.

Potential Champion(s): Co-chairs/representatives of all technology clusters.

Potential Sources of Funding: Public-private sector cost sharing formula.

3. Market Ottawa Microelectronics

Challenge: Need to overcome low visibility of Ottawa as a high-tech centre, especially as a centre of excellence in

microelectronics-related technology, which is impeding the region's ability to attract talent, foreign direct investment, and venture capital.

General Approach: Use sophisticated communications techniques to “brand” and market Ottawa as a microelectronics centre of excellence. Link with “Brand Ottawa” flagship and design a sub-brand focused on microelectronics.

Sources of Leadership: OED

Potential Champion(s): Cluster co-chairs/members

Potential Source of Funding: Private and public sector cost sharing formula

4. Develop Cluster-specific, Near-term Strategic Action Plan

Challenge: Need to “deepen” the cluster by attracting to the region a semiconductor manufacturing plant, a test-bed facility, and related facilities. The objective of this initiative is to build a stronger critical mass in the region to spur more inward investment as well as more local entrepreneurship.

General Approach: Develop a strategic plan to build on past attraction campaigns and co-ordinate focussed, public and private sector efforts, especially marketing efforts.

Potential Source of Leadership: OED, Cluster co-chairs, cluster working group.

Potential Champion(s): Cluster co-chairs/members.

Potential Sources of Funding: Federal/provincial programs and private sector through cost-sharing mechanisms.

Software and Communications Cluster

Ottawa's Software and Communications Services Cluster provides an array of packaged software, software and information technology (IT) services, as well as certain telecommunication services to domestic and international markets. Cluster growth has been a function of growing market demand as well as the evolution of the region's technology products. Markets for IT services and consulting have evolved

Ottawa's Software and Communications Services Cluster offers an array of

packaged software, software and information technology (IT) services, as well as certain telecommunication services to domestic and international markets.

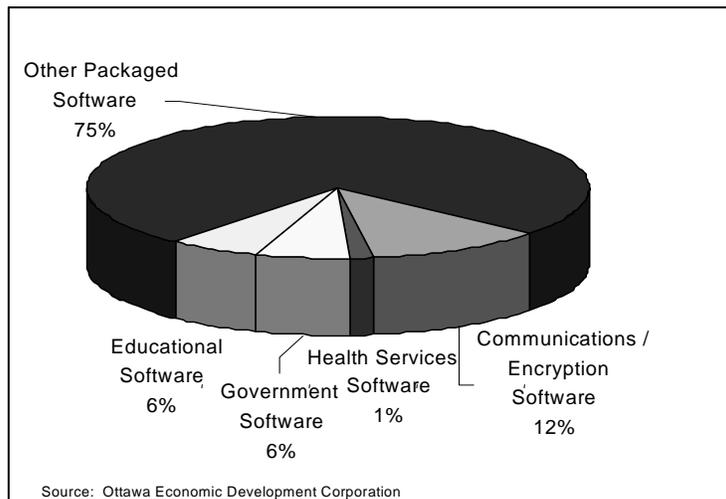
with the spread of the Internet. In this context, the software and communications cluster has been able to harness existing strengths in other advanced technology fields to meet the emerging opportunities worldwide in the fast-changing software and communications fields.

The success of Ottawa's software and communications cluster is another example of the strength of home-grown business expansions. Like the region's other advanced technology sectors, the cluster can attribute some of its success to long-standing local institutional resources (e.g., CRC, NRC).

Software Products

Many of Ottawa's software firms are among the largest in Canada. Corel, which specialises in business, graphics and Internet software, has a worldwide reputation. Cognos, another large software firm, is known for its business intelligence software. Hundreds of smaller and younger firms also contribute to the burgeoning software industry in the region. As Figure 3-9 indicates, the structure of Ottawa's software industry closely reflects the cluster's strength in other knowledge-intensive activities in the region such as government and education.

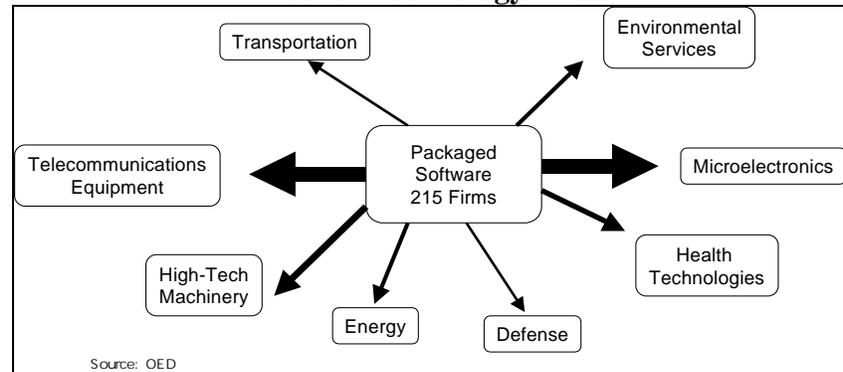
Figure 3-9. Ottawa's Packaged Software Industry: Employment by Technology Area, 1999



Software development is a growing business line for technology firms typically associated with other clusters. Linkages between the region's producers of software packages and the telecommunications and microelectronics clusters are particularly strong. Nortel Networks, at the forefront of the

global revolution in telecommunications, develops software that allows telecommunications service providers to better manage the increasing demand placed on the local telephone network by Internet users. Figure 3-10 illustrates the kinds of interaction among software and other technology clusters in Ottawa. The width of the arrow indicates the degree of interaction.

Figure 3-10. Number of Software Companies also Working in Other Technology Areas



A small but growing segment of Ottawa’s Software and Communications Services Cluster is multimedia software. As this segment grows, new media could well be one of Ottawa’s “seed clusters.”

A small but growing segment of Ottawa’s Software and Communications Services Cluster is multimedia software. A number of multimedia applications used in the \$1 trillion world-wide industry originated in the Ottawa region, in part, through the efforts of the NRC and other public research institutions who have contributed to the development of technologies in the field. The focus of this segment has increasingly been on 3D imaging and mapping, as well as colour image applications for graphic arts and motion pictures, digital animation and editing, among other multimedia systems. As this segment grows, new media could well be one of Ottawa’s “seed clusters.”

IT Consulting

IT consulting firms provide assistance with telecommunication and computing technologies and/or perform system integration services. Such services may include software engineering, information security, project support services, Internet web design, network design, computer communications network design, and data processing services. More than 100 firms provide these services throughout the Ottawa region.

Communication Services

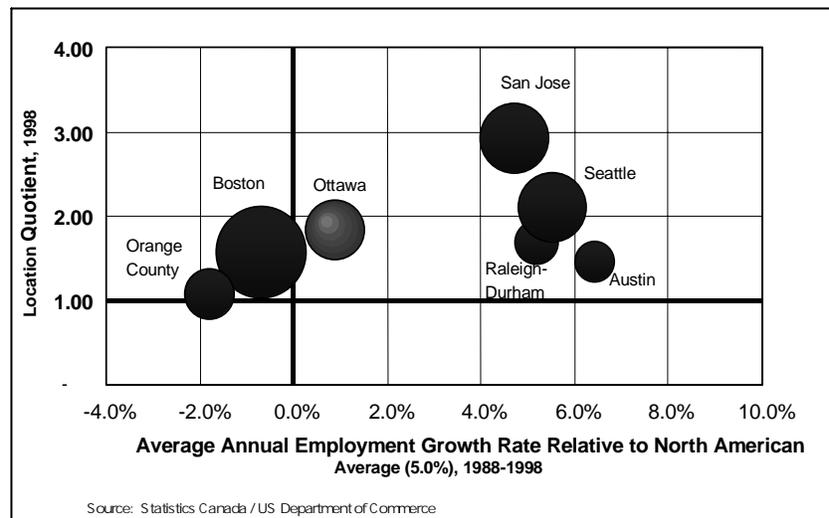
This segment of the cluster includes providers of technologies

and services related to Internet and Intranet applications. Markets include customers within Ottawa as well as outside the region. The Internet-access segment has approximately 30 local Internet service providers.

Ottawa's R&D institutions have played an important role in communications services as they have in other technology clusters. For example, CRC and Communications and Information Technology Ontario (CITO) have been involved in research related to Internet development tools, especially as they pertain to global search networking, information access technologies, and interpersonal communications over the Internet.

With markets growing worldwide this cluster can be expected to grow. However, it may not be on the steep growth trajectory seen in some other software centres. San Jose, Seattle, Raleigh-Durham and Austin are North America's leading software regions and all are growing faster than Ottawa (see Figure 3-11). While the analysis suggests slower growth than other software centres, it also shows that employment concentration is higher than many other regions suggesting that Ottawa has local competitive advantages not enjoyed by other regions (e.g., the presence of a large government market).

Figure 3-11. Growth Share Matrix for Software and Communications Services Clusters: Ottawa and Key U.S. Competitors



The challenge for Ottawa's software cluster will be to

One reason for the relatively slower growth rate is that the level of local entrepreneurship is substantially lower than that in

accelerate employment growth by enhancing entrepreneurship in the cluster and working to create new companies to fill growing niches in the cluster's many segments.

competitor regions like Silicon Valley. In some respects this is due to the presence of very large, well-established companies like Cognos, but it also reflects the still limited penetration of venture capital investment in the cluster. The challenge for Ottawa's software cluster will be to accelerate employment growth by enhancing entrepreneurship in the cluster and working to create new companies to fill growing niches in the cluster's many segments. Ottawa's software entrepreneurs should look especially closely at opportunities in the expanding Internet security and GIS markets where companies like Entrust and others are finding success. These are also areas on which Industry Canada is focusing attention. And with each of the region's clusters expected to grow significantly over the next few years, opportunities should emerge to meet changing cluster needs for specialised packaged software and IT services.

Key Cluster Challenges

Critical issues identified by the Cluster Working Group included the following:

Human Resources: Workforce development is the cluster's top priority. Facing widespread shortages of management talent and enterprise management skills, cluster leaders are concerned that the region is at risk of becoming a smaller, second or third "tier" cluster in North America's growing software industry.

Financial Resources: As is the case with all the technology clusters, software leaders felt particularly strongly that cluster firms lack sufficient access to early stage capital. Knowledge among local equity investors of the local software scene is felt to be insufficient to spur conventional VC-type investments. Rather than later stage VC, cluster leaders felt that start-up firms in the cluster need to develop angel investors because local venture capital firms may lack confidence in Ottawa's software entrepreneurs. A related challenge is the fact that outdated enterprise evaluation models in use by most investors make it difficult to assess the value of new software firms.

Business Climate: The current capital gains tax code makes it difficult to attract venture investment from individuals. (This challenge was articulated before the 2000 Federal budget that at least addressed the capital gains tax.)

Institutional Reform: Leaders feel that there is a shortage of college graduates with the training needed by the cluster. Colleges and universities programs may not be optimal as related

to the fast changing needs of this cluster.

Marketing: *Leaders feel that more can be done to promote, or brand, Ottawa as a centre of software excellence. The region's rapidly growing and successful software cluster does not receive enough visibility in other parts of the Canada, let alone in global markets.*

Proposed Cluster Initiatives

The Cluster Working Group identified several priority actions to respond to the above challenges.

Cluster leaders have proposed four action initiatives.

1. Enhance Industry-University Linkages to Attract and Retain University Professors

Challenge: Need to address the problem of university professors being lured from their teaching careers by offers of higher income in the private sector. This initiative should focus on attracting and retaining talented professors (especially in key disciplines such as software engineering and photonics). It should also aim to increase research funding for the computer sciences at Ottawa-area Universities. Toward this end, steps should be taken to reach out to local firms likely to need the additional technical support available from local universities.

General Approach: Enhance and expand industry-university linkages focused on supplementing professors' salaries with consulting agreements with private industry. Use new sources of income for professors as inducements for them to remain in the area, and to attract professors from other regions.

Sources of Leadership: OCRI, Cluster co-chairs working with leaders of Carleton, University of Ottawa, other universities and colleges.

Potential Champion(s): CEOs of large firms, University of Ottawa, Carleton University, colleges.

Potential Source of Funding: No new funding needed.

2. Create Mechanisms for Linking Training Needs to Training Systems

Challenge: Build mechanisms for linking evolving

education/skill needs to educational institutions for “just-in-time” training.

General Approach: Enhance collaborative relationships between the educational/training institutions and the cluster. Create a mechanism that keeps cluster leaders abreast of changing industry skills needs and supports continuous changes to specialised training modules. Initiate a pilot project with a large firm. Conduct an Internet-based survey of software firms in order to gauge skills needs.

Sources of Leadership: OCRI, Ottawa’s post secondary education/training institutions.

Potential Champion(s): OCRI, SHRC (Software Human Resource Council).

Potential Source of Funding: HRDC, city, education/training institutions with private sector matching funds.

3. Design and Launch an Ottawa Software Portal

Challenge: Raise the visibility of the software cluster; enhance ability to attract talent and investment, enhance local and international networking. Link to “Gateway Ottawa” and “Brand Ottawa” flagship initiatives.

General Approach: Create a web portal providing Software cluster-specific information and business opportunities, focusing on *investment, companies, products, and people*. Create links to restaurants, hotels, attractions and local news in existing pages like www.ottawa.com, www.ottawabusinessjournal.com, www.ottawaonline.com and others.

Sources of Leadership: OED, Software Cluster working group.

Potential Champion(s): OED; partnership between the Software Cluster co-chairs.

Potential Source of Funding: Public-private sector cost sharing formula, in-kind services from cluster.

4. Prepare Videotape Showcasing Ottawa and Designed to Attract Software Developers to Ottawa

Challenge: *In order to attract skilled workers to Ottawa, steps*

are required to enhance the visibility of the region as a centre of software excellence. Because software developers are often young people, Ottawa should integrate into the “brand” its nightlife and recreation opportunities.

General Approach: *Prepare a short video documentary (working with a news media company) showcasing the industry, and the high quality of life in Ottawa. The focus would be to highlight the significant advantages of Ottawa for software entrepreneurs and developers (and for other technologies) vis-à-vis Silicon Valley. Potentially titled “A Tale of Two Valleys,” with strong marketing the documentary could be of interest to TV networks as well as new media outlets such as a well-advertised web site.*

Sources of Leadership: *OED, Cluster leaders with good television media contacts, City of Ottawa.*

Potential Champion(s): *OED, Co-chairs of all technology clusters.*

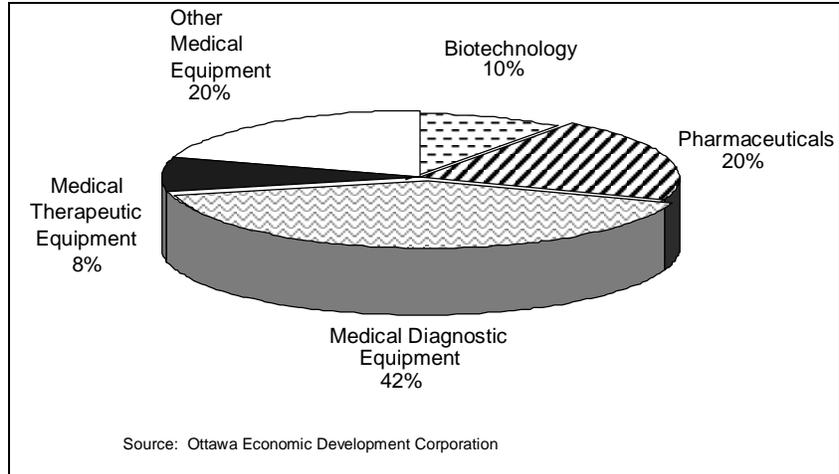
Potential Source of Funding: *Large technology firms, City of Ottawa.*

Life Sciences Cluster

With its broad base of public S&T institutions and small but growing number of firms, the Ottawa region is becoming one of Canada’s centres of excellence in the life sciences. The region boasts cutting-edge research and new product development in the fields of medical diagnostic equipment, therapeutic equipment, implants/prostheses, biotechnology, pharmaceuticals, and a range of electromedical applications. This cluster has strengths across an array of technologies in the human, animal and agricultural sciences. Figure 3-12 illustrates the structure of the sector in Ottawa.

*Figure 3-12. Ottawa’s Life Sciences Cluster:
Employment by Technology Area, 1999*

The region's life sciences cluster is diverse, and includes firms in the fields of medical diagnostic equipment, therapeutic equipment, implants/prostheses, biotechnology, pharmaceuticals, and a range of electromedical applications.



This cluster, like Ottawa's other high technology clusters, draws much of its strength from the technical excellence found in the region's world-class research centres. There are more than 40 specialised life sciences research institutes in the region, many of which are closely linked to cluster firms.

Local universities and university-affiliated hospital research centres further contribute to the strength of the cluster. The University of Ottawa, with its highly ranked medical program, along with Carleton University, offer excellent undergraduate and graduate training in health sciences, engineering, business administration, information technology and other fields related to the life science cluster. Algonquin College and La Cité Collegiale also offer certification and job skill training programs supporting the cluster.

The Ottawa Life Sciences Council (OLSC) is the dominant source of cluster leadership in the region. OLSC is a not-for-profit development corporation promoting excellence in the cluster by providing networking activities, consortia building, technology development, company financing assistance, cluster advocacy, and cluster marketing programs. OLSC has taken the lead to plan the establishment of a life sciences business incubator. Government funding to initiate the incubator is forthcoming. Overall, OLSC plays a key role in fostering cluster development through strategic partnerships between companies, investors, academia and government S&T institutions.

