

ICT Industry Report to MEDT

In terms of information and communications technology (ICT) innovation and enterprise, Ontario punches well above its weight. A partial list of the contributions Ontario's ICT industry has made to the global ICT marketplace includes:

- An Emmy-award winning chip-set technology which allows TV studios to transmit uncompressed, unencrypted digital signals extremely quickly within a studio's production facilities;
- Canada's technological footprint on Mars, the highly sensitive digital sensors that permit the transmission of crystal clear images from the Mars Rover's ongoing explorations of the Red Planet;
- Epic Pinball, one of the world's most successful shareware games ever released;
- The Blackberry Pearl, one of the smallest, smartest and most highly functional smart phones in the world;
- EA (emulsion aggregation) – a nanotechnology-based breakthrough in toner technology that delivers high image quality with a lighter environmental and energy footprint and effective toner usage for printers all around the world;
- The world's first X.25 data switch enabling the first standard-based commercial application of packet switching – the backbone technology of the Internet;
- And, the telephone conceived at the Bell family homestead in Brantford in 1874.

ICT is ubiquitous throughout the province with a point of presence in virtually all communities large and small. In some communities, it has established itself so profoundly as to fundamentally transform local economies. Waterloo, for example, was just named the world's top intelligent community by the New York-based Intelligent Communities Forum, beating out seven other finalists include Ottawa-Gatineau long known as Silicon Valley North. These two well-known tech clusters tend to overshadow the significant amount of ICT activity undertaken in the Greater Toronto Area, which is distinguished as the third largest centre for ICT activity in North America. Few jurisdictions can claim such strong centres of technology-based activity.

ICT in Ontario is a diverse industry ranging from garage-based, single person start-ups to large sophisticated laboratories operated by Canadian and multinational leaders in the industry. And it is broad in scope, embracing software, hardware, microelectronics, telecommunications and digital content development. Ontario's ICT industry goes beyond technology

The ICT industry provides the insight, knowledge and tools to lead business transformation. In fact, the technologies developed by the ICT industry are increasingly developed to enable change and innovation across an array of public and private sectors in response to customer demand and a desire for differentiation in an increasingly globally competitive economy. ICT is intrinsically part of the transformation to a services-led economy. More than 70% of Ontario's output and employment is generated in the services producing industries. Approximately 80% of the ICT industries' output and employment is in the software and services producing segments. According to Ontario's Ministry of Finance, business investment in ICT as a proportion of total investment in capital (e.g. structures, machinery, transportation) increased from 4% to 29% between 1984 and 2004 – an increase of over 700%. The ICT industry provides the knowledge, tools and insight to solve business problems and lead transformation towards innovation and productivity.

Beyond the enabling effect, the ICT industry is also a bellwether of Ontario's knowledge-based economy. The ICT sector is the most active investor in research and development in the economy. Major investments in R&D facilities by Canadian companies, like Nortel and Research in Motion, have anchored the vigorous technology clusters of Ottawa and Kitchener-Waterloo in little more than a generation. Major investments by multinational ICT powerhouses, such as IBM, Xerox, Motorola and AMD, have helped to anchor the Toronto cluster. And in Ottawa, Alcatel-Lucent helps to anchor the cluster with a major Research and Innovation Centre (one of six in the world) that employs over 1700 professional engineers and designers. Of Research Infosource's top 20 R&D performers in Canada in 2006, seven are Ontario-based ICT companies. This combined with energetic R&D investment by smaller firms represents a tremendous natural resource for Ontario and a springboard for 21st century prosperity. Not only does this activity produce persistent innovation, high value exports and high value employment, it also provides a critical foundation for the province's broader innovation ecosystem. Through close collaboration with universities and colleges, it provides a demanding customer for Ontario's highly skilled graduates. It helps to drive a much broader culture of science and technology literacy in Ontario that other jurisdictions all around the world envy.

But we cannot take our strong foundation in science and technology, and the enterprises that spring from it, for granted. The recommendations contained in this report reflect the industry's view of measures that must be adopted immediately in order to preserve the ICT legacy that we have and leverage it for competitive leadership and growth in the 21st century economy.

