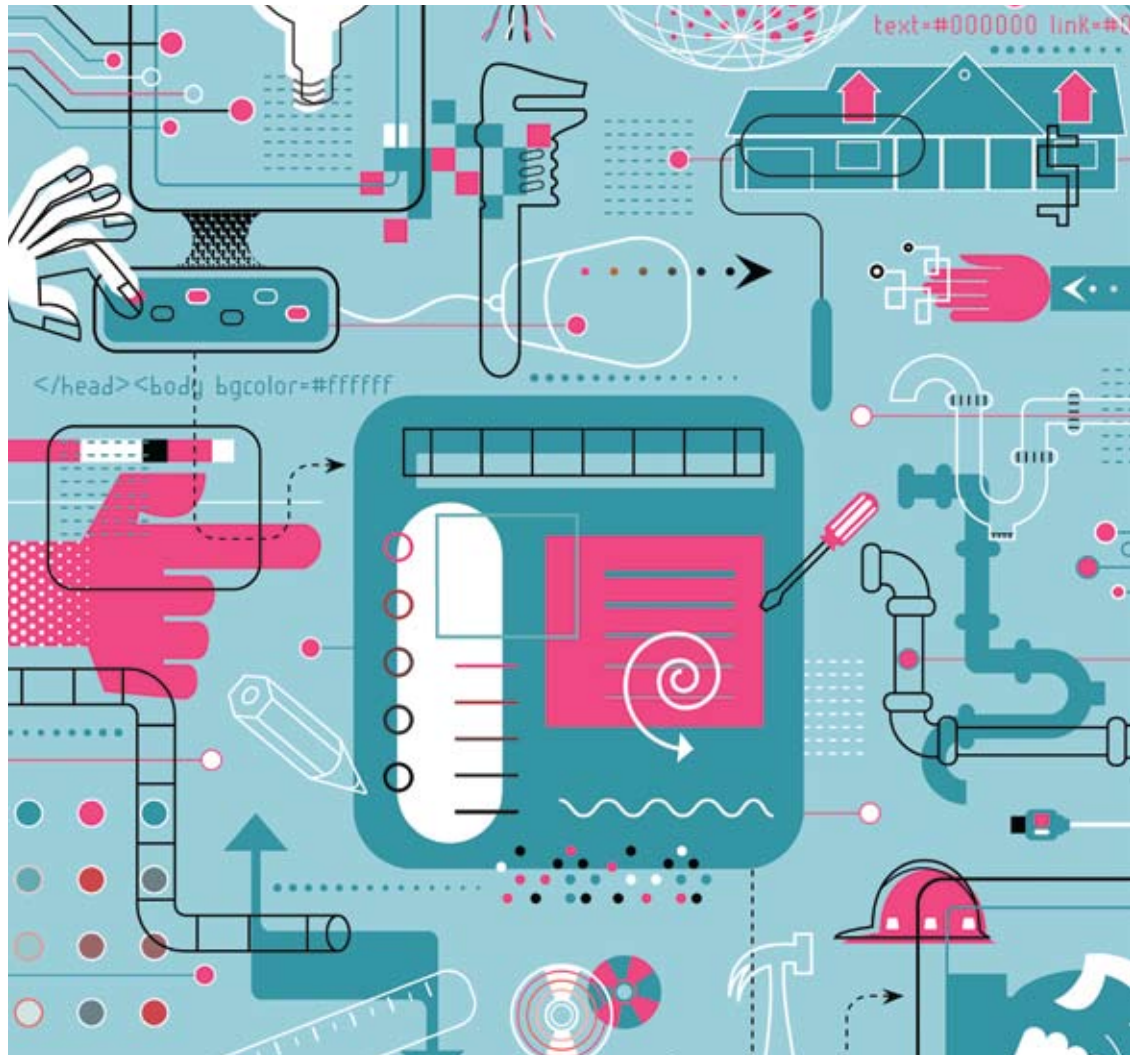# Upping our game

A National ICT Strategy for Canada

2008/2009 Annual Review

ITAC
INFORMATION TECHNOLOGY
ASSOCIATION OF CANADA

ACTI
ASSOCIATION CANADIENNE
DE LA TECHNOLOGIE DE L'INFORMATION

ICT: leading and enabling Canada's transformation into a knowledge-based economy

Contents

Digital dreams

The development and diffusion of technology is, at its heart, an aspirational pursuit. Those of us who work in information technology are driven by the quest to find ways to solve previously unsolvable problems, to build stronger, more equitable, societies, to vanquish disease and ignorance, and to build more competitive economies and enterprises.