Cluster leaders report that the life sciences industry employs 18,000 local residents, about 3,000 of them in life sciences companies and the rest in related supplier firms and

institutions. Like the other technology clusters, many jobs require highly developed skills and pay high wages. Employment in the cluster is expanding at between 15% and 20% annually, with much of the expansion occurring in start-up companies. Between 1995 and 1997, for example, 27 new companies were formed.

As seen in Figure 3-12, biotechnology firms account for only 10% of cluster employment. However, this segment holds much of the potential for cluster growth. Throughout Canada, the biotechnology industry is growing rapidly. From 1994 to 1996, revenues from biotechnology-related commercial activity rose from \$353 million to \$1.1 billion, an increase of over 200% during the period. Most of the growth resulted from the formation of new biotechnology companies. From 1994 to 1996, the number of biotechnology firms in Canada more than doubled, from 121 to 224 firms.

Most of the growth can be attributed to global market trends. A key trend is the movement towards biology-based solutions to technological challenges where solutions were once found in chemistry. Global economic trends also help explain the recent success of the biotechnology businesses. Worldwide, there are limited resources to support further improvements in agricultural productivity. This, coupled with the world's growing population and increasing purchasing power, add to the demand for the adoption of new biotechnology solutions, agricultural technologies in particular. In this context, the strategy for developing the region's life sciences cluster is to build especially strong relationships between cluster firms and government sources of R&D.

Key Cluster Challenges

The Cluster Working Group identified a number of priority challenges to cluster competitiveness.

Human Resources: Cluster leaders see a need to aggregate information on the job skill training needs of cluster firms as well as mechanisms for communicating this information better and faster to local universities and colleges. A related problem is that the cluster's specific training needs are not easy to link to government education/training funding or certification requirements. Efforts are needed to develop a cluster-specific "cross-walk" between cluster needs and the services offered by government programs.

Financial Resources: Key to the continued growth and creation of new companies is access to early-stage, private investors. Leaders feel that managers in the cluster need to become more business savvy in order to compete better for available venture capital.

Marketing: Cluster visibility is not as good as it could be—the industry does not enjoy a well defined image in the marketplace. At least partly as a result, market penetration is less than it could be and marketing costs are higher than it could be if the region were better known as a centre of excellence. Moreover, the cluster’s image could be significantly enhanced if there were a well established life sciences firm in the region as an “anchor tenant”.

Proposed Cluster Initiatives

Cluster leaders have proposed four action initiatives.

To begin to address the challenges above, the cluster working group outlined four specific initiatives. The challenges above, and the action initiatives below that are related to marketing and early-stage financing are closely linked to the “Brand Ottawa” and “Ignite Enterprise” flagship initiatives.

1. Design New Mechanism for Financing Young Companies—Life Sciences Investor Network

Challenge: *The challenge is the same for all technology companies—access to early-stage financing to accelerate the growth of new business formations in the cluster.*

General Approach: *Develop a life sciences investor network to facilitate investment in start-up life science companies with high potential for growth, wealth creation, and overall job creation. Identify potential life science angel investors and explore their requirements and expectations. Develop mechanisms and a standardised format for investors to receive funding requests from start-ups. Educate and assist entrepreneurs in the investment process and addressing investment issues.*

Sources of Leadership: *OLSC, OED.*

Potential Champion(s): *OLSC, OED.*

Potential Source of Funding: *Public-private sector cost*

sharing formula.

2. Create Pilot Plant Manufacturing Incubator

Challenge: Become a world leader in life sciences-related production processing. Create the means for quickly launching new “product-ready” and “market-ready” firms. Enhance technology commercialisation overall.

General Approach: Create a pilot plant production incubator facility. Focus the facility’s mission on developing a set of core processing competencies with the objective of developing a critical mass of small and medium-size enterprises with products ready for commercialisation. Related objectives include:

- Creating, as an integral part of the incubator, a self-sustaining “service enterprise”.
- Developing the business infrastructure to improve commercialization for emerging technologies and processes.
- Developing the requirements of such a facility based on private sector needs (with survey).
- Assembling a steering committee comprising NRC/IRAP, NRC Process Institute, and private sector representatives, including commercialisation consultants.
- Targeting short-term market products to garner national attention.
- Developing a short list of potential candidates.

Sources of Leadership: OLSC, with NRC, private sector leaders.

Potential Champion(s): NRC in partnership with private sector leaders.

Potential Sources of Funding: NRC/IRAP, NSERC, Industry Canada.

3. Implement Targeted Marketing and Communications Plan

Challenge: Life Science firms face the same challenge of other technology clusters, the need for more visibility in the market place. Leaders also want to step-up efforts to promote the life sciences and their beneficial impacts on the region (e.g., source of good jobs) where more community support would prove helpful to cluster development.

General Approach: Brand and market Ottawa as a life sciences centre of excellence. Link with “Brand Ottawa” flagship and design a sub-brand focused on life sciences accomplishments and roles.

Source of Leadership: OED.

Potential Champion(s): OLSC, Cluster co-chairs/members.

Potential Source of Funding: Private and public sector cost sharing formula.

5. Develop New OLSC Resources Plan

Challenge: OLSC’s leaders feel strongly that the organisation needs a more stable source of funding. The job of cluster development is large and new resources will be required for OLSC to achieve meaningful success in cluster development.

General Approach: Presently, OLSC’s base funding is from RMOC. OLSC leaders feel that they can leverage four times RMOC’s contribution from private and public sector sources. Recently, OLSC has been able to supplement government funding with revenues from conferences and projects. However, these non-traditional funding sources are not guaranteed. OLSC’s leaders feel that new funding is required to support staff resources at the Ottawa Biotechnology Incubation Centre as well as three additional OLSC staff. Solutions to this problem will require creative thinking on the part of OLSC, its members and government. OLSC feels that the need for additional base funding will decrease as new sources of funding are tapped.

Sources of Leadership: *OLSC, TOP.*

Potential Champion: *Prominent member of OLSC.*

Potential Source of Funding: *Unclear, pending discussions noted above.*

Photonics Cluster

Ottawa’s Photonics Cluster encompasses an array of technologies related to the commercial application of light, including fibre optics, lasers, and optoelectronics, imaging, optical processing of information, and related applications.

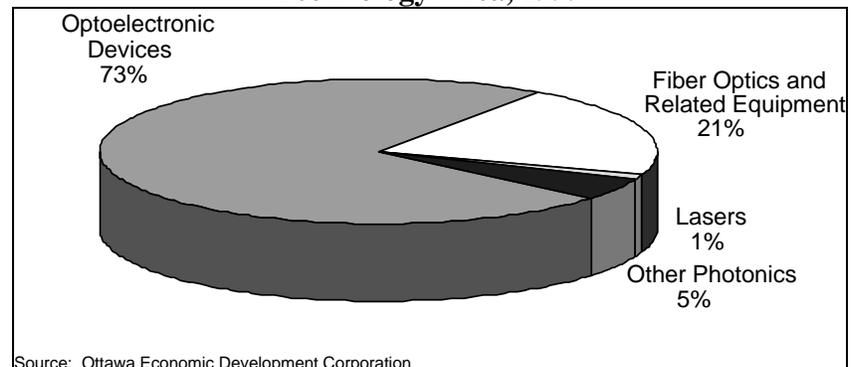
Ottawa's Photonics Cluster encompasses an array of technologies related to the commercial application of light.

These technologies are central to the growth and evolution of the telecommunications, information technology, and microelectronics industries. Photonics, also sometimes called optoelectronics, represents a set of fundamental technological innovations that can dramatically improve the performance of a whole range of information and communication technologies in the future.

The worldwide demand for fibre-optic gear is growing rapidly and Ottawa's Photonics Cluster is especially well positioned for continued growth. Optical technology is evolving quickly and investment is exploding to meet a seemingly insatiable demand for advanced communications technology (\$3.6 billion has been invested in networking start-ups in the first quarter of 2000). Ottawa's industry leaders, seeing this potential, have taken the initiative to form the Ottawa Photonics Cluster (OPC), dedicated to the advancement of the industry (the Imaging Technology Organisation has recently merged with the OPC further strengthening the cluster's institutional capacity). The growth of photonics is a sign that Ottawa's economy is restructuring to include "next-generation" industries that will be the source of new jobs well into the future.

Ottawa's telecommunication equipment companies have been involved in photonics for several years and many of the region's photonics firms have spun out of local firms. More recently, however, new photonics-specific companies have been formed in the region as both local suppliers and producers for markets outside the region. Figure 3-13 shows the structure of Ottawa's Photonics Cluster by employment in each technology field.

Figure 3-13. Ottawa's Photonics Cluster: Employment by Technology Area, 1999



Technological synergy between telecommunications, microelectronics and photonics is strong and is one key reason why Ottawa leads the country in the growth of this cluster.

Technological synergy between telecommunications, microelectronics and photonics is strong and is one key reason why Ottawa leads the country in the growth of this cluster. In the past four years, cluster employment in the Ottawa-Hull region increased by approximately three-fold. JDS Uniphase is the largest and fastest growing photonics firm, but there are other key players as well. Depending on how employment is counted, segments of the large telecom firms and the photonics-specific firms combined employed more than 20,000 Ottawans in 1999. Small photonics firms are also growing but their employment pales in comparison to the employment at large, well-established firms.

From a strategic perspective, the Ottawa Photonics Cluster should pursue its current work plan while taking additional steps to harness the existing competitive advantages of the region (e.g., growing venture capital, private sector innovation, government supported science and technology). Competitiveness in the future will depend on achieving two results simultaneously--rapid market penetration and new product innovation to meet fast changing demands. From a national perspective, photonics industry leaders have taken steps to organise private and public cluster organisations for the purpose of fostering improved communication, strengthening links with local universities and research centres, and providing support to start-up companies.

Key Cluster Challenges:

The Photonics Cluster shares many challenges similar to other high tech clusters in the Ottawa region. Members of the Photonics Cluster working group identified the following:

Human Resources: Workforce development is a top priority. The supply of workers with the skills needed by the Photonics Cluster, especially software programmers and developers, is limited. Small companies are particularly challenged, as they must compete with the large companies for skilled employees.

Marketing: As new as it is, there is too little general awareness of the photonics markets, the industry and its critical issues.

Non-technical descriptions of the industry are needed and these must be communicated to the local and greater business community as well as worldwide. Overall, Ottawa's excellence in photonics needs to be better known to the rest of the world.

Institutional Reform: While the region has enjoyed a number of successful technology transfer initiatives over the years, cluster leaders feel a need to improve the ways that the region brings together photonics companies and public R&D institutions for the purpose of sharing ideas, joint R&D projects and efforts toward commercialising photonics technologies.

Proposed Cluster Initiatives

The OPC, participating in the Economic Generators Initiative as a Cluster Working Group, has outlined a number of initiatives designed to address priority concerns:

Cluster leaders have proposed six action initiatives.

1. Develop Human Resources

Access to a skilled and adaptable workforce is at the top of the cluster's priority list of concerns and will require comprehensive efforts if it is to be adequately addressed; three related efforts are under development by the OPC:

- *Development of a Skilled Workforce*

Challenge: Address the problem of a "skills mismatch" in the workforce (well educated people without the specific skills needed by industry).

General Approach: Design and deliver a "re-skilling" program for the region's underemployed, immigrant University graduates; build on the VITESSE model.

Sources of Leadership: VITESSE (Canada) Reskilling Inc., universities, and industry.

Potential Champion(s): A prominent University executive has agreed to be the champion.

Potential Source of Funding: Ontario Strategic Skills Initiative, private sector, and student fees.

- *Attract and Retain Academics/Professors*

Challenge: Strengthen basic and applied research at local universities, building the infrastructure (especially the professorate) required to service the increase in undergraduate/graduate students stemming from the growth of the high tech sectors.

General Approach: Partner with industry and seek industrial commitments to access leveraged government funds through existing Federal and Provincial programs.

Potential Sources of Leadership: Universities and Colleges working with OPC.

Potential Champion(s): Prominent University executive (working with OPC) has agreed to be the champion.

Potential Source of Funding: Specific Federal and Provincial government programs (e.g., CFI, ORDCF), private sector.

- *Increase Supply of Technologists*

Challenge: Ensure that the region has sufficient technologists to service local existing and emerging demand, especially for the Photonics Cluster.

Potential Sources of Leadership: Algonquin College, Photonics Research Ontario.

Potential Champion(s): Members of the cluster have agreed to be the champions.

Potential Source of Funding: Ontario Strategic Skills Initiative.

2. Launch Comprehensive Marketing and Communications Plan

Challenge: Enhance cluster visibility; current low visibility impedes the ability to attract talent, foreign direct investment, and venture capital.

General Approach: Brand and market Ottawa as a photonics centre of excellence. Link with “Brand Ottawa” flagship and design a sub-brand focused on photonics.

Potential Source of Leadership: OED, with the photonics cluster working group.

Potential Champion(s): Cluster co-chairs/members.

Potential Source of Funding: private and public sector cost sharing formula.

3. Plan and Implement Key Cluster Events

Challenge: Work to build better base of knowledge and broader understanding of the cluster through cluster-sponsored events within the region.

General Approach: Implement a series of events, including: career fairs, lecture series, annual industry conference and gala. Participate in other events such as the Ottawa Venture Capital Fair.

Potential Source of Leadership: OPC, OCRI, cluster firms.

Potential Champion(s): OPC event committee.

Potential Source of Funding: Sponsorships, membership fees, revenue generated from events.

4. Develop Funding and Membership Plan for the OPC

Challenge: Ensure funding and use funds to strengthen OPC; build organization into a powerful force for industry advocacy and development.

General Approach: Develop a funding and membership plan for the OPC. Develop information on membership benefits, types of membership and annual fees.

Source of Leadership: OPC.

Potential Champion(s): OPC.

Potential Source of Funds: OPC members, membership fees.

5. Develop Technology Road Map

Challenge: Keep cluster leaders abreast of photonics-related technology development and on the cutting edge of innovation.

General Approach: Develop a Canadian Photonics Technology Roadmap.

Potential Source of Leadership: OCRI, Photonics Research Ontario, Industry Canada. Other institutions (CITO, NRC, CRC) have agreed to support the initiative as founders.

Potential Champion(s): Member of OCRI/PRO working with members from Industry Canada, IBIS Research.

Potential Source of Funding: Contributions from founders to cover startup costs and subscription fees to cover operating costs.

6. Develop Strategic Plan for the Cluster

Challenge: Establish a vehicle for continuing the process of identifying and addressing challenges and opportunities.

General Approach: Prepare a strategic plan for the OPC. Use existing vision, mission and strategies as a launching point. Identify gaps. Develop strategic planning process.

Potential Source of Leadership: OPC.

Potential Champion(s): Member of OPC has agreed to be champion.

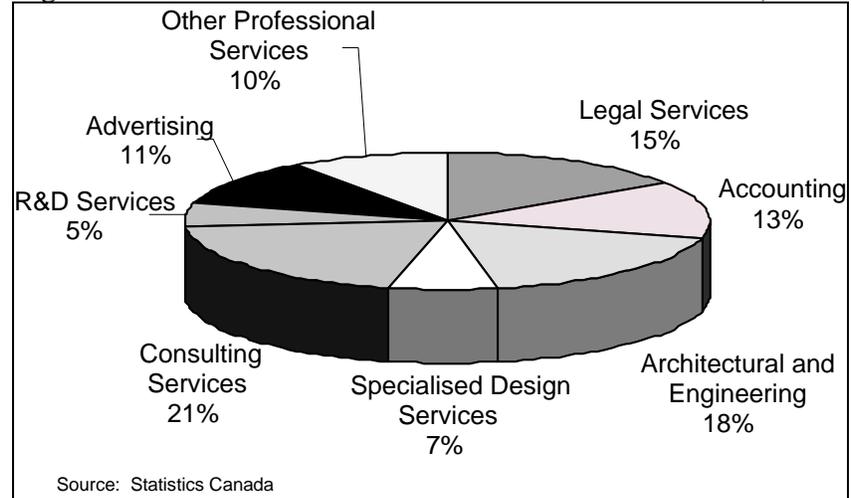
Potential Source of Funding: Pro-bono

Professional Services Cluster

The Professional Services Cluster in Ottawa includes a broad range of “knowledge services”, illustrated in Figure 3-14 below. As Ottawa’s economy has restructured the Professional Services cluster has both grown and changed its market focus. Government was once essentially the main client for firms in this cluster. But with the growth of the high technology sector, the cluster has grown to serve an increasingly diverse client base.

The Professional Services Cluster in Ottawa includes a broad range of “knowledge services” including legal, accounting, architecture and engineering.

Figure 3-14. Structure of Professional Services Cluster, 1998



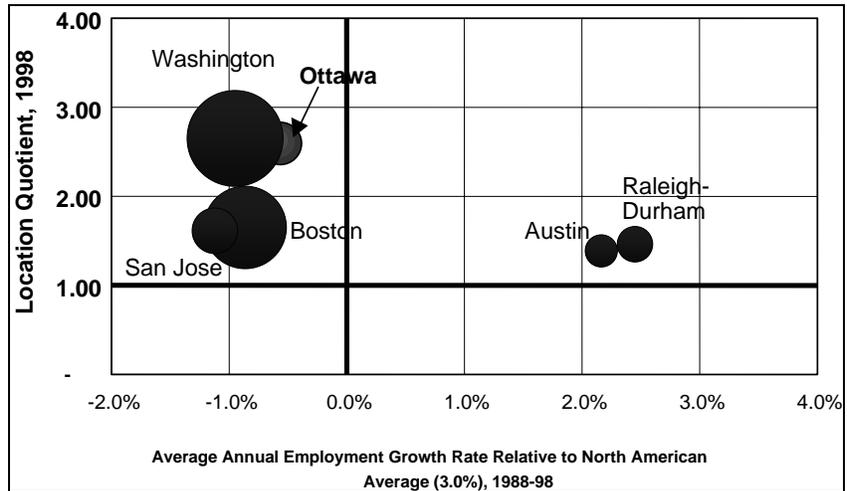
High technology firms rely on the Professional Services Cluster for support in areas including mergers and acquisitions, intellectual property rights, IPOs, equity investments, stock options, etc. Consultants provide input on marketing strategies, systems and procedures and solutions for a range of firm-specific strategic and operational issues. Architectural and engineering firms provide clients with an array of design and engineering services.