Leaders from the industry have consulted with Ministry and Economic Development and Trade (MEDT) officials and other representatives from other ministries to produce this report. Their consultations took place through a series of meetings from March to May 2007. The recommendations revolve around the work of four working groups who probed four key areas integral to producing a strong ICT industry and a strong culture of innovation based on science and technology. These four working groups are:

- Innovation and Industrial Policy;
- Talent ;
- Productivity; and
- Procurement.

In sum, the recommendations listed below will lead to the fulfillment of three objectives:

- Retain and grow domestic and international ICT company investment in Ontario by positioning the province as a preferred location among all other jurisdictions;
- Expand investment in ICT services across Ontario's economy in order to bolster business productivity, innovation and competitiveness; and
- Increase and encourage dialogue and collaboration between Ontario's ICT industry and the Ontario Government to harness the transformative impact of ICT on the Government's most pressing policy and services delivery challenges.

Virtually all of the recommendations in this report will require sustained engagement and collaboration with MEDT and other parts of the Ontario Government over a multi-year period of time. Therefore, our first recommendation transcends all working groups.

Given the economic importance of the information and communications technology industry as both the third largest sector in the province of Ontario and, as a fundamental enabler of productivity growth and innovation in all other sectors, the industry recommends that an ongoing, formal and objective-driven framework for dialogue and consultation be created between the Minister and senior leaders of Ontario's ICT industry.

INNOVATION AND INDUSTRIAL POLICY

Canada is among the top five nations in the world conducting information and communications technology-oriented research and development. Approximately half of Canada's ICT workforce is located in Ontario. Many of them are graduates of world class, Ontario-based universities which are recruitment magnets for global ICT companies. In short, Ontario has a suite of natural advantages that make it a robust contender in the global race to build innovation-driven economies. The advantages Ontario currently enjoys are enviable by other jurisdictions in Canada and around the world. If properly fostered and strategically developed, these advantages can provide the fulcrum necessary for leveraged growth and leadership in the global knowledge-based economy. As Ontarians, our strategic objective should be to marshal these resources to make Ontario the premier destination for the conduct of ICT focused R&D on earth.

Recommendation #1

With a long term objective to create and market an effective incentive package for Ontario-based industrial research and development for existing and new investments, the industry recommends a competitive analysis study of incentive instruments used by other jurisdictions. The study should aim to reveal best practices and identify gaps in the current "package" available in Ontario. This package must be recognized as multi-dimensional including all aspects of the innovation/commercialization continuum such as the cost and availability of talent, labour costs, tax structures, IP policies and cost of resources. The analysis should consider what public policy instruments – direct incentives, tax incentives and other levers – can best address the challenge of making the best case for retaining and expanding ICT enterprise investment in Ontario as opposed to any number of low-cost jurisdictions. The study should be collaborative between a number of government ministries (MEDT, Ministry of Research and Innovation, Finance) and it should be iterative, refreshed at regular intervals appropriate to a rapidly changing sector. It should also engage industry to review recent R&D investments lost to other jurisdictions. This competitive analysis and the packaging of a strong incentive program for Ontario is vitally important in order to ensure we retain the current R&D activity we currently enjoy and build upon it.

Recommendation #2

ICT adoption throughout the economy and the ICT industry itself benefits from the outspoken championship of leaders in government. Consistent with our overall recommendation for ongoing engagement with government, we recommend, therefore, that the Minister of Economic Development and Trade fulfill this role at the Cabinet Table and with the public. Advocacy of this nature would take the form of endorsement of the need to reform the SR&ED tax credit, to protect, improve and expand the Centres of Excellence program and to encourage effective adoption of ICT solutions in other dimensions such as health, environment, transportation and education.

Recommendation #3

The ICT industry believes that Ontario's single payer health system serves the needs of patients well but also situates Ontario to be a world leader in electronic health technologies. The ICT industry in Ontario provides thought leadership to health care

delivery agencies throughout the world and has dedicated a significant amount of analysis to health care transformation, its drivers and models for success. The ICT industry's capacity in Ontario to work collaboratively on this challenge goes beyond its capacity for technological ingenuity and innovation. The ICT industry understands the challenges that the Ministry of Health faces and shares the common objective of improving the health and welfare of Ontarians while managing cost and other resource pressures.

