



## KNOWLEDGE-BASED INDUSTRIES IN OTTAWA

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### **Purpose of Ottawa Prosperity Plan White Papers**

*The City of Ottawa’s Economic Strategy Update Steering Committee is seeking input from stakeholders and the public to formulate a common economic vision for the City over the next five years. It is also seeking to determine the mission or role of the municipality in leading, encouraging or contributing to the realization of that shared vision.*

*This is one of a series of White Papers to present discussion topics in a format that will include “Overview,” “Current Situation,” “Challenges,” “Options and Suggestions for Action,” and “Questions to Consider” categories. It is hoped that the reader will offer feedback to guide the formation of the shared vision – what “good” would look like in the context of the white paper topic – and creative thoughts and innovative ideas about how to respond to each white paper challenge.*

*White paper feedback will be considered by the Economic Strategy Refresh team and incorporated into the collective Vision and Guiding Principles/Policies for Ottawa’s Economic Development Strategy (2010 to 2015). Reader input will also guide decisions about which economic strategies and initiatives should be undertaken to realize the City’s vision.*

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### **Overview**

In successful economies, growth is increasingly driven by creativity and knowledge. Ottawa’s ability to cultivate and attract knowledge-based workers, jobs and businesses is vital for its future economic prosperity. The city faces intense global competition for those workers, jobs and businesses. Without continued leadership and investment in high technology, Ottawa risks an innovation and talent deficit.

What does this new economy – one that relies more on knowledge-based inputs and less on manual work – mean for Ottawa? How can Ottawa acquire or enhance its unique advantage in this competitive marketplace?

The answer is complex, but needs to be based on creative, motivated talent, innovative companies and a regional environment that people want to live and work in. Notably, Ottawa has been a Canadian leader in many of these areas. For instance, it has one of the best-educated workforces in Canada, and more than 40% of its workforce continues to work in “creative” occupations.

However, the city faces challenges as it looks to maintain these strengths. Profound shifts in the manufacturing and high-technology sectors in the last decade have generated new startup activity but also a great deal of uncertainty with regard to private research funding and job security. As many large anchor companies like Nortel and JDS Uniphase have departed or are reorganized, new clusters in clean technology, wireless applications and security/defence have emerged as opportunities.

This has demanded a reconsideration of how to promote and assist high-technology industry in Ottawa; increasingly, growth and employment will be driven by a greater number of small firms, and less by large anchor companies. Strategies must shift to respond to these structural changes.

There is a great deal at stake. Knowledge-based industries (KBIs) drive research, employment and the emergence of new technologies, which can have

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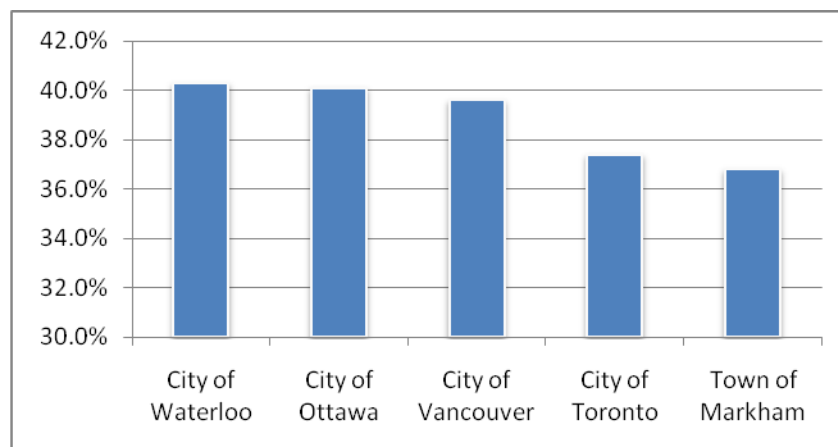
spillover effects into many sectors of the economy. As one example, clean technologies can open significant avenues for research funding and job creation. It is projected that Ontario's Green Energy Act will generate thousands of "green-collar" jobs in manufacturing and construction within the renewable energy sub-sector alone. Yet there remains some uncertainty with respect to technological adoption, regulation and funding which have a large impact on the outlook for this sector. The importance of pragmatic leadership in pursuing knowledge-based industries is key to a successful comprehensive regional growth strategy for Ottawa.