Professional service firms are major users of, as well as agents for, technological innovations. They often serve as the impetus for new technological developments. Many service firms also play an important role in disseminating technical know-how, in effect, “cross fertilizing” the region’s economy. Some even develop new technologies themselves, through R&D activities. Figure 3-15 benchmarks the region’s cluster performance against some of its competitor regions in the U.S. Law firms, accounting firms and consulting firms are growing slowly, if at all, in most large metro regions. Instead, professional services employment is shifting from larger to smaller cities as firms establish new offices in new markets.

In the case of Ottawa, the Professional Services Cluster is increasingly serving the region’s other cluster firms, especially from the high tech clusters. In this context, Ottawa’s Professional Services Cluster is likely to see growth at essentially the same rate expected from the other clusters.

Figure 3-15. Growth Share Matrix for Professional Services

Clusters: Ottawa and Key U.S. Competitors



Key Cluster Challenges:

Key challenges identified by the Cluster Working Group include:

Marketing: Leaders feel that their cluster needs to become better organized in order to develop a clear voice and send a clear message to both local clients and the local community more broadly. This is, in part, the challenge of gaining access to potential clients in the region. But the larger issue is the cluster’s image. Leaders feel that much more can be done to build a “brand” image of excellence and integrity.

Financial Resources: Financing for business formation and expansion is an issue that affects essentially every cluster. Leaders of the Professional Services Cluster feel that Ottawa needs a "transformation" in banking so that financing needs of the New Economy are better met. More attention to the needs of small and mid-sized enterprises is critical.

Physical Infrastructure: There is a sense among this cluster’s architect, engineering and land development segments that the Region has unreasonably complex planning and permitting procedures that make for slow and unnecessarily expensive approval processes.

Vision, Creativity and Entrepreneurship: Cluster leaders feel that there is a pervasive lack of vision and entrepreneurial thinking in many cluster segments, a legacy tied to “old line” conservative law and accounting firms. The cluster needs to foster creativity and celebrate entrepreneurship.

Cluster leaders have proposed key action initiatives.

Proposed Cluster Initiatives

The following initiatives were developed by participants during the Professional Services Cluster working group meetings. Two initiatives are closely related to flagship initiatives, “Global Learning Centre” and “Brand Ottawa”. Implementation of these initiatives should be through the flagship initiative implementation process.

1. Establish a Global Learning (Training) Centre

Challenge: Ottawa has the opportunity to capitalise on the presence of its many education and training institutions, for three reasons. First, the region has an array of excellent education and training institutions, several of which are enjoying widespread recognition in the marketplace. Second, markets are growing for non-traditional, “short course” corporate education and training. Finally, Internet and related technology is rapidly changing delivery mechanisms for education and training. Ottawa is positioned to take advantage of its strengths and these opportunities.

General Approach: This initiative should build on the presence of excellent post-secondary institutions and the emerging image of Ottawa as a centre of technological excellence. Innovative marketing initiatives (such as “branding” strategies) could establish Ottawa in the marketplace as a “Global Training Centre”. Market analysis will identify specific client needs while an analysis of new education and training delivery mechanisms will show others ways for Ottawa to find its best market niche. In a developmental way, steps would be taken to acquire or build appropriate facilities. (See the Global Learning Centre flagship initiative for additional information.)

Potential Sources of Leadership: From the Professional Services cluster, form a Global Learning Centre task force involving leaders from business, academia and government.

Potential Champion(s): Member of cluster working group.

Potential Source of Funding: Funding partnerships potentially involving: private sector, local and provincial government, and post secondary institutions.

2. Branding and Marketing Ottawa’s Professional Services

Challenge: Need to overcome low visibility of Ottawa as a professional services centre; what market visibility that exists for the cluster is far overshadowed by the visibility of the high tech and government sectors.

General Approach: Brand and market Ottawa as a centre of excellence for professional services (link to the “Brand Ottawa” flagship initiative). Conduct a survey of professional services capabilities in the region and identify niche expertise. Incorporate these findings in marketing materials and consider the publication of a newspaper supplement that explains what professional services are and why they are important to the economy.

Potential Sources of Leadership: OED, Cluster Working Group.

Potential Champion(s): Cluster co-chairs/members.

Potential Source of Funding: Private and public sector cost sharing formula.

3. Organise a Professional Services Cluster Network

Challenge: *While individual cluster segments are supported by their own associations, the broader cluster has no forum for addressing shared concerns and challenges and to support broad-based marketing of professional services.*

General Approach: *Create a professional services network-type organisation (perhaps modelled after the new Ottawa Photonics Cluster); its mission should be “cluster development”; and early activities should include membership development and targeted events, like an awards dinner. From this basis, the organisation could expand activities eventually becoming a cluster network-type organisation with broader goals.*

Potential Sources of Leadership: *Professional Services Cluster Working Group.*

Potential Champion(s): *Co-chairs of the working group.*
Potential Source of Funding: *Member fees.*

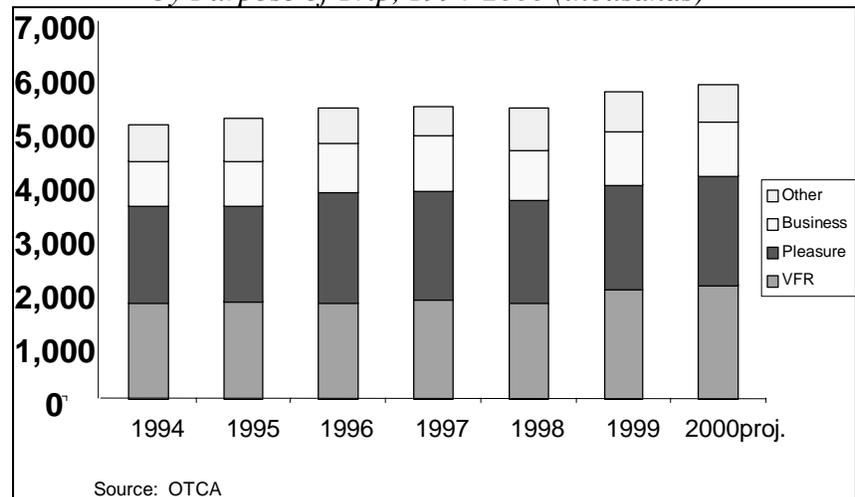
Tourism Cluster

With its variety of cultural and historical establishments, seasonal festivals, outdoor activities and growing international firms, Ottawa is one of Canada's premier destinations.

Almost six million people a year visit Ottawa, either for tourism or business. These visitors add more than \$800 million to the local economy annually. As Canada's capital city, Ottawa has a wide variety of cultural and historical establishments, seasonal festivals, and outdoor activities. The city has an abundance of hotels and restaurants and other traveller amenities that make for a comfortable and interesting stay for visitors of all kinds.

As illustrated in Figure 3-16, Ottawa's Tourism Cluster has seen steady growth (2.4% annually) since 1994, the turnaround year following the recession of the early 1990s. Growth in business travellers and Visiting Friends and Relatives (VFR) have led the way, with pleasure travel growing slightly slower and other markets remaining relatively flat. The region captures approximately 3% of Canadian tourism overall. However, it is stronger in particular markets. Ottawa captures nearly 6% of Canadian business tourism and nearly 4% of the country's VFR tourism.

Figure 3-16. Person-Visits to Ottawa-Hull by Purpose of Trip, 1994-2000 (thousands)



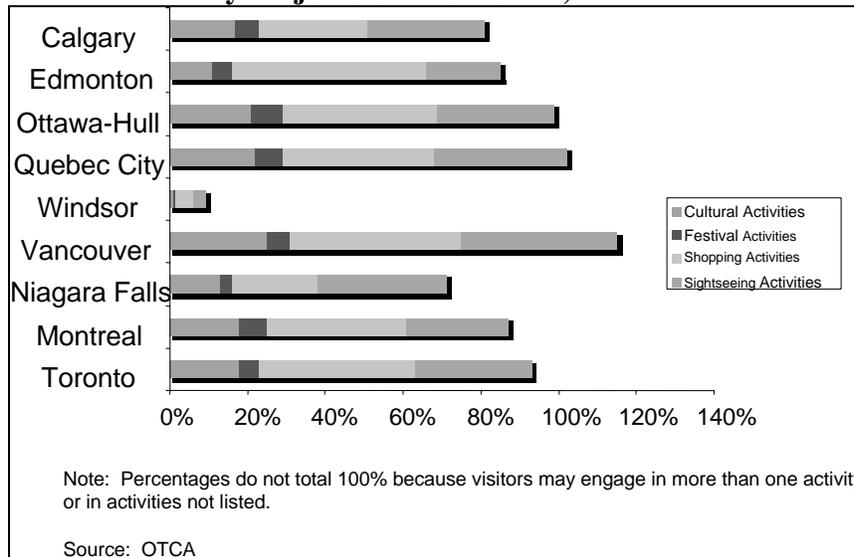
Pleasure Tourism

Approximately one third of all out-of-town visitors to Ottawa come for various recreational activities, with festivals being a

primary attraction. In fact, Ottawa attracts more visitors for festivals than any other Canadian city.

Figure 3-17 illustrates the popularity of shopping, sightseeing, and cultural activities in Ottawa.

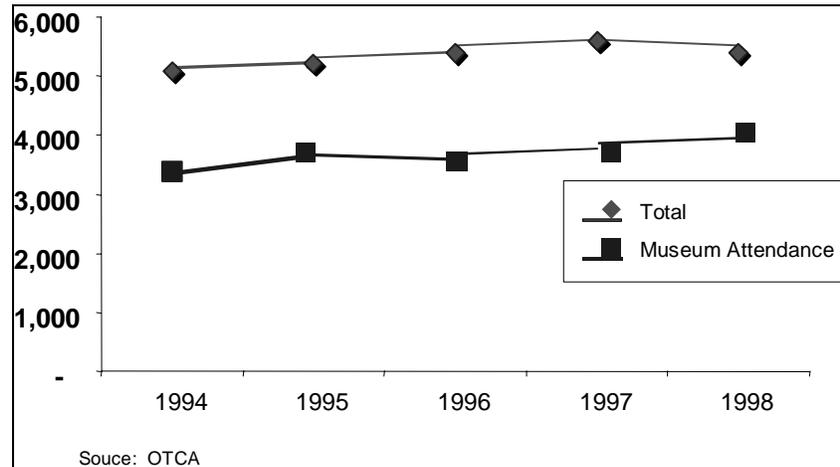
Figure 3-17. Tourism Activities by Major Canadian Cities, 1996



Ottawa’s many cultural institutions, including Parliament Hill, Rideau Hall, the Royal Canadian Mint and the National Gallery, are the largest attractions for pleasure tourists in the region. In 1998, 85% of all pleasure and VFR tourists who stayed in Ottawa at least one night visited at least one of these attractions. Figure 3-18 shows trends in total visitors and museum attendance.

In 1996, 35% of tourists to the region visited Casino de Hull but that figure dropped to 10% in 1998. The profile of Casino visitors may be changing, as is the case across North America. For example, in 1996 34% of visitors arrived by plane but two years later air arrivals had dropped to 17%. Today, Casino visitors are more likely to arrive by car, bus or train. Nevertheless, Casino visitors spend \$887 per visit on average (1998 data), considerably more than other non-Casino tourists who inject \$653 into the economy per visit.

Figure 3-18. Ottawa-Hull Total Visitors and Total Museum Attendance (in 1000s)

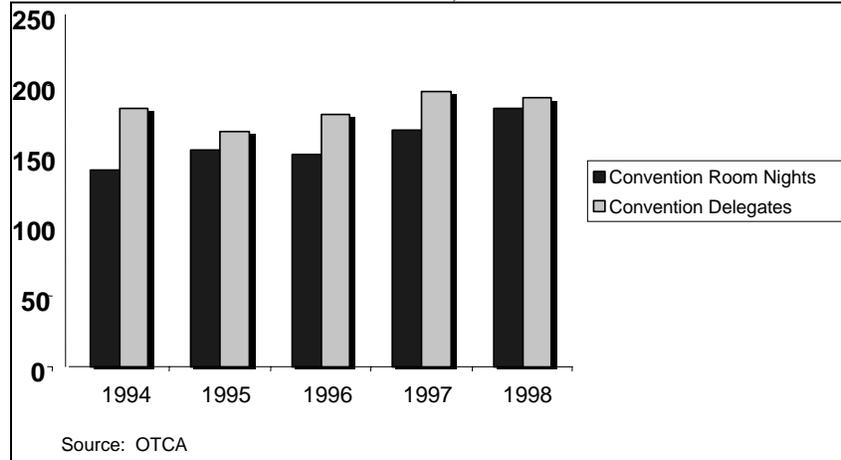


Business Tourism

Ottawa is one of Canada's leading convention centres. Almost 200,000 business delegates visit the city each year.

Approximately 25% of visitors to the Ottawa region come for business, spending more than \$150 million per year. With about 700 conventions taking place in the region's convention centres and hotels, almost 200,000 business delegates visit the city each year. Examples of Ottawa's facilities include the Ottawa Congress Centre, an 84,000 square foot convention space which accommodates nearly 5,000 persons, a 200-store shopping complex at Rideau Centre, and an array of entertainment amenities in the city's downtown. Lansdowne Park, the site of the annual Central Canada Exhibition, draws thousands of visitors for some of the region's most popular trade and consumer shows. Hotel occupancy is relatively high in the region, but Figure 3-19 shows slow growth and even recent decline in delegate visits, due in part to undersized convention facilities.

Figure 3-19. Number of Convention Room Nights in Ottawa-Hull, 1994-98



From a strategic perspective, Ottawa's Tourism Cluster needs to focus on "product development," while accelerating marketing efforts. An improved product will come from both improved packaging of the total visitor experience, as well as from adding new elements to the experience (e.g., new convention facilities, new festivals and celebrations). For marketing, steps are required to enhance the region's image. Many tourism leaders feel that too many potential tourists still know too little about what the region has to offer.

Key Cluster Challenges:

More than 50 tourism leaders participated in the cluster working group process. Among the highest priority cluster challenges the group focused on include the following issues:

Physical Infrastructure: *Moving the much discussed Convention Centre initiative forward is top of the list of priorities of this cluster. It is widely accepted that Ottawa has a shortage of convention space for business events. In addition, cluster leaders feel strongly that there is an insufficient supply of lower cost hotels and hostels for travellers, especially during the summer months.*

Financial Resources: *Convention centre expansion will require creative financing. All plausible creative solutions for financing this expansion will need to be examined.*

Marketing/Financial Resources: *Tourism needs new mechanisms to finance destination marketing. As new*

mechanisms are developed it will be important that smaller players are not excluded from financing opportunities.

Marketing: *Marketing is a high priority issue for cluster leaders, as it is in most regions. Leaders are looking for more, and better marketing efforts. Working group members feel that professionals in destination marketing need to take better advantage of both general and specialised media and other widespread promotion resources.*

Customer Service: *Approaches to customer training need to be overhauled. Cluster leaders suggest a more efficient, “one-stop” customer training process. Developing and advancing new service concepts (leaders referred to ‘bundling of services’) could also enhance the region’s current approaches to customer service training.*

Proposed Cluster Initiatives

Tourism leaders agreed on several action initiatives, outlined here, that will begin to address the broad challenges faced by the cluster.

Cluster leaders have proposed seven action initiatives.

1. Launch a Convention Centre Campaign

Challenge: Steps are required to garner more broadly based community support for the expansion of the convention centre

General Approach: Existing and new information needs to be packaged and widely disseminated about the importance of conventions to the community and to the economy. Local media (mass media and specialised publications) must be encouraged to communicate this information. Special events such as presentations to business and other key community groups should be planned to advance the communications process.

Potential Sources of Leadership: Private sector, OED, OCRI, OTCA.

Potential Champion(s): Prominent member of Ottawa’s society, members of OTCA, OED, Ottawa Board of Trade, OLSC.

Potential Source of Funding: Federal, provincial and municipal sources: private sector contributions.

2. Design and Launch a “High Tech” Customer Service Program”

Challenge: Capitalise on the presence of high-tech in the region to enhance the competitiveness of tourism operators.

General Approach: Build a high-tech customer service database that is comprehensive, non-commercial, user-friendly and interactive and that provides a one-stop shopping service (based on San Jose’s City website). Create a centralised 1-800 service to access the database. Encourage partnership with industry in developing tools. This initiative can link into the smart city initiative.

Potential Sources of Leadership: OTCA, NCC, Tourism Cluster Working Group.

Potential Champion(s): Member(s) of cluster, OTCA.

Potential Source of Funding: City of Ottawa, private sector, NCC, BIAs, fees or commissions.