Therefore, the ICT industry recommends that the Ministry of Health and Long-term Care organize quarterly consultation sessions with ITAC and ICT industry participants in order to have regular dialogue on ICT issues, with the objective of fostering an economic and responsive health system for Ontario. Given the importance of health issues to all Ontarians, the ICT industry is also interested and receptive to discussions about any other means as to how it might assist the Ontario Government in advancing the province's health transformation strategy and agenda.

In addition to the quarterly consultations, the ICT industry also recommends that the Ministry of Health and Long-term Care organize periodic, focused sessions to address specific topics related to the ongoing implementation of elements of the health transformation strategy and the need for information from vendors regarding products and services.

Recommendation #4

Ontario should aim to be a global leader in the commercialization of new innovations. Commercialization of new innovations takes place in a variety of venues from industrial labs to "Centres of Excellence". The industry recommends the establishment of incentives to encourage more coordinated, collaborative, industry-led research and product development. Incentives may apply to industry engagement in OCEs, to existing industrial collaborative research centres and to the creation of net new collaborations. The impact of such an incentive program would be to establish a critical mass of investment in research, collaboration and innovation against applied business problems across disciplines (though obviously including ICT) and across business sectors. The Ontario Ministry of Research and Innovation's Strategic Plan speaks to the importance of establishing meaningful partnerships between academic institutions, between industry and academia and across disciplines. It also speaks to the need to stimulate the development of close industry-academia partnerships and networks at the regional and provincial level and to create a network of collaborative commercialization centres. The ICT industry strongly supports this approach to commercialization. Collaborative commercialization centres will position Ontario as a global leader in products and solutions for emerging, strategic convergent technology sectors. Investment of this nature in the innovation ecosystem is urgent.

TALENT

To a degree unrivalled by any other sector, the ICT industry depends upon a strong supply of knowledge workers as its primary (indeed in some cases its exclusive) natural resource for the generation of economic output. Without the assurance of a strong resource of highly qualified people, ICT businesses are simply unsustainable. On the other hand, ICT firms will make the availability of talent the primary consideration in their investment decisions. In many cases, it may outweigh all other considerations combined. So a jurisdiction that can boast an army of

knowledge workers, equipped with current expertise, has a strong competitive advantage in nurturing its domestic ICT industry and attracting investment and growth.

Ontario has a strong knowledge-based talent pool fuelled by world-class academic institutions. It is a leadership contender for the attraction of high value ICT investment. However, like any natural resource, this asset requires careful husbandry. Indicators, such as an aging population and anecdotal evidence of a waning interest in science and mathematics, suggest that Ontario must take immediate measures to protect and grow a resource that will be vital to the ICT industry and throughout the whole economy.

As a jurisdiction, Ontario can never hope to compete with others on the quantity of highly qualified people it produces. China and India, through their own industrial policies, are producing exponentially more graduates than we can ever hope to. But Ontario's knowledge-based labour pool can compete on quality if the right strategic decisions are made. For example, recent initiatives to fuse technological education with business education could create a cadre of talent that would make Ontario an attractive place to grow knowledge intensive enterprises.

Recommendation #1

Ontario can distinguish itself among all Canadian jurisdictions through the creation of a sustained, long-range (5-20 years) talent strategy incorporating all dimensions of talent input (K-12 education, post-secondary, industrial education and immigration) into a comprehensive plan that ensures a strong, qualitatively differentiated talent supply for the ICT-sector and other knowledge-based industries. The ICT industry is keenly willing to collaborate with MEDT and other appropriate Ministries to map this strategy.

Recommendation #2

The industry recommends a private/public collaboration to identify trends in the enrolment of advanced technology disciplines including interest in science, mathematics and technology. To build a robust society equipped to meet the demands of the 21st century, we must ensure a high level of science and technology literacy among our citizens. The ICT industry recommends that we unify all efforts to promote science, mathematics and technology to students into a comprehensive and sustained, private-public partnership. This should begin with the creation of an inventory of all programs to promote these disciplines across the province. Interest in science, mathematics and technology is particularly problematic among young women, aboriginals and immigrants. This inventory and the process that follows will strengthen private and public promotional and educational efforts with these key components of our community.