In addressing these issues, Ottawa must be strategic and discriminating in evaluating its areas of greatest opportunity. As mentioned, regions across the world are in intense competition for investment in knowledge-based industries. Ottawa must apply insight, flexibility and proactive leadership to target the specific elements of these sectors that it is likely to attract or develop. Where do Ottawa's existing strengths and assets present the best opportunity for future growth? What opportunities exist where these current sector strengths converge? How can Ottawa leverage proactive leadership to translate these opportunities into sustainable prosperity for the region?

### Current Situation

Knowledge-based industries have long anchored Ottawa's economy and continue to do so. This is in no small part due to the many assets on which Ottawa can build. As a census subdivision, Ottawa ranks second in Canada in the proportion of those with a bachelor's degree or higher (40.1% - see Figure 1). It has the highest level of employment in "creative" occupations in Canada at 43%; five major post-secondary institutions; hundreds of government and academic research centres; and an estimated \$3 billion per year in total public and private R&D funding. Ottawa's innovation infrastructure is strong.

**Figure 1. Percentage of Population aged 25 to 64 with Bachelor's Degree or Higher, 2006**



Source: Statistics Canada, 2006

From a firm perspective, the outlook is less clear. The number of firms in KBIs

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has grown since 2000 but leveled off at around 1,800 since 2005. There is no longer a dominant KBI sub-sector, as the evolving telecommunications industry continues to shed jobs in Ottawa. Indeed, the high-technology sector as a whole, a key component of KBIs, lost 3,600 jobs between 2001 and 2006, mostly in high-tech manufacturing associated with telecommunications. In addition, based on Labour Force Survey data, the high-tech sector decreased a further 8.8% between 2006 and 2008<sup>1</sup>.

Paralleling this trend, however, has been the emergence and growth of new clusters including clean technology, digital media and life sciences – the latter of which grew 73% between 2006 and 2008. This trend is accompanied by more growth in smaller companies – 50% of Ottawa’s KBI companies have 10 or fewer employees – and suggests potential increases in new employment opportunities for workers in declining KBI sub-sectors.

The following provides an overview of these increasingly important areas of opportunity, convergence and growth in Ottawa, as informed by the Ottawa Innovation Strategy, developed by the Innovation Strategy Working Group led by the Ottawa Centre for Research and Innovation (OCRI).

**Current Cluster – Photonics:** Though previously associated primarily with telecom, the photonics cluster has diversified in recent years and now provides inputs to solar/PV cells in the energy sector, displays and lighting for consumer goods and implements for the life sciences and security sectors. Given these many applications, this sector’s projected global market was \$710B for 2009, at a growth rate of 14%. With 102 companies housing almost 2,000 employees, the photonics cluster is a significant mature cluster in Ottawa that is primed for further growth.

**Current Cluster – Enterprise Software/eBusiness:** This cluster continues to be a business and employment driver for Ottawa as it employs 22,735 workers locally. It contains the region’s large anchor firms such as Cognos, Corel and IBM yet at the same time, 46% of sector companies have fewer than 10 employees. Though it has experienced some reorganization, its connections to enterprise, new media, manufacturing and security sectors, along with a global market of over \$300B in 2008, ensure its continued importance to Ottawa’s economy.

**Current Cluster – Wireless/Mobile Applications:** This sector is expected to garner \$568B worldwide in 2010, at a growth rate 7%. In Ottawa, 12,344 employees work in the cluster, primarily in branches of non-local firms; the Ericsson purchase of Nortel’s wireless assets was a significant contributor to this. As traditional strengths in telecommunications research and manufacturing have waned, the sector has evolved to focus on developing network infrastructure, WiFi and WiMax, GPS, radio, and Bluetooth applications.

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<sup>1</sup> Statistics Canada, Labour Force Survey, 2008

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**Current Cluster – Life Sciences:** This sector has been specifically targeted by OCRI as a key growth cluster for Ottawa. Encompassing biomedical (pharmaceutical/therapeutic) and biotechnology (devices, informatics) sub-sectors, the cluster saw 73% employment growth between 2006 and 2008. With more than 100 government and academic research centres that facilitate tech transfer and serve as magnets for talent, there is a dense network of local activity. Further, there are extensive synergies with traditional ICT expertise, health care provision, technology/device manufacturing, and regulation/policy development – all of which are strengths in the Ottawa economy, and suggest tremendous opportunities for convergence between sectors. The cluster remains small, with only 57 companies housing 1,700 employees. Some caution must be exercised in stating its impact on the overall regional economy, but life science represents high acquisition/growth potential.