3. New Image of Ottawa in National Media

Challenge: Change the image of Ottawa carried by national media.

General Approach: A two pronged approach: “De-brand” Ottawa as synonymous with federal government, while re-branding it with a new image. Garner support for the need to de-brand by using an electronic clipping service to survey national print and electronic media. Work with newspaper and magazine publishers, editors, and others to change this pattern of referencing Ottawa. Link with “Brand Ottawa” flagship.

Potential Sources of Leadership: Clusters (including Tourism), OTCA, NAC.

Potential Champion(s): City of Ottawa.

Potential Source of Funding: City of Ottawa.

4. Financial Resources

Challenge: Need for supplementary funding for destination marketing to ensure sustained growth of the tourism and convention industry in Ottawa.

General Approach: Seek enabling legislation to permit municipalities to expand Ontario sales tax on commercial accommodation from 5% to 8% (hotel, apartment hotel, suite hotel, and B&B) within the newly created City of Ottawa boundaries. Use this supplementary funding for “product development”, promotion and other purposes.

Potential Sources of Leadership: OTCA, Tourism Cluster Working Group.

Potential Champion(s): OTCA, Tourism Cluster Working Group Member(s).

Potential Source of Funding: OTCA, City of Ottawa.

5. Design and Implement a “Pageantry Template” Initiative

Challenge: Heighten the awareness of Ottawa festivals. Create a sense of excitement and a “buzz” so as to increase the visibility, attendance, marketing and revenues for festivals and similar events.

General Approach: Create an easy, replicable “pageantry” template that establishes a plan of action for mobilising the whole community in support of festivals (in adopting themes, colours, symbols, logos), events and pageantries. Organise the community (museums, organisations, retail, restaurants, public agencies in charge of streets, bus shelters, lighting, and taxis) around specific roles, with instructions on deploying posters, banners, and other thematic materials in support of the festival. In parallel, develop merchandise (T-shirts, ball caps, and buttons) that adds to the “buzz” of particular events.

Potential Sources of Leadership: OTCA, with Tourism Cluster Working Group.

Potential Champion(s): Member(s) of cluster, NCC.

Potential Source of Funding: City of Ottawa, private sector, NCC, BIAs.

6. Enhance Tourism Stewardship

Challenge: Lack of business support for tourism related initiatives and events. Need for educating the community, especially the high-tech firms, about the role of tourism in enhancing the quality of life in Ottawa and the need to support tourism related organisations.

General Approach: In order to enhance the visibility of the tourism sector and its importance in the daily life of Ottawa, this initiative focuses on two elements. The first involves a series of presentations to the business community, in the form of breakfast meetings, luncheons, and presentations to professional and technical associations, as well as business gatherings. Second, develop an awards banquet coupled with a media campaign to celebrate the community leaders who support the tourism industry.

Potential Sources of Leadership: A partnership involving the OTCA, Board of Trade, Community Foundation of Ottawa-Hull, and the Tourism Cluster Working Group.

Potential Champion(s): Member of the cluster.

Potential Source of Funding: Some funds would be required for the compiling of statistics and information to support the case for the importance of tourism to the community. These funds could be garnered through contributions, a percentage of revenue from tourism events or the like. Individuals making the presentations would volunteer their efforts.

7. Build “Tourism Gateways”

Challenge: Lack of a regional tourist gateway to serve as a welcoming and information centre.

General Approach: Nearly 9 million vehicles travel on Highway 401 each year, creating an extensive market of visitors seeking travel information pertaining to Ontario East as well as the rest of the province. Create a tourist information centre at the 416/401 interchange to serve as a ‘gateway’ that will introduce visitors not only to various attractions and accommodation options, but also to the flavour and character of the region, in particular three themes: heritage, adventure, and waterway. These themes will be present throughout the tourist information centre’s architecture, landscape, and displays.

Potential Sources of Leadership: *OETA, OTCA, NCC, Ministry of Tourism, Tourism Cluster Working Group.*

Potential Champion(s): *Member of Working Group with members of OTCA, member of OETA, MEDT.*

Potential Source of Funding: *50% from the Province, 50% from Federal Government, City of Ottawa, and other Eastern Ontario partners.*

Implementation of Cluster Working Group Initiatives

Cluster leaders have proposed more than 30 cluster-specific initiatives. Most initiatives already have “champions”. Now, Ottawa needs to move this agenda forward by providing leadership and, in some cases, funding.

As the Economic Generators Initiative moves forward, each cluster working group will be encouraged to remain engaged in the process—looking to The Ottawa Partnership (TOP) for implementation guidance. Where the cluster working group action initiatives have common elements (e.g., “Brand Ottawa” and the Global Learning Centre Initiative of the Professional Services Cluster), they can be implemented through the “Flagship Initiatives” process discussed in Section 5. Action initiatives that are uniquely appropriate for the cluster working group to pursue will require that small action teams be formed and more detailed implementation plans developed. As discussed in Section 6—Agency Recommendations—responsibility for economic development among and between agencies will need to be adjusted. While this process goes on, the Cluster Working Groups should take the initiative to pursue all plausible avenues to secure leadership and resources for implementation.

4. Ottawa's Economic Foundations

A region's economic foundations provide the inputs needed by firms to be competitive.

The success of Ottawa's clusters will depend on market demand and the region's capacity to support cluster growth and development. Section 3 made the point that all seven clusters enjoy large and growing markets. Each of Ottawa's clusters is well positioned for continued growth. In this section, the local resources that comprise Ottawa's economic foundations are examined. Economic foundations—local human resource capacity, technology, finance, and the like—are the critical inputs needed by firms. It is crucial, especially in today's fast-paced New Economy, that the institutions that provide these foundation inputs remain strong and flexible in order to meet the constantly changing needs of cluster firms.

Understanding how institutions that shape key economic foundations function and interact with the surrounding economy is a critical part of devising a regional economic development strategy. It is also important, though, to understand the micro-level relationships between firms and economic foundation institutions. Firms need, for example, access to not only workers educated in basic skills, but also increasingly, workers with very specialised job skills. In this context, new forms of co-operation between firms and economic foundation providers are essential. Industry-university partnerships, collaborative public-private training programs, and industry extension programs are just a few examples of the types of relationships that are blurring the boundaries between public and private sectors and creating new, more effective modes of both governance and economic stewardship.

This section presents both Ottawa's strengths and key challenges concerning economic foundations related to:

1. Human resources
2. Technology resources
3. Financial capital
4. Business climate/ regulatory environment
5. Physical infrastructure
6. Quality of life

A recent study commissioned by the U.S. Department of Housing and Urban Development found that the competitiveness of the fastest growing clusters in the country are driven by investments in these six foundation areas—especially human resources,

technology, venture capital, and community quality of life. Moreover, not only is attention to these economic foundations imperative to enhance and maintain the competitiveness of the region's clusters, strengthening human resources and enhancing quality of life are social goals in their own right.

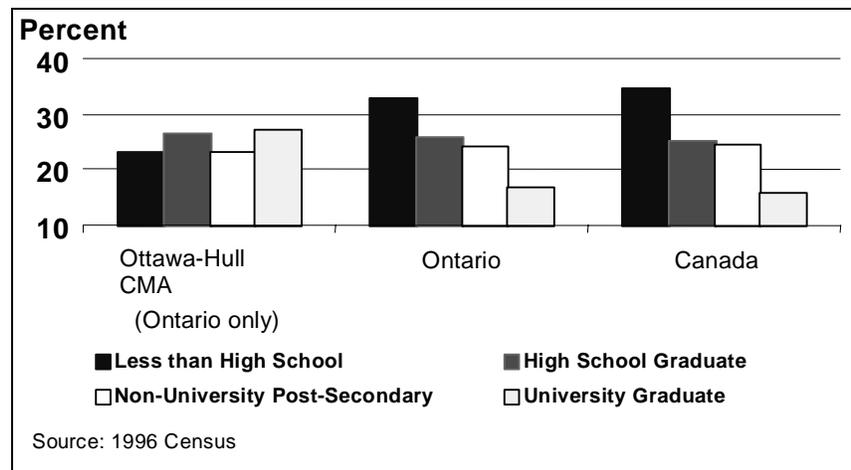
Ottawa's Economic Foundations

Human Resources

A well-educated workforce is one of the most important factors in attracting investment to a region.

Ottawa boasts the most educated workforce in Canada. Twenty eight percent of the population ages 25 to 64 have a university degree, compared to the national average of 17%. Seven percent of the workforce is comprised of scientists and engineers, compared to less than 3% nationally, and 44% of the population is bilingual.

Figure 4-1. Education Levels



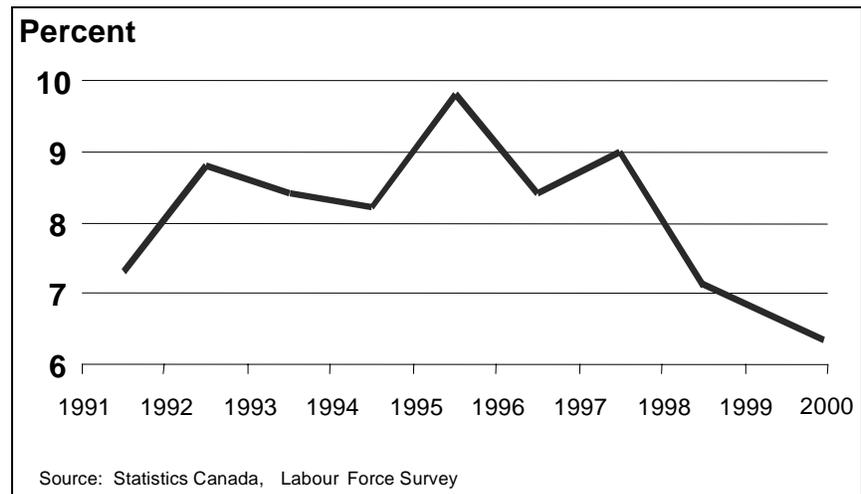
While Ottawa has the advantage of a highly educated workforce, it still shares the frustration that every dynamic, high tech economy has today-- a serious shortage of skilled workers.

Eight colleges and universities, numerous professional and business schools, and several academic and research organisations provide residents with a wide range of educational opportunities. Furthermore, many of these institutions have deep linkages with industry and are attuned to industry human resource needs. For example, the University of Ottawa's MBA program draws expertise from corporate partners and a 15-member Advisory Board. Carleton University graduates numerous science, engineering, and mathematics majors who find careers in Ottawa's high tech sectors through relationships between the University and the private sector. Commerce-oriented research

initiatives of both institutions have spun innovative ideas into commercial success stories. At La Cité Collegiale, more than 500 local employers sit on its advisory committees to ensure that academic programs fit with the current job market. And Algonquin College has a wide array of relationships with local firms that depend on the college for a steady stream of skilled workers.

While Ottawa has the advantage of a highly educated workforce, it still shares the frustration that every dynamic, high tech economy has today-- a serious shortage of skilled workers. With unemployment at its lowest level in years and falling fast (see Figure 4-2), Ottawa is experiencing tight labour markets. Recent data report unemployment in the region at less than 6%. While this is good for workers in the economy, it is a growing challenge for the economy overall. Tight labour markets can lead to wage growth that outpaces increases in worker productivity, which in turn can lead to a loss of competitiveness of the region.

Figure 4-2. Unemployment Rate in Ottawa-Hull CMA



Furthermore, although the Ottawa workforce has higher skill levels than most regions, business leaders report that the actual skills of workers differ from the levels and specific qualifications demanded by Ottawa's fast-changing, high tech industries. With employment across all clusters likely to increase substantially in coming years, improving access to skilled and adaptable workers must be Ottawa's highest economic development priority.

When addressing the shortage of skilled workers, many business

leaders point to Ottawa's "brain drain", referring to the outflow of high-skilled, high-paid workers who leave the region to take more competitive jobs in the U.S. Labour mobility in technology sectors around the world is a notorious problem for firms. As to whether workers are leaving for higher wages, the matter is debatable. Ottawa's cost of living is substantially less than places like Silicon Valley. Differences in housing costs alone can be several hundred thousand dollars. Considering other complicating factors such as hour-long commutes in many U.S. tech centres raises the question of why people leave Ottawa. Some high-skilled workers may well leave Ottawa to pursue specific career opportunities not available in the region, but these or others may well move back to Ottawa as the region's technology economy expands.

The competition for human talent is growing worldwide; Ottawa's leaders must act quickly, with fresh new thinking, expand existing workforce development programs, and implement new job skill training initiatives.

While there is some data from Statistics Canada that indicates that a net "brain drain" might exist, the numbers are exceedingly small; there could be less than a 0.1% annual net loss of the supply of knowledge-workers in Canada. There is also evidence of an influx of well-educated, high-skilled immigrants. In the 1990s immigrants accounted for one-third of the increase in employment among computer engineers, system analysts, and computer programmers. And Canada gained more university graduates than it lost. In the 1990s, recent immigrants were twice as likely as native-born Canadians to be working as computer scientists, engineers and natural scientists. Clearly, recent immigrants have played a substantial role in meeting the country's growing demand for high tech workers. On balance, a "brain drain" may be occurring in particular occupational niches but the overall effect is probably negligible, if not offset by skilled immigrants increasingly filling technical positions in many industries.

Ottawa's human resource challenge is to develop an appropriately skilled and adaptable workforce for the Innovation Economy it seeks to build. Stepping up job skill training programs at universities and colleges is one path forward. Retaining workers the community has invested in is another path. Good job opportunities of a variety of kinds in growing companies can "anchor" people to the region. Keeping community quality of life at high levels and geared to the needs of the workforce must also be a part of the strategy. As leaders consider the challenge of developing a workforce for the future, the competition for human talent is growing worldwide. Now is the time to move quickly with fresh new thinking and new skill training initiatives.

Technology Resources

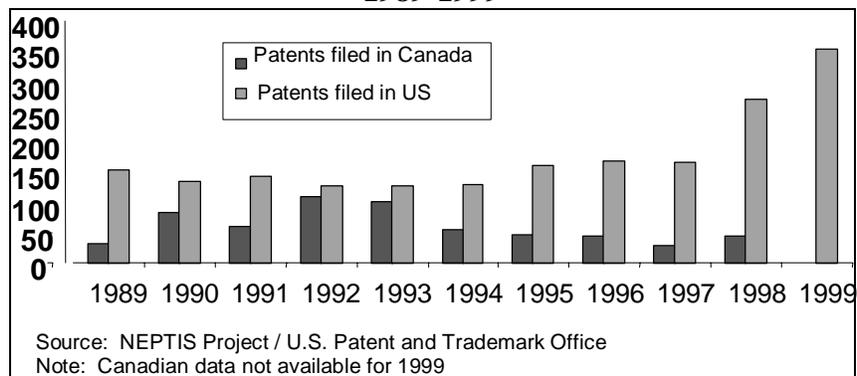
The foundation area we call Technology Resources refers to the collective capacity of a region to generate new ideas and apply technologies to commercial applications. Here Ottawa excels with a variety of world-class technology resources. The key resource is the region's Federal research and development activities. Canada spends more than \$5 billion annually in Federal science and technology activities, which includes the National Research Council (NRC), the Communications Research Centre (CRC), and several other leading technology institutions. These institutions and others in the region have been instrumental in spurring commercial innovation in many fields. The region's wealth of talented engineers and scientists in Ottawa's academic institutions has also contributed to the success of the region's technology clusters. Provincial organisations like Communications and Information Technology Ontario (CITO) and local agencies like the Ottawa Centre for Research and Innovation (OCRI) are two additional players in the region's technology base. Many business leaders point to the partnership role they have played in Ottawa's technology-driven economic growth.

For government-based R&D to have an impact on firms, local inventors must be able to secure patent rights and firms must have access to those rights.

Many local high tech firms whose "genealogies" link them with government-developed innovations are increasingly contributing private sector investment to Ottawa's R&D base. Other firms not historically tied to public R&D institutions (e.g., Cisco) are bringing new R&D investment to the community, as well as further deepening the technology base in Ottawa.

For government-based R&D to have an impact on firms, local inventors must be able to secure patent rights and firms must have access to those rights. Figure 4-4 shows that patent activity of Ottawa-area inventors has skyrocketed in the past few years. Most interesting is that an increasing number of patents registered by Ottawa inventors are registered in the U.S. rather than in Canada. This suggests that local inventors feel that their patents have more value in the U.S. than at home. This trend has resulted in essentially all patents filed by Ottawa inventors in 1999 being filed in the U.S.

**Figure 4-3. Patents Registered to Ottawa Inventors
1989-1999**



Patent activity of Ottawa-area inventors has skyrocketed in the past few years—an increasing number of patents registered by Ottawa inventors are registered in the U.S. rather than in Canada.

The generation and application of technology must be central to Ottawa’s economic development strategy. To have a cluster-based, Innovation Economy means to have not only good sources of innovation but also the ability to continuously diffuse new product and process ideas into the economy. All clusters, including professional services and tourism, will need improved access to Ottawa’s sources of innovation. Fortunately, Ottawa is relatively well endowed with the required institutional capacity. Going forward, however, Ottawa’s science and technology institutions will need to develop new bridging mechanisms for taking innovations from the lab to the marketplace.

The finding that local inventors register their patents in the U.S. is interesting, suggesting that Ottawa’s inventors see their market opportunities primarily in the U.S. From a strategic perspective, Ottawa’s private sector should do much more to seek out product opportunities whose patents, when issued, would be held by local researchers. Likewise, local inventors should do more to market their intellectual property rights to Ottawa firms. Cluster leaders should develop new kinds of relationships with universities, with institutions like NRC, and with agencies like OCRI to improve the linkages between industry and inventors.