Recommendation #3

Increasingly, the demands of the 21st century ICT enterprise call for the integration of a broad array of skills across multiple disciplines. Ontario academic institutions have demonstrated commendable innovation and leadership in the development of programs that integrate knowledge in disciplines such as engineering and business. The ICT industry strongly supports this initiative and believes that a broader promulgation of this practice would create a further qualitative differentiator and competitive advantage for the province's talent pool particularly if we were to explore integration in key areas such as the development of advanced skills in business services. The industry recommends

that MEDT champion a multi-disciplinary skills development initiative that is cognizant of the emerging importance of “services scientists” in our industry and business in general. The industry recommends that MEDT initiate a forum to explore Ontario's experiences with this new approach to higher education. We also recommend that MEDT engage with Ministry of Research and Innovation (MRI), Ministry of Training, Colleges and Universities (MTCU) and industry to identify options for expanding the capacity for multidisciplinary education in Ontario's colleges and universities.

Recommendation #4

Skilled immigrants are an important part of the supply of labour available to the ICT industry. Yet immigrants frequently face challenges in integrating into the workforce (language, lack of access to business networks, and issues regarding validation of foreign credentials). Overcoming these challenges would position Ontario, which is already a preferred destination for immigrants, with a key competitive advantage in the quality of its workforce. We recommend therefore that MEDT convene a forum on strategies to overcome these challenges and build the policy and industrial framework to achieve that qualitative outcome. We also recommend the formulation of new strategies to more vigorously attract highly qualified immigrants to Ontario.

Recommendation #5

The co-op education program is important to the ICT industry's ability to identify and develop new sources of talent and knowledge. The industry believes that strengthening and expanding Ontario's co-op program will give the province's talent pool a strong competitive advantage. The industry will collect its suggestions for measures to achieve this outcome by September of 2007. It will then seek the support of MEDT and other departments to improve this vital program.

Recommendation #6

While Ontario institutions are producing world-class talent, we still face challenges in retaining them in our labour pool. More favourable personal income tax regimes and direct incentives targeted at attracting specific graduates are posing serious threats to the sustainability of some segments of the ICT industry. For example, though Ontario leads in education of animators, developers and producers of content for the gaming and multimedia industry, the industry itself faces unequal competition to retain Ontario talent due to direct incentives that draw resources to Quebec and British Columbia. The industry recommends that MEDT undertake a competitive analysis of the public policy instruments deployed by other jurisdictions to attract talent.

PRODUCTIVITY

Over the past five years, the link between investment in information and communications technology and productivity growth has evolved from hypothesis to mainstream economic and public policy orthodoxy articulated in a large number of economic studies.

These include a paper in the late 1990s (The Resurgence of Growth in the late 1990s: Is Information Technology the Story?); “IT and the New Economy: The Impact of Information

Technology on Labour Productivity Growth” by the Conference Board of Canada and two studies by the Centre for the Study of Living Standards. In one of these studies, “What Explains the Canada-U.S. ICT Investment Gap?” CSLS, while unable to point to one single cause for the gap, suggested a number of contributing causes including significant structural differences between the two economies. Canada, for example, has a relatively larger portion of small firms than the United States, and they invest less in ICT than their U.S. counterparts. The prospect of changing the structural nature of Canada’s economy is unlikely. But we can adopt measures to ensure that our small and medium-sized business sector can achieve a higher rate of productivity growth through expanded adoption of ICTs. These measures may take the form of communications initiatives. They may also be supported by fiscal measures to encourage ICT adoption and the training of employees to ensure maximum utilization of the ICT infrastructure. Action is also needed to remove gratuitous barriers to adoption. For example, the industry has raised the issue of retail sales tax on software and telecommunications products and received encouraging indications of support from MEDT.

Recommendation #1

The province should seek to be a leader in the investment and application of productivity enhancing ICT tools, services and solutions, in particular by small and medium-sized enterprises (SMEs). From its work with other industrial sectors, the ICT industry has found that SMEs are more likely to adopt ICT solutions based on the counsel of peers and the trusted networks of business collaborators (such as accountants, industry associations and some government programs). Therefore, the industry recommends a close consultation with itself, MEDT and the Ministry for Small Business and Entrepreneurship (MSBE) to identify a program building on MSBE’s existing network and programs to provide educational opportunities on ICT adoption to SMEs throughout Ontario. This program may involve collaboration with universities offering programs of SMB counsel.