**Current Cluster – Security/Defence:** At more than \$1 trillion globally, this sector encompasses a huge potential market. With significant investment and research from the public sector, there are more than 360 security and defence-related companies employing more than 23,000 people in Ottawa. Ottawa's unique strengths in this sector lie in its connections with communications and ICT, including the development of security and encryption systems.

**Emerging Cluster – Cleantech –** This sector includes a wide range of “green economy” activities; clean air/water, renewable energy, bio-products (including manufacturing), green building and waste management. Locally, there are additional potential growth areas in environmental and smart grid technology and information management, which mirror existing strengths in systems design. There are both challenges and opportunities associated with the policy and funding environment for this sector; technological standards are still being defined, and government incentives are often non-permanent. Nevertheless, the sector is primed for growth and it is projected to command a global market of \$1.3 trillion by 2017. In addition, OCRI's *Ottawa Cleantech* Initiative provides information and resources to companies in the cluster.

**Emerging Cluster – Digital Media/Gaming:** This high-growth, though somewhat fragmented sector, is a key driver of the software and applications markets and is projected to grow to \$378B in total available market by 2011. There are more than 200 companies in the digital media supply chain in Ottawa, associated with content production, interactive media, production and distribution, R&D and skills training.

**Emerging Cluster – Virtual Education (Global eLearning):** This cluster is estimated to grow to \$52.6B by 2010, at a rate three times faster than traditional corporate training. It emphasizes content development, training, assessment and content management systems. In Ottawa, there is extensive spillover in this sector with university labs, software and defense industries.

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**Emerging Cluster – Communications Enabled Applications:** This new cluster is defined by the integration of open source systems, communications and IT applications. Typical products are associated with digital cable, smart devices, content management and social media/communication. The cluster recently received a \$9M investment through the Ontario Ministry of Research and Innovation and is receiving further interest and investment by older companies (e.g., RIM, Microsoft, Nortel) that see complementarities with these advanced applications and their current competencies.

This is an extensive range of clusters, all of which Ottawa is targeting for continued growth. Naturally, if this is to occur, support needs to come from multiple directions, and there are currently many assets to assist in cluster development. These include sector-specific and industry-wide business service organizations, like the OCRI and its Entrepreneurship Centre; professional organizations and networking bodies (e.g., Young Environmental Professionals); academic and government institutions; and other innovation and startup initiatives (e.g., Carleton University's Foundry Program; OCRI's TalentBridge).

Despite these strengths, Ottawa will not maximize its success unless it makes full use of its local and regional assets in a way that is appropriate to the actual needs of its businesses and workers. For example: are these cluster development strategies fully utilizing the extensive funds and support available through provincial and federal programs? Ontario's Next Generation of Jobs Fund and Advanced Manufacturing Investment Strategy, and Industry Canada's Industrial Research Assistance Program are just the most prominent examples of large-scale research and funding programs affecting many of Ottawa's target clusters. Improving linkages between the City's institutions, funding sources, entrepreneurs and workers must be Ottawa's key priority going forward.

### Challenges

What needs to be done to ensure that knowledge-based industries in Ottawa will experience sustainable growth and remain a driver of the regional economy?

As suggested above, Ottawa's extensive assets are accompanied by risks associated with shifts in high-technology sector, uncertain research and development funding in clean-tech and other sectors, and extensive external competition for resources. Ottawa must consider the following challenges in addressing these issues.

**Messaging:** Ottawa's greatest opportunities for growth in KBI jobs and output exist in sectors that are just emerging or were even unheard of during the high-tech boom of the previous two decades. In addition, many large urban centres in North America and across the globe are pursuing knowledge-based industries, and each has its own strengths. To attract investment, Ottawa must identify its unique competitive advantages, while simultaneously developing a message for high-tech that can unify the increased diversity of the sector.

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**Strengthening Local Investment:** Ottawa has a high density of innovation/research centres and annual R&D spending. However many knowledge-based industries still struggle to acquire funding. The reorganization of Nortel and downsizing of other anchor firms has meant a significant decline in private research funding and most federal research spending does little to directly benefit the City. How can Ottawa harness government and sector-specific investment programs to generate local jobs and economic prosperity in knowledge-based industries?

**Labour pool:** Since the high-tech bust of the early 2000s, employment in KBIs has levelled off at around 80,000 in Ottawa. Yet more of these jobs are now in smaller, less established companies. Consultations with industry leaders have suggested that the job pool is not deep enough that high-technology sector employees can feel confident they can find new jobs if their company is in trouble. There is a strong, well educated talent pool in Ottawa, but it can't be taken for granted that there will always be jobs to retain them.