Financial Capital

Ready access to financial capital has always been a key to economic development. But the nature of business financing is changing. Historically, debt financing was the means by which

most new companies were started and by which more established companies got the money needed to expand and modernise their facilities. But in today's knowledge- and service-based economy (where collateral can be non-existent), equity financing—venture capital—is growing in popularity. This is especially so for new, knowledge-based firms.

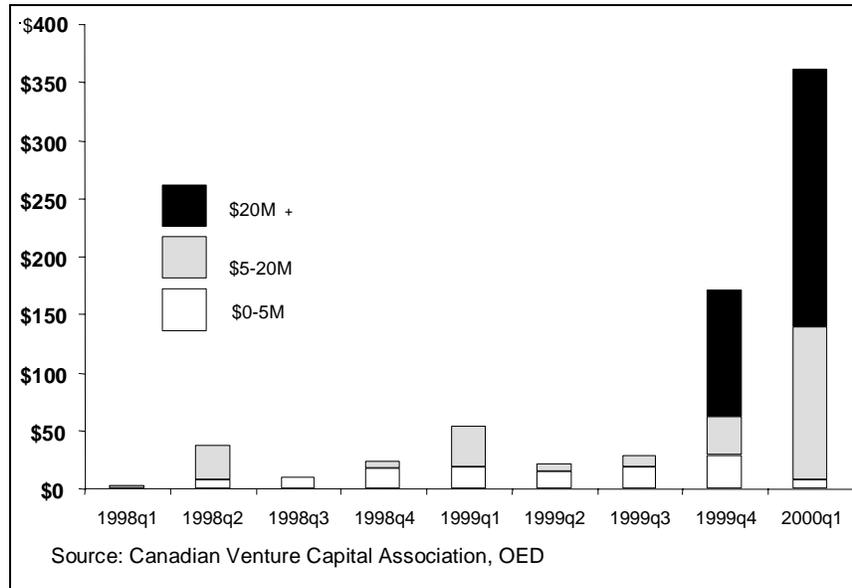
Traditional debt financing in Ottawa is not reported to be a serious problem for Ottawa's clusters. Well-established firms in some clusters, like telecommunications equipment and microelectronics, have access to major lending institutions around the world. For these firms, access to financing is not the issue it is for smaller firms in newer sectors such as software. For younger firms in knowledge-based sectors, venture capital is the "coin of the realm."

Venture capital is growing very rapidly in the region.

Local capital is not unknown to Ottawa entrepreneurs. In fact, several firms have been operating in the region for years. But with the rapid growth of high tech, and especially with more businesses growing to meet specialised and sophisticated market demands, access to venture capital is a critical issue.

Fortunately, the availability of venture capital is growing very rapidly in the region. In the first quarter of 2000, venture capital deals rose to \$361 million, surpassing total VC investment for the whole of 1999, which was itself a record year. Figure 4-4 shows the dramatic increases in large VC investments.

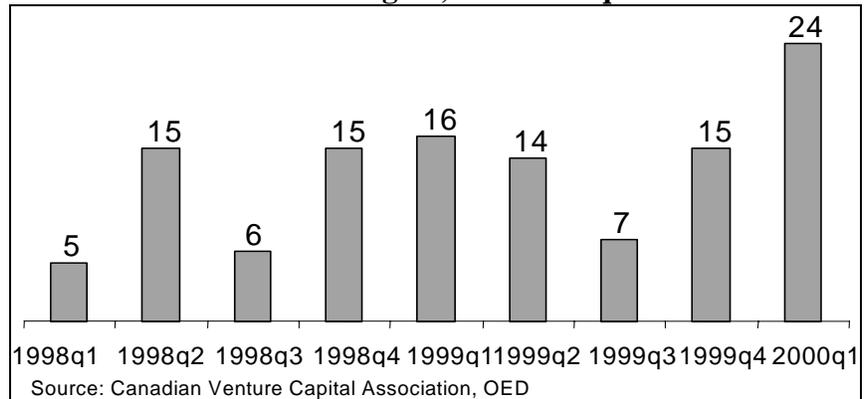
Figure 4-4. Venture Capital Investment in Ottawa Companies By Size of Investment, 1998-2000q1



A closer look at the structure of recent venture capital deals in Ottawa reveals important issues for the region. VC investment over the past two quarters is largely represented by later-round financing of firms preparing for an Initial Public Offering (IPO). This fact makes the case that Ottawa is a maturing technology centre. Venture capitalists seek high rates of return when firms go to the public with share offerings. These sophisticated investors see excellent opportunities in Ottawa. However, the observation that there has been little growth in deals of less than \$5 million suggests that the region needs to work on improving both the quantity and quality of these typically riskier ventures.

Figure 4-5, shows the overall number of venture capital investments in Ottawa during the same period. Although 24 new venture capital investments were recorded in the first quarter of this year, for most of the past two years the quarterly number has varied from 7 to 15. If Ottawa is to continue to make the most of its economic development potential, venture capital investment must grow to include both smaller, earlier-stage deals as well later stage deals where recent investment growth has been extraordinary.

Figure 4-5. Number of Venture Capital Deals in the Ottawa Region, 1998-2000q1



Another trend associated with VC investment in Ottawa is the increase in deals made by U.S. investors. While it is a good sign that U.S. investors are finding business opportunities in Ottawa it raises the question of whether U.S. investors are simply being more aggressive or if local investors operate with significantly different investment criteria. Whatever the case, with the economy expanding and entrepreneurship growing, local investors should see an increasingly larger number of opportunities for investment.

Ottawa is producing more successful entrepreneurs; these younger entrepreneurs are also likely to be the region's future investors and business mentors.

Going forward, efforts will be required to mobilize the region's angel and more traditional venture capital investors. Once mobilized, the strategic question is how to link investors to exceptionally well-qualified business opportunities. The answer may lie in how the venture capital industry is changing today. As more and more venture investors are themselves experienced and successful entrepreneurs, a hands-on approach is emerging for mentoring new entrepreneurs. Finance people are bringing much more to the deal than just money. It is not unusual in mature venture capital markets for investors to provide a full complement of directors, executives and marketing experts to help ensure a successful business venture. As Ottawa produces more successful entrepreneurs it is also producing potential investors and business mentors.

Ottawa's strategy should focus on organizing, to a greater extent than the case today, angel, venture capitalists and "retired" entrepreneurs into informal networks for information sharing, improving links to local business opportunities and as a means of strengthening the quality of business propositions seeking investment.

With one of the fastest growing economies in North America, Ottawa is facing infrastructure constraints of many kinds.

Physical Infrastructure

Physical infrastructure has long been recognised as a vital ingredient for economic growth. The presence of particular kinds of infrastructure determines where economic activity will take place, how rapidly it will expand, and how much growth a region can support. Good infrastructure also shapes the overall quality of life in the region by ensuring, for example, that residents have good public transportation and parks.

With one of the fastest growing economies in North America, infrastructure constraints are emerging, somewhat unevenly, across the region. Estimates of population increases range from a low of 10,000 to 12,000 annually (the average of the last 20 years) to many times this average in the next few years. (The RMO is soon to launch a review of its long-range population and employment forecasts which will help clarify issues of the rate of growth.) Whatever the actual growth will be, there is little doubt that serious infrastructure constraints could slow growth which could in turn slow growth in per capita income. Severe infrastructure constraints would also damage the high quality of life residents enjoy and central to the kind of community characteristics that workers and investors seek.

Business leaders report that a rapidly shrinking supply of office space is a cause for alarm, especially to companies in fast-growing markets. Just this year, 1.5 million square feet of space will go up in Nepean and Kanata, and most of it will be taken up before construction even begins. Current availability in Kanata is near zero while demand for space in the heart of high technology activity is exploding. These pressures will only grow in the coming years, making one of the new city's priority challenges that of finding creative solutions to problems that leaders in regions like Silicon Valley are only now beginning to address (e.g., a private sector sponsored commuter train from centres of lower cost housing to the employment centres of the Valley).

Many planners and developers advocate expansion in Ottawa's east-end as a solution to the space shortage in the west-end. In the east-end, there are 2,000 acres of industrial-zoned land that is available to be developed. However, until recently most technology companies have focused on expansion opportunities in the west. With a recent announcement by JDS Uniphase to build production facilities in older commercial buildings in the east-end, other announcements have followed, signalling market

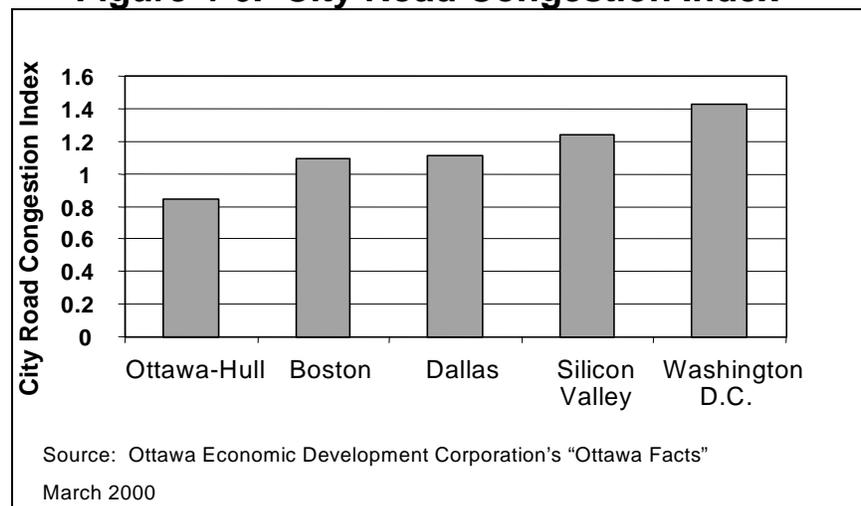
forces that will accelerate development in this area.

With increased population, new business, and visitors in Ottawa comes new stresses on the region's transportation system.

In addition to space for new offices, space for conventions is also a physical infrastructure need voiced by many business and community leaders in the Ottawa region. A \$130 million convention facility at the Rideau Centre has been proposed and, if approved, is estimated to trigger \$320 million in spending by the private sector in the downtown shopping area. Building new convention space has been reported by leaders of the tourism cluster to be a very high priority. Without new space, business leaders worry that the cluster will be unable to grow to meet increasing demand in the market for conventions.

With increased population, new business, and visitors in Ottawa comes new stresses on the region's transportation system. Traffic congestion on the highways is a growing concern among many residents who have long taken pride in everything being "just around the corner," a factor contributing to the region's superb quality of life. For any commuter on the Queensway, however, jobs and housing are no longer just around the corner. Figure 4-6 illustrates relative degrees of traffic congestion and makes the point that Ottawa needs to take the steps necessary to ensure that it doesn't end up with the notorious traffic jams of Silicon Valley, Boston and other high tech regions.

Figure 4-6. City Road Congestion Index



Business air travel is growing especially fast in the region. Air travel to the U.S. increased 40% in the past two years and is expected to surge in coming years. A \$300 million expansion to

the Ottawa International Airport, more than doubling the size of today's facility, could be completed by 2004. However, plans may be delayed or even reduced in the face of escalating payments to the federal government and high property taxes.

Going forward, leaders must take the steps necessary to build the kind of advanced infrastructure needed by an advanced Innovation Economy.

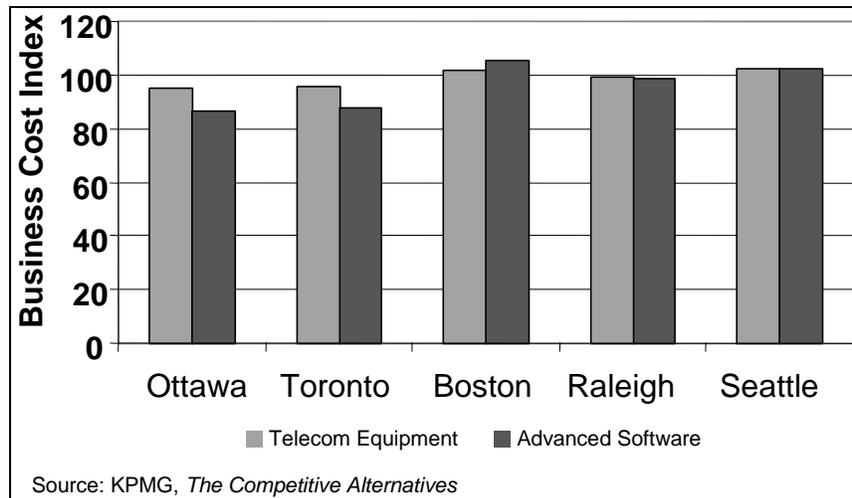
Going forward, leaders must take the steps necessary to build the kind of advanced infrastructure needed by an advanced Innovation Economy. As a priority, strategies are required for addressing the jobs-housing-transportation mismatches that have brought serious productivity losses and declining lifestyles to many of North America's fastest growing regions. Priority must also be given to the airport's expansion. As Ottawa builds an economy that can compete in the global economy, efficient air transportation becomes much more than a necessary convenience for residents. Today, air transportation and airport facilities must be viewed from an economic perspective as well. It would be unfortunate if Ottawa ended up with a constraint on jobs and growth because airport expansion stopped due to what should be largely inconsequential intergovernmental financing issues.

Business Climate

Business climate refers to issues including a region's tax and regulatory environment and to other costs of doing business in a region. High taxes, excessive regulation or inefficient regulatory processes relative to other regions can drive away investment. Overall, there is considerable evidence that Ottawa's business climate compares favourably to other major cities in Canada and the U.S.

Due largely to the currency exchange rate, investors from the U.S. and Europe view Ottawa as a region of low wages and low production costs. And because Ottawa's workforce is highly skilled, the quality-for-price trade-off is good. A 1999 study by KPMG compared total costs (including labour, lease, ETT, interest and depreciation, and taxes) of doing business for major cities around the world and Figure 4-7 shows Ottawa's business costs relative to the indexed costs in the U.S. for telecommunications and software firms.

**Figure 4-7. Comparison of Relative Business Cost Indices
(United States Average = 100)**



Up until very recently, Ottawa’s tax climate compared unfavourably with competing regions. Both the Federal and Ontario Year 2000 budgets have begun to address the problem. New measures proposed at both levels of government will reduce corporate and personal taxes. An analysis prepared by the Toronto Star earlier this year estimated that the combined federal and provincial tax rate will be more than 10% lower than the U.S. Great Lakes states—states that could compete with Ottawa for manufacturing-related investment.

Proposed tax cuts in this year’s budget could go a long way in boosting job growth and encouraging investment in Ottawa. Spread over five years, a reduction in the share of capital gains subject to tax from 75% to 50% could motivate entrepreneurship. And corporate tax and capital gains breaks are estimated to total more than \$1.4 billion over the first year after they go into effect. By 2005, the tax rate will be cut to 8%, down from 15.5%, a rate that has not changed since 1985. Further strengthening the region’s business climate is a Federal Government announcement that starting in January 2001, the corporate income tax rate will fall from 28% to 21% for businesses in high-taxed sectors.

Other tax measures are good news for industry leaders trying to attract and keep a talented workforce. Many technology-related workers will no longer have to pay provincial income tax on the first \$100,000 a year earned through stock-option benefits and

Firms making investments today increasingly place a high priority on the speed and efficiency of government approval and permitting processes.

related capital gains. All of these measures are evidence of the government's efforts to help high tech companies attract skilled workers and discourage high-skill workers from moving to the U.S.

Other challenges that arise out of Ottawa's business culture pertain to the city's ability to respond to the growing infrastructure needs discussed above. Some business leaders involved in the Economic Generators Initiative feel strongly that the region's planning and permitting processes are too complex and inefficient, slowing needed expansions. As the plans and procedures of the new city are developed over the next few months, leaders will want to keep in mind the kind of calculations that firms in the New Economy make when they consider investing in a community. They want a good education system, good infrastructure and a high quality of life. Of course, every community claims they have what the companies want. But the rewards of new investment will flow to those cities that not only can *demonstrate* what they offer (many can), but who can also provide these inputs fairly and efficiently.

Quality of Life

Ottawa's renowned quality of life is obvious to any visitor. It is a beautiful city, built on a human scale, with all the cultural attributes of any large city and with easy access to parks, clean lakes, rivers, and other recreation attractions. A 560-square kilometre national reserve, the greenbelt offers an abundance of outdoor activities and makes Ottawa one of the "greenest" large cities in the world. In 1994, Ottawa was ranked the best city in Canada by *Chatelaine* magazine, measured in terms of crime rates, air quality, job prospects and green space. More recently, the city was ranked by an international consulting firm, the Corporate Resources Group, sixth in the world in a composite index of green space, job prospects, air quality and crime rates.

Indicators of quality of life are notoriously problematic. Yet there can be little doubt that Ottawa compares favourably with other high tech regions in measures relating to art, culture, recreation and leisure time. Obviously, on indicators relating to climate the region does not measure up well to U.S. sun-belt cities but not badly to the wetter and colder high tech regions (e.g., Seattle, Portland, Minneapolis, Boston, New York). Environmental measures would be another area where Ottawa excels. Carbon monoxide emissions in Silicon Valley, for example, were six

times those in Ottawa in 1997 and 1998 and ozone depletion was nine times greater in Silicon Valley.