Recommendation #2

Twenty percent of Canadian SMEs have no ICT personnel. Pressures of business place the emphasis on “core” functions with the result that many SMEs have no resources for effective ICT solution identification and adoption. Yet Ontario leads other Canadian jurisdictions with an apprenticeships tax credit that includes seven ICT functions. The industry therefore proposes to work with government (MEDT and MTCU) to retain, expand and promote the use of the apprenticeship tax credits among SMEs. Other measures such as direct incentives to assist in the acquisition of consultative ICT support are also recommended.

PROCUREMENT

Government procurement represents a significant expenditure. It is often viewed in terms of possible links to economic development strategies. Ontario is bound by the Agreement on Internal Trade (AIT). Ontario’s procurement policy is to procure goods and services in an open, fair and transparent manner. There is still the opportunity to get benefit from the buying power of Ontario. Ontario is a large sophisticated buyer of ICT. As a model user of ICT, Ontario can support innovation.

Recommendation #1 – Review of Technology Opportunities

Conduct a review by the Ontario Government of the opportunities for the use of ICT solutions to best address public policy priorities while generating economic benefits from fuelling the world leadership of Ontario's ICT industry. The priority areas that come to mind include:

- **Healthcare: see Recommendation #3;**
- **Government Services and Government Operations: The ICT industry is prepared to work with the Office of the Corporate Chief Information Office (OCCIO) to review opportunities for further significant improvements in services to the public and in government operations. The large, complex operations of the Ontario Government and its work to date to use technology to provide breakthrough improvements in services to the public and in government operations make it ideally suited to generate ICT-enabled applications that the Ontario ICT industry can then bring to other markets;**
- **Other areas where there should be similar opportunities include the environment, energy and security.**

In many cases, the greatest benefit in these applications will come from using an enterprise-wide approach.

The emphasis should be on identifying the most important win-win opportunities where the interests of the Ontario Government are best served and the opportunities for ICT-driven economic development are optimized. Because of this, it would be appropriate for MEDT to be the champion for this exercise. The ICT industry is prepared to work and consult with MEDT and whoever else is charged by the Ontario Government to carry out these reviews.

Recommendation #2 – Procurement Process

Continue improvements to the procurement process to facilitate the effectiveness of the lead customer role of the Ontario public sector and to support the view of Ontario as an ICT-friendly jurisdiction. This will include:

- **Ongoing work on Terms and Conditions (T&Cs) to make selling to the Ontario Government easier and to open the process to as many qualified suppliers as possible;**
- **Continuing to look for opportunities for more flexible procurement processes, such as pre-procurement consultations, draft RFPs, post-award negotiations, solution-oriented procurements;**
- **Most importantly, move the procurement process from a paper-based system to a technology-based system. This would not only reflect current best practice in supply chain management, it is absolutely essential if the procurement process for Ontario is to be able to serve its needs and the needs of its suppliers adequately in light of growing demands on resources, time and effort.**

The ICT industry supports the need for Ontario to place a major priority on addressing a growing shortage of skills to be able to operate a modern, best-practice procurement operation in light of demographic and other challenges. The ICT industry is prepared to share its own knowledge of best practices in the areas of procurement and also to participate in any interchange programs that may be used in addressing this challenge.

Recommendation #3 – Pre-Procurement Pilots

Set up a pre-procurement pilot program in MEDT to seek out opportunities to use innovative, new technology in cases that would help develop a product or solution using Ontario as a lead customer. This would include a fund of \$10-20 million per year to lower the cost and the risk of acquisition for client ministries.

MEDT would consult with the OCCIO and CTO, MRI and other sources of technology expertise on the choice of pilots. Subject to the undertaking of suitability assessments on any potential pilots from both business and technology perspectives, MEDT would consult with Ministry of Government Services Supply Chain Management with respect to developing and applying criteria to determine when and how to use pre-procurement pilots in a way that is fair and transparent.