**Sustainable Business Development:** The new emerging clusters bring high potential, but also uncertainty. Ottawa has a strong environment for startups, providing information and support through various programs, but only 43% of the OCRI Entrepreneurship Centre's education services clients were ultimately in business one year later. As important as cluster development is, Ottawa also needs to work on developing individual good ideas and promising businesses, in addition to the linkages between them, if it is to grow.

In short, Ottawa has many knowledge-based assets, but needs to better capitalize on them. The stakeholders mentioned above need to work together to identify and promote opportunities emerging across and between industries. To further develop KBIs with an eye to innovation and growth, Ottawa needs to achieve more than the sum of its parts.

### Options and Suggestions for Action

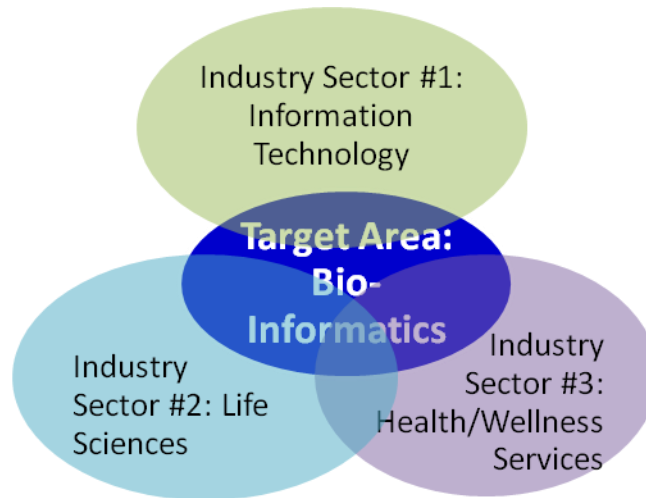
To continue moving forward, Ottawa must focus on what its businesses need; where are the service gaps in terms of creating a stable, progressive business environment that innovative KBI companies and workers want to be in?

It is clear that there are a number of knowledge-based industry sectors with high growth potential. Yet for Ottawa to be a leader in these industries, it must generate a first-mover advantage. The greatest opportunities for this will come through convergence of existing competencies and strengths. A Strengths, Weaknesses, Opportunities and Threats (SWOT) analysis conducted by MillierDickinsonBlais in 2009 identified an example of the competitive advantages that Ottawa can gain by applying this kind of thinking to its current business areas (see Figure 2). The next big company in Ottawa may be in an industry not identified above, or even defined. The City needs to be flexible and consider how to facilitate cross-cluster, integrative networks.

**Figure 2. Bio-Informatics as an Example of Industry Convergence**

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As stated, the effective facilitation of cross-sector, collaborative relationships between Ottawa’s existing business services and institutional stakeholders is also important to strengthen the city’s financial and intellectual capital. Examples of collaborative initiatives the City can take a supporting role in include:

- Co-operative education, placement, and school-to-work programs;
- Shared business-education curriculum development, and commercialization/tech transfer assistance for academic research;
- Assistance in negotiating funding/regulatory information for businesses;
- Cluster-based networking, strategy development and advocacy.

In addition, because the KBI environment is increasingly defined by smaller companies in newer sectors, the City can take an active role in facilitating entrepreneurship and employment transfer of highly skilled workers, to ensure that they want to, or are able to, stay in Ottawa to work. Enhanced skills training, career consulting, and networking initiatives delivered together with economic development and education partners will help build this foundation.

Finally, underlying any cluster strategy or knowledge-based industry initiative, Ottawa needs to be able to “walk the talk”. It can work toward being a place that is a representation of its strategies pertaining to knowledge-based industries. This includes ensuring a high quality of place; providing and marketing the assets that current and prospective talent wants. Ottawa can also support cluster development by using and purchasing municipal services in accordance with its KBI targets (e.g., waste management, LEED building, local procurement etc.). This can begin to address challenges in marketing, and will open another avenue for more direct business support and knowledge of industry needs and specialization. These strategies will require risk-taking, co-operation, and leadership; Ottawa’s growth and prosperity depends on it.



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### **Questions to Consider**

- How can Ottawa better utilize its existing research, funding, and economic development assets to better assist individual companies and entrepreneurs looking to grow and develop their knowledge-based business?
- What are the local impediments to the development of existing and emergent clusters in knowledge-based industries?
- What specific initiatives, programs or policies can Ottawa develop that will incite further innovation within or across these sectors?