Ottawa's strategy in the quality of life area must be to continuously seek balance between economic growth and environmental protection. This means thinking about economic growth and community development simultaneously. Other fast-growing communities are doing so by adopting a "smart growth" development philosophy, a planning paradigm that would be appropriate for Ottawa at this point in its development.

Conclusion

This report finds that Ottawa's economic foundations are relatively strong; their impact on the economy accounts for much of the region's economic prosperity.

Ottawa's economic foundations are relatively strong and their impact on the economy accounts for much of the region's economic prosperity. With its highly educated population, its science and technology institutions and the region's high quality of life, Ottawa is well positioned for the future. However, leaders should be concerned about several areas discussed above.

Continued workforce shortfalls could end up being economic development "showstoppers". Creative thinking will be required to find the highest and best linkage between the NRC, CRC and other public technology institutions and the economy. Steps will be needed to mobilise Ottawa's successful entrepreneurs, and their wealth, putting both to work to ignite new enterprises. Infrastructure constraints must be addressed, particularly making sure that land and office space is available for expanding firms and new comers. And issues impeding the airport's expansion need to be addressed. While the region's business climate has been improved with the recent tax measures of the Provincial and Federal Governments, leaders should keep an eye on trends that would make the region's tax burden so non-competitive as to stifle investment or force companies to relocate. Finally, community quality of life must be considered to be as important to future economic development as the availability of venture capital, presence of skilled workers or adequacy of infrastructure. Already, communities across North America are competing for scarce human talent on the basis of community features such as nightlife, recreation and the presence of arts and cultural attractions.

5. Flagship Initiatives

More than just a study, the Economic Generators Initiative has been designed to “kick-start” new economic development thinking and new activity across the region.

The Economic Generators Initiative has been designed from the start to be more than just a planning exercise. Section 4 presented, for each of seven clusters, a set of action initiatives designed by cluster leaders through a collaborative strategy process. Some of these initiatives are already moving forward through the efforts of the “champions” of the initiative. Others however will require further development before they are ready for even the first steps toward implementation.

For the Economic Generators Initiative to be truly successful, however, it needs to have “kick-started” the implementation of more than a handful of cluster-specific actions. The analysis suggests the need for the entire community to move forward in several areas related to the region’s economic foundations—human resources, financing, physical infrastructure, and the like. Specific recommendations in these broader, thematic areas are referred to as “Flagship Initiatives”. Nine Flagship Initiatives have emerged from the collaborative strategy element of the Initiative and are discussed in this section.

What are Flagship Initiatives?

Flagship Initiatives are defined as public sector, private sector or partnership actions that will positively impact the competitiveness of a broad component of the economy. They differ from the cluster-specific initiatives of Section 3 in that they are comprehensive, targeting issues such as institutional reform and are potentially more difficult to implement. Because of their scope or complexity, Flagship Initiatives could also be relatively costly to implement.

The nine Flagship Initiatives discussed in this section are viewed as high priority recommendations. All of these recommendations will require, first, further conceptual development and then a community-wide effort over a relatively long period of time in order to realise concrete results.

The nine Flagships fall into three categories:

1. New institutional approaches—new methods for stimulating economic growth and competitiveness
2. New “soft” infrastructure—new inputs for more competitive firms
3. New “hard” infrastructure—new facilities to make the entire region more competitive

The nine proposed Flagship Initiatives are discussed below under these three categories of activity.

1. New Institutional Approaches

“Brand Ottawa”: A Sophisticated Marketing Initiative

In order to sharpen the region’s international image, Ottawa needs to market or “brand” itself to better reflect its true business and visitor assets.

Opportunity

Ottawa can lay claim as one of the world’s most rapidly growing and vibrant high tech professional services and tourism centres. In fact, there might only be a few regions in the world that can claim Ottawa’s technological diversity and it is possible that the region’s telecommunications-related capacity is unmatched. But only recently has Ottawa begun to be recognised for its technological prowess, and then mostly in other high tech regions where Ottawa’s firms are finding common cause—strategic partnerships, supplier relationships, and venture investments. In this context, it is unfortunate that the national and international media has defined Ottawa as Canada’s capital city, and little more.

Ottawa faces tough competition from high tech centres around the world for talented workers and investment. To position the region for success in this competition, Ottawa needs to take steps to further develop its reputation and image as a place of high tech excellence. Marketing, in particular “branding” Ottawa as more than a capital city emerged in the cluster working group process as one of the highest priority challenges facing the region.

General Approach

This initiative calls for a comprehensive strategic branding initiative involving all seven clusters. The expected

outcome is a sophisticated “market communication plan” designed to influence targeted audiences in specific ways (e.g., VC investors to seek out business opportunities, skilled workers to seek out job opportunities, suppliers to seek out business relationships, visitors). The plan will be based on a clear and distinct definition or “brand” of Ottawa as an innovative, attractive, high tech region. Two levels of planning will be incorporated, an overarching branding plan for the region as a whole and eventually, a customised plan for each individual cluster.

The branding exercise will have four phases:

Phase I—Develop Overall Approach and Basic

“Message Outlines”: The first step will focus on identifying best practices in other cities/regions, working with leaders from the seven cluster groups on desired overarching “branding” messages.

Phase II—Opinion Research—Identifying Baseline

Case: This phase will focus on researching the prevailing awareness and perceptions of Ottawa, market-by-market. When compared to the basic message outlines of Phase I, the “gap” between the perceived image and actual situation will be understood, market-by-market.

Phase III—Develop Marketing/Communications

Strategy: With the base in place, this phase will include cluster-specific brand/communications planning sessions focused on identifying target audiences (geographic and other market segments), positioning objectives, development of messaging strategies by audience, development of strategies/tactics, pilot testing of branding messages and final communication plan.

Phase IV—Implementation: Phase IV will focus on full implementation, securing the necessary funds, and the communication plan.

Potential Sources of Leadership

OED will provide the lead on this initiative. Every cluster will select a member to serve on a multi-cluster team that will work on both Ottawa region branding and specific cluster branding. It is expected that program “stewardship” will be offered by TOP as well by the

individual cluster groups. A steering committee, with representatives from each cluster, will provide strategic direction. Stewardship provided by the private sector, especially from the cluster co-chairs, will be key to the success of this initiative.

Potential Sources of Funding

Private and public sector cost sharing formula

Technological Listening Posts: New Roles for the NRC and other Science and Technology Institutions

Opportunity

In the face of funding restraints, the NRC needs to reposition itself and key activities so it can better play its role in local economic development.

Ottawa's high tech clusters have benefited substantially from the NRC's creative venturing in new technologies. It would not be much of an overstatement to say that the NRC has been one of the key cornerstones on which the region's high tech economy is built. However, with cutbacks in government funding, the NRC has been resource-constrained for more than a decade. As a result, the NRC (and other government S&T institutions) has weakened in terms of its competitive positioning, its ability to invest in new venture areas, and its capacity to attract and support creative minds. This initiative calls for public and private sector support for a new role for NRC—fostering the exploration of convergent and divergent frontiers of next generation technologies. In this way, the NRC and its partner S&T institutions will increasingly serve the local economy as a “technological listening post”, developing information at the leading edge of technology development, worldwide. In this role, the NRC can both advance its traditional mission as well as play a new supporting role in the local economy. When describing this initiative, NRC's leaders use the analogy of an icebreaker opening the way through which others can pass. Operating at the frontiers of knowledge, the NRC and its partner institutions can be an invaluable source of technological intelligence. Putting the intelligence to work will require strengthening the linkages between institutions and the region's economic clusters.

General Approach

The broad approach would be based on a consortium, similar to those NRC has pioneered for solid state optoelectronics and software engineering. A selected group of future technology “scouts,” strategic planners and research leaders from around the world would be responsible for keeping abreast of cutting edge research and development. This group would serve to filter relevant information to the clusters and would maintain a constant outlook on competitive opportunities, as well as threats inherent in the technical challenges of the next generation and beyond. In essence, they would constitute a pool of intellect accessible to all the clusters, and they would serve as an important building block for innovation and collaboration. Their information could be posted at a web site or portal that would serve as a gateway to the intelligence collected.

The project could be directed by the NRC, but it would require an independent financial accountability system in order to ensure flexibility and agility in responding to new venture opportunities. OCRI’s model, which secures support for new opportunity areas with a base of public funding and membership fees, may serve as a useful example.

Potential Sources of Leadership

- NRC
- Leading technology companies
- Local science and technology institutions
- Cluster co-chairs

Potential Source of Funding

Public-private partnership working with a cost sharing plan involving NRC, other institutional sponsors, and private firms.

“Smart Growth”: Building Smartly to Ensure Sustained Economic Growth

Continued rapid economic expansion is highly likely; growth pressures on the region’s infrastructure must be addressed “smartly” with new thinking and new approaches.

Opportunity

Ottawa’s strong economy has stretched key infrastructure elements to the limits. There is little office space available in parts of the region favoured by the high tech clusters. Business leaders are concerned that the large tracts of land necessary for major expansions are not being made available at the rate demanded by economic expansion. Traffic on the Queensway is congested at the rush hour to the point that firms are probably experiencing productivity losses. Airport expansion has been planned in the face of demand but financing issues may hold up the necessary expansions.

For continued economic growth and prosperity, Ottawa must move quickly to address today’s infrastructure constraints and prepare for the pressures tomorrow. It would be unwise to simply allow developers to build what needs to be built. Silicon Valley is testament to the risks of sprawling physical development that has made the housing-mismatch worse than the case 20 years ago. Instead, Ottawa needs to adopt a “smart growth” philosophy and drive planning with economic projections, not simply forecasts of more population.

With seven clusters identified as the most likely engines for future growth, land use, servicing and transportation planning can now be based on the known needs, and projected growth of firms in these clusters. In this way, Ottawa can customise its plans to meet cluster needs, ensuring that the engines of the economy are kept strong.

This initiative has several components:

Airport Expansion

As markets develop around the world, air travel plays an increasingly key role in Ottawa’s economy. There is increasing demand for new non-stop flights to places like San Jose and more frequent flights to other business centres. But the Ottawa airport is near its limits; current demand exceeds the capacity of existing facilities.

Lack of expansion of the airport has been identified by many business leaders as a potential economic “show-stopper”.

General Approach

The general focus is on a \$300 million expansion effort by the Ottawa Airport Authority. Plans are already well along. Under this initiative, an ad hoc Economic Generators Initiative working group will be formed, comprised of key leaders from TOP and the cluster working groups. The group’s mission will be to prepare an analysis and generally assist the Ottawa Airport Authority develop a forceful “economic logic” to help advance the expansion. This group can also act as a sounding board for a number of airport expansion issues, such as:

- Development, from the perspective of the clusters, of requirements for a new terminal (high speed internet, automatic pre-clearance for international passengers, meeting/demonstration rooms and display areas, automatic billing for parking with pre-paid user card or credit card)
- Identification of themes for airport architecture, or displays “celebrating” historically important Ottawa inventions and products
- Provision of input to airport executives on issues related to new flights, routes, and airport services
- Development of plans for involving airport executives in the recruitment of new companies, with the Brand Ottawa initiative, and in other economic development activities

Long-range Physical Infrastructure Planning

Long-range planning is difficult when local economies are changing fast, as is the case with Ottawa. Nevertheless, planners need to be strategic and consider the many forces at work in the economy. Cluster analysis provides a new basis for land use, service and transportation planning. Knowing which clusters are growing, and something about their typical needs for personnel, for facilities and for land provides a framework, or benchmark for establishing land use and other plans.

General Approach

The initiative will establish a mechanism that brings cluster leaders and government planners together on a continuing basis. Working under the stewardship of TOP, this working group, perhaps comprised of cluster co-chairs and including long-range planners from the City, could begin by developing a “Cluster Competitiveness Infrastructure Planning Framework”. The framework would outline cluster trends and their impacts regarding infrastructure and space, cluster-by-cluster. Other critical needs would be set forth through this process as well (e.g., changing needs for more streamlined development and permit processes; the need for more government agility and flexibility to meet changing needs of cluster firms.) Through this process, government would have access to top-level business leaders who are in the best position to understand the dynamics of their industry. These leaders should be a continuing source of long-range “planning intelligence”. This information should be used as *economic input* to the planning processes whose inputs are now largely grounded in changes in population and land use. With this source of economic input to a long-range infrastructure plan, Ottawa can move towards the “smart growth” planning paradigm being adopted by an increasing number of technology-intensive, fast-growing communities.

Potential Sources of Leadership

- Ottawa Airport Authority
- City of Ottawa
- Cluster co-chairs

Potential Sources of Funding

Appropriate government agencies

“Reinvigorating Ottawa”: On-Going Strategic Planning and Action

Strategic planning is not a project; it is an on-going process.

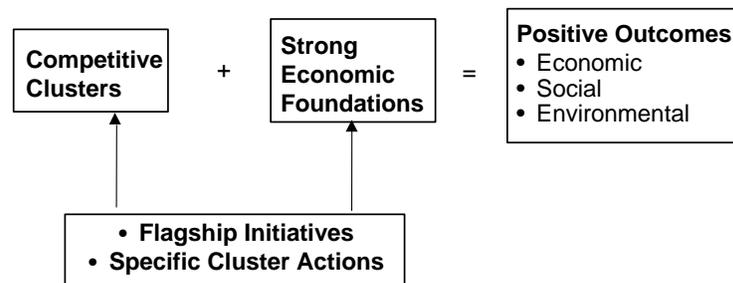
Opportunity

Sustaining the momentum built up during the Ottawa Economic Generators Initiative will require a new

framework and information system to track progress. This Flagship Initiative will outline the key dimensions of the system, which can be used to follow the progress of the action plans and flagships developed during the Initiative and to monitor the most strategic aspects of the Ottawa regional economy.

General Approach

The general approach for benchmarking the Ottawa regional economy reflects the critical role of cluster competitiveness in generating positive regional outcomes, and the importance of strong economic foundations in supporting cluster competitiveness. The cluster action plans and cross-cluster flagship initiatives are designed to deepen and broaden the structure of the clusters, and/or to strengthen specific economic foundations.



Thus, a linkage must exist between the monitoring of the economy and the monitoring of the actions coming out of the Economic Generators Initiative. The monitoring system should have the following elements:

1. Monitoring Ottawa’s regional economic performance
2. Assessing Ottawa’s cluster structure and performance
3. Assessing Ottawa’s economic foundations
4. Assessing the progress of flagship and cluster initiatives; assessing the need for new flagship and/or cluster initiatives, and a revised strategy effort

1. Monitoring Ottawa’s Regional Outcomes

The analysis summarised in Section 2 of this report dealt with the outcomes of the region’s economic generators, or the region’s economic “bottom line”. Monitoring Ottawa’s performance in measures such as employment, per capita income, location quotient (evidence of clustering), should be the first priority of the monitoring

system. These and other measures indicate whether or not the region is potentially entering a difficult period, or, on the other hand, is surpassing its objectives.

The analysis found in Section 2 focused primarily on traditional economic outcomes, but there are good reasons to consider expanding the range of indicators examined under “regional outcomes”. The economic vision of an Innovation Economy embraces the notion of *sustainable advantage*, which in turn suggests cluster and economic development objectives that include meeting environmental and social, as well as economic goals. Regions are increasingly recognising the interdependence of the three: not only can environmental and social decline disrupt the political consensus behind growth policies, but growth itself in the New Economy increasingly hinges upon a quality environment and the full utilisation of human resources associated with maximum social opportunity.

Thus the three key concepts which inform this broader approach to regional outcomes include:

Economic Prosperity (e.g., job and population growth, relative wages and income, growth in real wages and income). As was done with most of the analysis in this report, comparative regions in the U.S. and Canada should be chosen for benchmarking. Comparative as well as time-series analysis will be important because cyclical economic effects will create economic up- and down-turns for reasons that the region has little control over. However, if and when the region significantly changes vis-a-vis the set of comparable regions, this may be indicative of changes in regional competitive advantage, which are heavily based on actions taken or not taken at a regional level by cluster leaders. On the economic side, much work is already being done within the region, and by Canada-wide bodies, such as the Conference Board, which are concerned with metropolitan and urban issues.

Environmental Sustainability (e.g., measure of air, water, and land pollution by source; measures of land consumption vis-a-vis growth; toxins in the environment). Environmental data such as this is an important adjunct to new economic development modes recommended in this report, but is difficult to develop at the regional level.

Social Equity and Opportunity (e.g., poverty rate, labour force participation rate, income inequality, income differences by race, ethnicity, and gender). These data, whose interpretation is straightforward, are typically available only on a five-year basis in Canada, through the Census.

Potential Sources of Leadership

- City of Ottawa/Economic Affairs Office

Potential Source of Funding

- City of Ottawa

2. Assessing Ottawa’s Cluster Structure and Performance

Ottawa’s clusters are its economic generators, the ultimate private sector determinants of its overall level of economic prosperity, and important contributors to environmental and social outcomes as well. During this Initiative, Ottawa’s clusters were identified as groups of related industries in which Ottawa is unusually specialised. The precise methodology was described in the document entitled “Identifying Industry Clusters in the Ottawa-Carleton Region”. This methodology should be updated, using current data, every two years.

An important part of the region’s industrial structure is its pattern of emerging industries. During the Economic Generators Initiative, new media, film, and environmental services were identified as emerging industries. A useful criterion to define emerging industries is: industries growing five per cent per year or faster, and growing five per cent per year *faster* than the same industry in Canada. Thus, emerging industries should not only be defined as new sources of jobs, but as indicating new sources of competitive advantage in Ottawa. Collaborative strategy processes similar to those of this report should be considered for these industries.

3. Assessing Ottawa's Economic Foundations

Another important part of the analysis was the benchmarking of Ottawa's economic foundations, which ultimately drive the competitiveness of its economic generators. Six categories of foundations are particularly important: technological resources (patents, R&D); human resources (educational attainment, number of scientists and engineers in the workforce, unemployment / underemployment rates); financing (venture capital deals and amount invested); quality of life (arts and recreational amenities; health care; cost of living); and business climate (cost of business; tax rates; industry-specific regulation).

4. Assessing the progress of flagship and cluster initiatives; assessing the need for new flagship and/or cluster initiatives, and a revised strategy effort

The major outcome of the Economic Generators Initiative was a series of initiatives and champions organised around the recognised challenges of each of Ottawa's clusters. An important early implementation step will be creating specific objectives and milestones for each initiative. The implementation team, whether it be for a flagship or cluster initiative, should be encouraged to report to TOP on progress made and barriers encountered, on a semi-annual basis. Every two years, the quantitative analysis and benchmarking work described above should be presented to TOP to assess if conditions in the cluster are changing, if current initiatives are effecting change, and if new initiatives or a larger strategy process are necessary.

2. New "Soft" Infrastructure

In the face of labour shortages, Ottawa must move forward with innovative approaches to re-skill residents to meet the job skill needs of cluster firms.

"New Skills for Ottawa": Next-Generation Approaches for Meeting Job Skill Requirements of Employers

Opportunity

Increasing difficulties in developing, attracting and retaining qualified workers present significant challenges to all the clusters. Recruitment costs, coupled with opportunity costs of not utilising local resources, are a

significant impediment to enhancing the region's economic competitiveness. However, there is evidence of untapped workforce skills in the region, particularly in the unemployed/underemployed immigrant population. There are other sources of labour as well. For example, as Ottawa's need and reputation for offering quality jobs grows, the region can expect to attract new workers from the broader region and to re-direct workers to local companies rather than losing them to the international job market. Wherever new workers are found, they will need customised job skill training.

Successful program delivery models such as Partners for Jobs, VITESSE and OCRI's Technology Resource Initiative can be expanded. It should be noted that goals of the "Branding Ottawa" and "Global Learning Centre" are supported and reinforced by this initiative.

General Approach

In order to address the challenges of developing, recruiting and retaining skilled workers, especially in the high tech industries, coordinated workforce development or "people infrastructure" should be undertaken. In the long term this coordination should ensure that talent pool gaps are identified, programs are set up to address these gaps and that an accountability and feedback mechanism is clearly established between the demand and supply sides of "New Skills for Ottawa". In the short term, three projects are recommended:

1. An education and training "portal" designed to provide information to potential employees and students.

As a part of the Gateway Ottawa flagship initiative, this specialised site would provide training information to potential workers—from both outside and inside the region—for the region's clusters. It could contain the following:

- Education and training information database, organised by occupation and general skill sets and referencing all public and private sector sources of job skill training

- Quality assurance standards and “seal of approval” for Ottawa training institutions
- Specific labour market information links to HRDC Ottawa
- Employment and counselling tools with links to related sites (HRDC)
- Other information: government, youth, volunteer, internships

To the extent possible, this Internet-supported information portal should be “informed by” the needs of the region’s clusters. This means that cluster-specific needs and organisational references be provided (e.g., references to cluster network organisations such as OLSC, OPC where additional information would be available).

Potential Sources of Leadership

- OCRI (for information on co-ordination and program models as well as local workforce/training resources)
- OED (for “portal” outreach to prospective employees)
- Cluster co-chairs
- Post secondary institutions
- HRDC
- Ministry of Education
- Ministry of Training, Colleges and Universities (MTCU)
- Partners for Jobs committee
- Joint private sector-academic-government partnership

Potential Sources of Funding

- HRDC
- City of Ottawa
- Ministry of Education (MOE)
- MTCU
- Private sector educators and trainers

2. A customised re-skilling program

The second part of this initiative envisions customised re-skilling programs that cater to cluster-identified skills gaps. This approach is already being developed by the Ottawa Photonics Cluster (OPC) and once fully developed would be transferable to other clusters. Key

implementation steps of the program are suggested by the initiative being pursued by the OPC:

- Identification of supply-side partners –in the private sector, colleges and universities. Process would require a neutral broker to link these and other supply-side partners and co-ordinate activities. For the OPC, this partnership took the form of a Memorandum of Understanding between cluster companies, Photonics Research Ontario, VITESSE and OCRI
- Private sector initiative to identify the skills gaps
- College and university initiative to identify current course offerings related to skills gap
- Work teams of partners to develop action plans to create customised training modules

Potential Source of Leadership

- OCRI-Vitesse partnership
- Cluster co-chairs
- Partners for Jobs committee

Potential Sources of Funding

- Private Companies
- City of Ottawa
- HRDC
- Ministry of Training, Colleges and Universities (MTCU)
- Ministry of Economic Development and Trade
- Industry Canada

3. CEO-Education Compact

One of the problems faced by the post secondary institutions is the speed at which the private sector needs change for new workers and skill sets. Leaders of the universities and colleges feel that by the time they have just begun to respond to private sector needs with new curriculum and training, companies tell them that they have new needs. From the perspective of the firms, markets are changing, competition is fierce, and new workplace “process” technologies hit them fast. If the demand side, the private sector, can barely keep up with the skill needs, it is understandable that the supply side,

the post secondary institutions would find it nearly impossible to do what is expected of them.

An answer to this conundrum may lie in building a new kind of communications infrastructure between companies and the institutions. Because the Economic Generators Initiative has mobilised a number of CEOs and senior officials of the region's universities and colleges, it might be possible to construct a CEO-Education Compact that takes the form of a new, high-level communications forum linking the "demand side" to the "supply side" of the education and training issue.

This part of the initiative calls for the establishment of such a Compact, beginning first with a working group of CEOs and education leaders who would work to outline key details of the issue and generally start designing the initiative.

Sources of Leadership

- CEOs active in the Economic Generators Initiative
- Presidents of the post secondary institutions
- OCRI

Potential Sources of Funding

- Universities/colleges
- Private Sector companies

"Global Learning Centre": Positioning Ottawa as a Place of Learning and Knowledge

Opportunity

Ottawa is well-positioned to take advantage of emerging market opportunities for corporate-focused education and training.

In today's knowledge-rich economy, economic rewards are increasingly going to those regions developing new education and training methodologies. A key trend is found in the fast-growing demand for corporate training needs, estimated to be a \$50 billion a year market in North America. Many major companies and organisations (including Fortune 500 companies, public enterprises, and the military) have large training centres. These centres train workers in specialised needs ranging from management to the application of specialised technologies

in almost every sector.

As the need for lifelong learning increases, private sector training institutes will generate new jobs and new sources of economic wealth as firms seek sources of specialised training. In this context, regions that can claim excellent public sector institutions, as Ottawa can, and are developing other training capacities will be well positioned for success in the future.

There is potential to capitalise on the growing market for training, which could take several directions. For one, many employers are moving to new E-training strategies. Ottawa's Global Learning Centre's market niche could be the use of advanced electronic training delivery mechanisms. Markets for state-of-the-art learning include:

- Self-directed learners
- Employer-provided learning
- Customer training
- Support for distance learning

Ottawa could be well positioned for success in several of these markets. For example, "self-directed" learners tend to want to network with managerial or other specialists and would be attracted to those regions, such as Ottawa, where such specialists are concentrated. Ottawa's Global Learning Centre could position itself in the market relative to the region's cluster strengths to take advantage of opportunities for "employer-provided learning". In this way, the Global Learning Centre would link the "learning and the learner" in innovative ways. Ottawa's successful business culture and reputation in tourism services, could be a draw for "customer training". Finally, with Canada's vast interior, Ottawa's niche could be support for distance learning.

The Global Learning Centre concept should be viewed in a developmental way. While the concept could begin with a facility offering private sector-oriented training programs, the goal should be broader and more visionary. By leveraging the region's excellent educational and research institutions, the presence of leading companies, and the new Training Centre, Ottawa could establish itself as one of the world's leading "regions of applied learning"

much as Oxford and Cambridge in the U.K. have been marketed.

It should be noted that this initiative also supports and reinforces the goals of the “New Skills for Ottawa” and “Technological Listening Post” Flagship Initiatives. As these idea move toward implementation, opportunities should emerge for cross-initiative synergy.

General Approach

Conceptually, and at the outset, the Global Learning Centre should be marketed as a training delivery mechanism. The primary focus would be a business-like model designed to attract to Ottawa thought leaders from around the world for short courses (a few days to a few weeks). Special marketing features of the Centre could include a market offering of both excellent content and excellent facilities.

Excellent Content

Ottawa has, within its borders, a critical mass of technical experts from two sources. First, the knowledge capacities represented by the four institutions of higher learning and the science and technology centres could play a large role by providing a source of specialised training content (professor/consultants). Second, excellent training content can be found in certain clusters (consultants, “training mentors” from firms). Experts could be mobilised to support the Centre from the four technology clusters for sure as well as from the professional services cluster. This model envisions a virtual centre. Examples include University of Phoenix, Athabasca University, and perhaps the NCIT. Leaders should look at how Austin leverages the presence of Motorola University with the presence of the University of Texas in ways that benefit the high tech community overall.

Excellent Facilities

If not a virtual training centre as described above, other models have been successful by building especially good training facilities to attract corporations and individuals to travel to the region as the preferred location for learning. Examples that may serve as useful models are Austin’s Motorola University, Andersen University and the Price

Waterhouse Coopers Development Centre. These models include custom designed, state-of-the-art facilities.

Algonquin College has recently taken an important step toward establishing a \$10 million training facility in Kanata that would respond to the growing demand for customised training for the high tech community. Leaders of the Global Learning Centre Initiative should discuss with Algonquin opportunities for partnering, perhaps linking the two initiatives.

As for marketing, leaders of this initiative should consider putting forth the best Ottawa has to offer:

- A vibrant multicultural, private-public, easily accessible business setting
- An outstanding array of recreational, athletic, dining, and cultural attractions
- Electronically equipped, multilingual translation classrooms, technology, learning centre and self-study networks
- Excellent technical and professional support for business clients
- Key international agencies (lenders, NATO, associations)
- Government training facilities
- Universities, professions and training content providers
- Global and large employers (e.g. Fortune 500)
- Local businesses and professional organisations
- Cultural organisations and communities
- Information technology providers
- Recreational, transportation and support services
- Investors

Potential Sources of Leadership

Implementation would begin with the formation of a Global Learning Centre Task Force, comprised of several members of the professional services cluster, along with executives of universities, colleges and local agencies. TOP would need to play an important role articulating the vision and advocating for the initiative.

Potential Sources of Funding

Funding would require creative thinking, but most likely would require funding partnerships involving:

- City of Ottawa
- Local universities, colleges
- Ministry of Training, Colleges and Universities (MTCU)
- Industry Canada
- Infrastructure for New Economy Initiative
- Private sector

“Igniting Enterprise”: A Call for Private Sector Action and New Business Formation

Opportunity

Ottawa has a rich history of government-funded technology turning into products for commercial markets. But more can be done to develop a strong “culture of innovation” in the region.

One important mark of vibrant and successful high tech regions is a constant generation of innovation and ideas with market potential. But good ideas and innovation are only one part of the equation. Venture capital, savvy management, and efficient operations are all important as well. While Ottawa has a long history of success turning research concepts into commercial success, some leaders in the technology community feel that more can be done to foster a comprehensive “culture of innovation” in the region.

While Ottawa has an abundance of high technology firms, the reality is that many cities of Ottawa’s size in Canada and the U.S. have a growing high tech sector. What Ottawa needs is to build more of a critical mass of technology-intensive firms. Some of this critical mass will come from acquisitions of the kind that JDS Uniphase has made. And while take-overs of Ottawa firms, such as Alcatel’s recent acquisition of Newbridge Networks, can add to the region’s critical mass, what the region needs to focus on is more entrepreneurial start-ups. Venture capital is key to meeting this challenge and, as Section 4 illustrated, Ottawa is seeing increased venture investing. Building critical mass of the kind that can propel the economy forward will require significant increases in

venture financing and an array of other new supporting mechanisms for fledgling entrepreneurs.

Historically, business incubators have been seen as an important mechanism for helping move from good ideas to successful businesses. Ottawa has a few incubator facilities; it also has the Entrepreneurship Centre. But what leaders in other regions have found is that programs and facilities are not as important as the presence of networks of individuals, services and their methods of working together that comprise a culture of innovation.

Essentially, this initiative is a call to private sector action. Ottawa has a growing number of “new enterprise consultants”, venture capital funds, and networks of successful business leaders seeking to mentor entrepreneurs. An increasing number of these people are individuals who have become wealthy through local IPOs, mergers and acquisitions. Already there are signs of new (often Internet-based) angel investor networks, and their supporting systems. Ottawa should build on this momentum and look to these and other private individuals to work together toward the concept of a regional “incubator without walls” to help ignite enterprise formation.

General Approach

This initiative could follow an emerging trend in business acceleration that is found in innovative regions such as Austin and Silicon Valley - the integration of savvy business people, venture investors, business mentors, with the various networks and support systems relied upon by each. Firms such as Austin’s Software Atelier, Silicon Valley’s OnSet and a host of others provide models to examine for potential application in Ottawa.

Traditionally, incubators provided physical space and basic office support and venture capitalists provided financing. Increasingly, venture capital firms establish a complete “safety net” around their investment, often including high quality management teams for each investment drawn from the VC firm’s network. Operating more informally than formally, these networks provide a matching service for entrepreneurs and investors and, when a venture is funded, they nurture the enterprise until

such nurturing is no longer needed. Examples of this model of business mentoring include the garage.com and venturefrogs.com firms from the San Francisco area. Canada's own Inno-centre in Montreal is another example, which also has a branch in Ottawa.

What is envisioned with this initiative is *accelerated private sector initiative and new enterprise formation*. The emphasis is on the networking of private individuals so as to create multiple paths, including interactive web sites, through which entrepreneurs can access expertise on business formation and venture capital. The networks should be designed to link an array of specialists with the entrepreneur and his team, including legal, accounting, marketing, and operations.

This largely private sector initiative would help accelerate new business formation by:

- Aiding individuals in planning, preparing business plans
- Assisting in due diligence for both entrepreneurs and investors
- Aiding in the preparation of commercialisation strategies
- Screening opportunities for those with the greatest business potential
- Providing a network of industry-specific and generalist technical experts to serve as advisors, technical assistants, mentors

The broad goal is to create a regional “incubator without walls” — a vibrant and sometimes frantic level of activity and ideas, start-ups, collaborations, and spin-offs across the region that would result in more economic dynamism, more jobs of higher quality and more prosperity for all.

Potential Sources of Leadership

TOP, which includes a number of private sector business leaders who have access to other “civic entrepreneurs” can play a key role by articulating the “call to private sector action”. While the action would be *largely in the private sector* and thus not very publicly visible, the Ottawa Capital Network can play a coordinating role, as can OCRI. The Entrepreneurship Centre can help link

investors to qualified business opportunities. OED can play a role interfacing with venture capitalists outside Ottawa to alert them/attract them to opportunities in Ottawa.

This idea has already surfaced among the region's angel financing community where "champions" could be found to take the idea forward.

Potential Sources of Funding

Funding would come mostly from the private sector, but partnerships with the public sector could work to the benefit of both the public and private sectors. Potential partners could include:

- Infrastructure Fund for New Economy
- Ministry of Training, Colleges and Universities (MTCU)
- Canada-Ontario Business service Centre (COBSC)

3. New "Hard" Infrastructure

"Ottawa Connects": A Far Reaching Telecommunications Initiative for the 21st Century

Fibre-optic infrastructure is expanding in Ottawa, but the region should move beyond the basics and build an advanced telecommunications infrastructure for the 21st Century.

Opportunity

Advanced telecommunications and computer technology is rapidly changing the way people live and work. The Internet, personal digital devices, mobile phones and whole range of similar products and services not available only a few years ago is vastly improving information flow, which is bringing increasingly higher levels of productivity to those people, firms and institutions who are "connected."

With its large and growing telecommunications cluster, Ottawa plays right into this information/connectivity revolution. Many of the core technologies have come from the region's science and technology institutions while cluster companies are producing the products that stem from the technology. While fibre-optic networks are a growing part of the Ottawa infrastructure, the region has

a growing part of the Ottawa infrastructure, the region has the opportunity to go beyond the basics and build a broadband telecommunications network for the 21st Century. An advanced information network infrastructure, as envisioned, can be likened to the basic road and highway infrastructure built in the early years of the 20th Century. Electronic connectivity—of people, enterprises and institutions—will likely have the same kind of stimulating effect on innovation and economic development as did the basic transportation networks built nearly a hundred years ago.

Ottawa has already sketched the outlines of the proposed new infrastructure. The Ottawa Metropolitan Area Network is an exciting concept involving scientists and engineers working for the community under the guidance of OCRI. The primary objective of OMAN is to foster broad-based economic development through “next-generation” Internet applications and services. OMAN would enable greater information sharing and thus the development of a wider range of increasingly advanced applications. More rapid access to information and research and heightened collaboration between people, firms and institutions would stimulate spin-off entrepreneurial activity, higher productivity and new thinking at Ottawa’s world-class institutions like the NRC, CRC, Carleton University and the University of Ottawa.

General Approach

OMAN could potentially be a private telecom service initiative. Several such municipal networks are already established in other urban regions. However, as a private initiative, OMAN would require waiting for a service provider to identify the technology, train workers and identify the value proposition. Under this scenario, Ottawa would be years behind other global technology centres.

An alternative, quicker approach to launching OMAN is to take advantage of existing community initiatives and resources. Examples include:

- The OCRI-led Ottawa Dark Fibre Initiative, which will connect 14 institutions in Ottawa to a high speed optical network, due to be launched in the fall 2000

- The SmartCapital initiative, a \$13 million program to develop 15 or more online services for government, education and business.

As currently planned, OMAN will be designed as a not-for-profit metropolitan network, open to all community participants. With the Dark Fibre Initiative as the starting point, the next step will be to build toward the full OMAN concept, including switching capability. With advanced switching, broadband connectivity will be much more affordable to a larger proportion of the community. To encourage the development of next generation Internet activities, OMAN will provide free municipal transit to all community Internet Service Providers.

Perhaps one of the most important outcomes of this initiative will be the creation of a collaborative and innovative common place - a virtual “Ottawa workplace” bringing together otherwise relatively isolated institutions and individuals and encouraging the facilitation and exploitation of rapidly emerging new discoveries. This virtual workplace, because it is highly “portable” and configurable, can be showcased to venture capitalists or other potential investors anywhere in the world. In this regard, the SmartCapital initiative already has funding for three showcase sites (the New City Hall, OCRI, and the Media Centre). As a part of the SmartCapital initiative, these sites will be connected via the OMAN fibre optic network to major research organisations to demonstrate Ottawa’s leadership in using the local area’s private sector Internet technologies to build advanced applications.

With the OMAN and SmartCapital initiatives Ottawa is already moving ahead of many cities to build a high-speed infrastructure and advanced communications services. Now community leaders need to expand on the concept, invest public and private resources as necessary and create one of North America’s most advanced telecommunications networks.

Potential Sources of Leadership

To accelerate the development process, The Ottawa Partnership (TOP) will need to put its weight behind the initiative, and advocate at all levels of government and

within the private sector. At the practical level, OCRI can provide the initial lead but once established, OMAN could operate best as a separate organisation from OCRI, with its own Board of Directors (the current Dark Fibre Consortium could evolve into the OMAN Board). With TOP advocating at the highest levels and with a visionary and forceful Board of Directors, OMAN could move quickly from what is now mostly concept to reality.

Under the guidance of TOP, OCRI should take the lead to work with the Dark Fibre Consortium, industry partners and other interested participants to develop a comprehensive business plan and design for the advanced network. The business plan will define the potential partners, network design features, funding requirements and governance plan.

Potential Funding Plan

Funding for such a comprehensive, and potentially expensive initiative would most likely come from federal, provincial and local government sources, in partnership with private investors.

“Gateway Ottawa”: Using the Internet to Link Ottawa to the World

Opportunity

Many business leaders feel that Ottawa’s low visibility as a centre of high tech excellence and visitor amenities impedes the attraction of firms, venture capitalists, new workers, and tourists. Moreover, when outsiders think of Ottawa as a place for a career or to invest, gaining access to the right partners in the region is difficult. This initiative seeks to address this communications challenge by relying on powerful Internet technologies. Specifically, Gateway Ottawa is designed to build an Internet “gateway portal” to enable faster, more informed responses to the enquiries of outsiders. Better and more rapid response to requests for information from potential: business partners and suppliers, investors, new employees, visitors, and others could help speed up and improve the quantity and quality of business transactions of all kinds. By building a comprehensive, centralised information portal relying on Internet and search engine technology,

Ottawa would be following in the footsteps of many other fast-growing regions.

Approach

The Gateway Ottawa portal would focus on four applications:

- General promotion: Ottawa needs more visibility as a high tech centre of excellence and a excellent travel destination; Gateway Ottawa will communicate around the world the intellectual, infrastructural, and human capital available in the region (for investors), the opportunities and needs of cluster companies (for suppliers and workers), and traveller attractions (for tourists).
- Investment promotion: the market for venture capital is increasingly a global market; this initiative would make information on specific investment opportunities available to potential investors worldwide using the power of the Internet.
- Product promotion: as markets for Ottawa's products globalise, leaders will need to rely on the Internet for creative marketing and product promotion.
- Career opportunity promotion: promoting high tech career opportunities which will become increasingly important as the search for qualified people and the challenge of matching them to employment opportunities intensifies.

Several clusters are working on designing cluster-specific portals as part of their cluster action initiatives. Because of the cross-cutting benefits and the powerful impact of one unified, centralised Ottawa portal, it would be useful to incorporate these efforts into a gateway portal that would both meet individual clusters' needs while providing the means to enhance the image of Ottawa through general promotion of the region.

With this initiative, several strategic alliances could be developed between existing organisations, e.g., OED, OCRI, ottawaonline.com, U-Hire.com and the Ottawa Business Journal. Alliances that link existing organisations would widen and deepen the available databases and result in a truly rich information portal for Ottawa.

Potential Sources of Leadership

- Ottawaonline.com
- Representative from each high tech cluster
- OED, ottawaregion.com
- Industry Canada

Potential Sources of Funding

Public Resources could include:

- Industry Canada
- Ministry of Education
- Federal Smart Communities

Private sector resources might include:

- In-kind Services
- Sponsorships Fees
- Advertising Fees
- Career Centre Revenues

Conclusion

These nine Flagship Initiatives are by no means the only high priority civic initiatives for Ottawa. They are, however, the initiatives that emerged in the Economic Generators Initiative process whose implementation seems plausible and whose impacts would address many of the issues raised during the project. Over the next few months, each Flagship concept will need to be refined and specific implementation plans developed by teams comprised of appropriate people from government, academia, and the private sector.

6. Agency Recommendations

Implementation plans and key agency responsibilities have been outlined for both the cluster initiatives recommended in Section 3 and the Flagship Initiatives recommended in Section 5. In this final section we focus on some of the institutional issues related to implementation, particularly those issues related to the roles and responsibilities of the region’s economic development organisations as this strategic plan moves forward.

Guiding Principles

As we formulated our recommendations for the economic development agencies, we were guided by several principles:

- *A New City*—Ottawa is moving to “one city”, which should by itself begin to reduce some of the inter-jurisdictional issues and complexities of economic development. With the Transition Board now focusing on how best to organise “new city” functions and programs, now is a perfect time to rethink a new city delivery mechanism for economic development.
- *Emergence of TOP as an Effective Leadership Organisation*—The Ottawa Partnership (TOP) was originally established to address issues raised in an earlier report regarding agency roles and responsibilities. As its first order of business, TOP launched this strategic planning effort and has emerged as an effective economic development leadership forum. Leaders of OED, OCRI, OTCA, OLSC, the Board of Trade, and the RGA feel that TOP is just what the region needs to develop and advance a shared economic vision and a comprehensive economic development work program.
- *Consensus to Move to Cluster-based Economic Development*—The cluster model for economic development was introduced to Ottawa by the consulting team as an analytical framework and as a way to organise leaders for collaborative strategy development. While other communities have adopted the cluster model as both the intellectual and pragmatic basis for their economic development plans, it was not clear at the outset of this project whether it would be widely accepted in Ottawa. However, it is clear that cluster-based development has taken hold among key agencies in the region as the preferred approach to economic development. Leaders must remember, however, that the seven export-oriented clusters represent only a fraction of all jobs. The

rest of the economy, including retail, health care, construction and other “local serving” sectors will have their own economic development challenges.

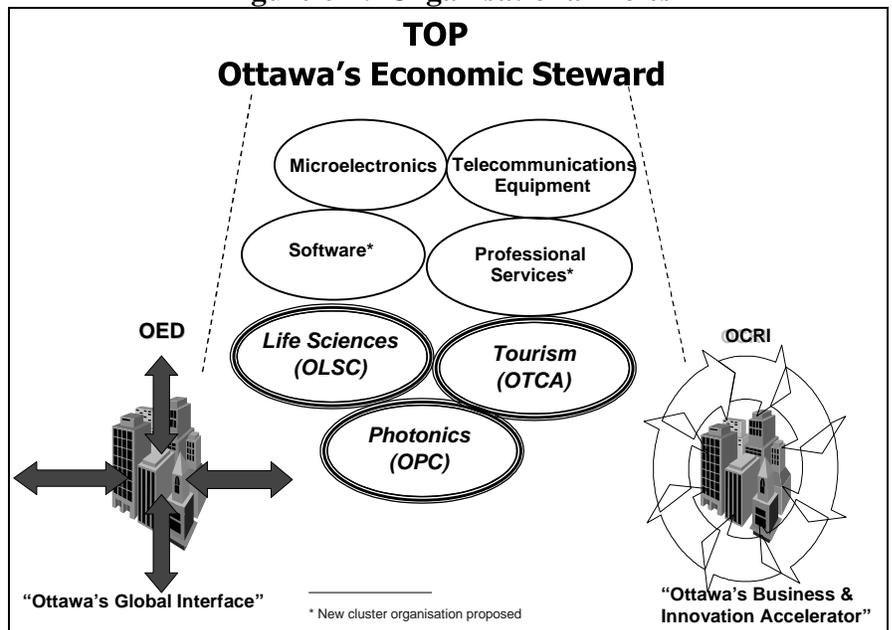
- “If It Isn’t Broken Don’t Fix It”—Organisational change is, at best, disruptive. Change for the sake of change should be avoided.

Recommendations

Figure 6-1 illustrates the recommended delivery system concept and the roles and responsibilities of key agencies. Three levels, or categories, of functions are discussed:

- Overall economic development leadership (the role of TOP)
- Cluster development (the role of OTCA, OLSC, OPC)
- The economic development process (the role of OED, OCRI)

Figure 6-1. Organisational Roles



Overall Economic Development Leadership—The Role of TOP

TOP's role should be strategic planning, coordination, and monitoring the implementation of this

Because TOP has been accepted by its members as the senior economic development organisation in the region, it should be formally affirmed as *the* economic development leadership agency in Ottawa. Going forward, its role should be *strategic planning, co-ordination* and *monitoring the implementation* of this plan and its

plan, and its updates.

updates. Over the next few months TOP's chief priority should be to manage the processes for implementing this report. TOP should avoid getting directly involved in the administration of service delivery. Instead, it should remain an advocate for a competitive economy and a leader in accelerating Ottawa's economic development.

Many leading technology regions in North America have formed a public-private organisation like TOP (e.g., Silicon Valley's "Joint Venture: Silicon Valley," Austin's "Austin 2000" and Charlotte's "Advantage Carolina" Initiative). With TOP, and the recommendations below, Ottawa will be adopting the organisational model best suited to achieving a dynamic Innovation Economy.

While TOP will have overall economic development leadership responsibility, the new city will likely require its own Office of Economic Affairs with a mission similar to that of today's office. This office should serve as the secretariat to TOP, generally staffing the partnership and helping guide implementation of the report. Going forward, the Office of Economic Affairs should also provide TOP with on-going economic research and input to what should become a "living" strategic plan.

Cluster Development—The Role Of OTCA, OLSC, And OPC

Because cluster-based economic development has been embraced in Ottawa, there is a strong case for an institutionalisation of cluster development mechanisms. New traditional cluster networking organisations are forming in many high tech centres today, often as traditional business organisations such as Chambers of Commerce change their focus. Cluster network organisations typically have a narrow mission—strengthening a region's clusters and making cluster firms more competitive. Some of these groups are purely lobbying organisations, advocating for pro-cluster initiatives by government, university or technology institutions. Some cluster organisations focus more on marketing and outreach than on policy advocacy. Others are mostly informal forums where cluster leaders meet to exchange information. Although the organisational models vary considerably, these networking groups are typically non-bureaucratic groups that have a responsive and flexible program structure so they can address priority cluster issues as they emerge. Cluster networks nearly always have a small, or even a volunteer staff.

Already, OTCA, OLSC and the new Ottawa Photonics Cluster (OPC) have missions very similar to that of the cluster networking

Ottawa's cluster organisations (e.g., OTCA, OLSC, OPA) should be responsible for setting cluster development priorities, for developing detailed strategic and action plans, and for implementing projects and programs.

organisations described above. These organisations are well positioned to evolve into the cluster development, networking role envisioned. OLSC, OTCA and the OPC should all make cluster development their chief priority. For OTCA especially, and OLSC to a lesser extent, this will mean broadening out the membership base to reflect the full scope of the cluster. For these organisations to be successful in their cluster development role, their leadership structure (e.g., board and committees) should include representatives of large and small firms from all segments, public and private sectors, of the cluster.

Leaders of the Software and Professional Services clusters have already discussed the formation of a cluster network-type organisation and, toward this end, TOP should encourage their Economic Generators Initiative working groups to remain in place. Because the larger clusters, Telecommunications Equipment and Microelectronics, are mature global players with good links to international and national groups (as well as to OED and OCRI), there may be no need for the leaders of their industries to form local cluster network-type organisation.

Ottawa's cluster organisations (e.g., OTCA, OLSC, OPC) should be responsible for setting cluster development priorities, for developing detailed strategic and action plans, and for implementing projects and programs. There should be a continuous flow of information between these cluster groups, OED and OCRI. Where appropriate, these cluster groups should implement joint projects with OED and OCRI, paying an appropriate share of project expenses through membership fees and other sources of income. Representatives of these cluster organisations should report to TOP on a regular basis.

While photonics is far removed from life sciences, tourism, professional services, or software, leaders of these other clusters should look at the newly formed Ottawa Photonics Cluster as an example of what is envisioned. Each cluster group will want to have its own mission statement, organisational structure, and program plans reflecting the cluster's unique needs and history. But each should begin moving to the cluster development role as soon as possible.

When the Software and Professional Services groups get organised, they should take the lead of OPC and consider linking with OCRI for administrative support. With limited funding, and in order to keep focused on its chief priority—cluster development—OLSC should also seek an *administrative* affiliation with OCRI.

The Economic Development Process—The Role Of OED And OCRI

Unlike the OLSC, OTCA and the OPC whose missions are focused on specific sectors of the economy, OED and OCRI play a broader role in the economic development process. OED has been Ottawa's premier marketing and promotion agency, focusing on attracting investment to the region. It has also been responsible for development of Ottawa's Entrepreneurship Centre and the Ottawa Capital Network.

OCRI, on the other hand, currently plays a much different role by programmatically supporting economic development in areas ranging from human resource development to participating in partnerships for research, development and innovation geared to economic development in the region. As cluster-based economic development is implemented in the region, OED and OCRI will each have important, but different, roles to play.

Ottawa Economic Development (OED)

As the Economic Generator's Initiative moves forward, OED's role should be the region's premier marketing organisation and "Global Interface".

OED's role should be that of the region's "global interface"—Ottawa's window on the world and the world's window on Ottawa. OED's primary mission should be marketing and promotion, with a sharp focus on attracting to the region strategic, high priority inputs needed by the region's clusters in order to be competitive (e.g., skilled people, venture capital). OED should embark on this more sharply focused mission by implementing sophisticated, comprehensive approaches to promote Ottawa's cluster competencies. Toward this end, OED should be responsible for implementing the "Brand Ottawa" Flagship Initiative. Because it is highly specialised, "destination marketing" should remain with OTCA.

To successfully respond to the needs of the clusters, OED will need to develop close linkages with cluster leaders, interpreting the clusters' "market signals" and translating them into relevant projects and initiatives. As it takes the lead in the branding flagship, for example, OED will need to focus on both the overarching branding messages, but also integrate cluster-specific elements designated by cluster leaders. As it gains success with its branding efforts, OED should propose special marketing projects for the region's cluster network organisations, such as participation at specialised industry meetings, targeted worker attraction or investment attraction efforts.

The activities of OED's Ottawa Capital Network are consistent with other global interface functions and it is proposed that the Network's activities be stepped up. For example, OED could play a key role supporting the private sector in the "Igniting Enterprise" Flagship Initiative. As OED evolves into its "global interface" duties, it is suggested that the agency avoid spreading its resources too thin. Marketing should be OED's highest priority.

Ottawa Centre for Research and Innovation (OCRI)

OCRI has an enviable record responding to the economic development needs of the community. OCRI's primary mission has been implementing programs aimed at developing the economy "from within." OCRI's entrepreneurial way of sensing needs and moving quickly with appropriate programs and creative funding serves as a good example of market-driven programming.

OCRI's role in economic development should focus on programs designed to accelerate business by leveraging resources needed by firms in order to be competitive.

OCRI should continue playing the role we call "business acceleration". Going forward, Ottawa will need an array of market-driven economic development programs. OCRI should be Ottawa's source of innovative efforts for meeting the crosscutting and specific needs of the clusters by leveraging resources needed by firms in order to be competitive (e.g., skilled workers, local technology competencies). To be successful in this mission, OCRI will need to develop especially close relationships with cluster leaders, who will be a source of "market signals" to which the agency can respond.

Roles For Other Economic Development Organisations

In addition to the agencies discussed above, many local municipalities in the region have economic development offices that will be brought under the new city. Moreover, many cities have a chamber of commerce that serves the local business community in a variety of ways, as the Ottawa Board of Trade and the Regroupement des gens d'affaires (RGA) do region-wide. These local-serving and membership organisations will be working out their own plans within the context of the new city. As these plans take shape it will be important to remember that the Economic Generators Initiative and this report focus on only a limited part of the economy. All healthcare, retail, construction and other local-serving enterprises will need to have their own business support mechanisms, many of which will be provided by the Ottawa Board of Trade, the RGA and local chambers of commerce.

(end)