At ITAC, the community of Canada's information and communications technology, we devote a great deal of energy, thought and discourse to these aspirations, this hope for a stronger nation and a better world, for we believe that the tools, products and services that we produce are enablers of prosperity, innovation, equality and excellence in all dimensions of modern life.

Continued innovation within the ICT industry in Canada and around the world will increase productivity and prosperity. These innovations will touch all aspects of life, including commerce, culture, education, healthcare and civil society. ICT has changed the world we live in and will produce even more change in the years to come. Consider a few examples of its potential.

Commerce

Without risk of overstatement, we are at a significant juncture of reassessment and change in the realm of commerce. As grim as the economic meltdown has been in many business sectors, as the current cycle turns upward new opportunities will emerge. And, as business restructures, ICT will drive much of the change. Countries that understand this and strategize accordingly will do much better than those that miss this crucial shift.

Infrastructure and an ongoing supply of talented workers with the right array of skills will play critical roles in ensuring that Canada continues to develop a knowledge-based economy.

If there are lessons for Canada to learn from the economic crisis, they are clear signals that even in our traditional sectors such as natural resources and manufacturing, the high-value jobs upon which we must build our economy in the 21st century will be technology-centric. To survive and grow in this new economic reality, business will be forced to find new ways of marketing and selling into new and traditional markets.

The tighter border, with its attendant burden of paperwork and delays for transported shipments, has already encouraged some Canadian entrepreneurs to find alternative ways of getting their goods to their U.S. customers. E-commerce applications and ICT-powered marketing techniques will be a critical area of growth as Canadian business struggles to compete in an increasingly global market where the borders are harder than ever to cross.

Continued innovation and increased investment in the ICT sector itself will also play important roles in sustaining the growth of Canada's economy. Learning from the examples of recent success stories such as Research In Motion, but also the lessons of the technology leaders who put Canada at the forefront of the ICT boom in the 1980s and 1990s, will be essential. Just as Canada was the leader in rolling out a national fibre optic network and pushing the development of digital telecommunications equipment, the leading players in this century will require foresight, wise investment and supportive government policy. With this support, Canada can be a leader in the global digital economy.

Culture

Few aspects of society have been touched more by sweeping technological change than the cultural sphere. Primary among the changes wrought by the advent of digitization has been the relationship between audiences and art — and, by extension, its creators.

Paul Théberge, the Canada Research Chair in Technological Mediations of Culture at Carleton

University, notes that this impact is likely to dominate all types of art. "Technology," he says, "is going to affect culture in profound ways at every level, from the way in which artists make their work to the way artists connect with their audiences and the way people exchange objects they admire with one another."

The digitization of art and the widespread deployment through the Internet of cultural materials present challenges and opportunities. We must, for example, ensure that the widespread deployment of artistic work does not come at the expense of artists who have every right to expect remuneration from the art they produce. Updating the way we think about intellectual property to meet the demands of the digital age is a complex problem that will require ingenuity and will to solve.

However, solving it in a progressive manner will unlock the doorway to tremendous possibilities for artists and audiences alike. Canada Online, a proposal to digitize all Canada while remaining respectful of the rights of the originators, gives us a glimpse of these possibilities. Canada Online aims to digitize more than 5 million items, including books, maps, images, journals, newspapers, sound recordings and films. In the process, it will deploy Canadian technology and innovations to complete this task, simultaneously creating a major new industry and catapulting Canada into a leadership position while creating an unprecedented online stage for Canada's cultural heritage.

Education

Despite the presence of computers in many classrooms, and the role that academics have played in developing ICT innovations, education is still wide open to technological revolution. In summarizing findings by the Institute of Research on Learning Technology Visions, the Information Technology & Innovation Foundation (ITIF) report "Digital Quality of Life" concluded: "Using computer technology for 15 minutes a day is a start, but the real power of IT will be unleashed only when we begin to fundamentally rethink the entire learning process in a way that maximizes its potential."

A vision for the future includes expanding the traditional pedagogical approach to take advantage of the range of possibilities offered by ICT, including applications yet to be developed.

Among the types of applications that have met with success are those related to some aspect of electronic gaming. These types of play-based, experiential learning programs also recognize the existence of multiple styles and speeds of learning.

A 21st century knowledge-based workforce will require persistent and ongoing education. With the growing emphasis on lifelong learning — including technical skills upgrading and on-the-job re-training — ICT holds great potential to meet the requirement for online, any-time learning. Many programs already take advantage of the capability to provide self-grading and self-paced learning, which is particularly advantageous for a task-based course of study, such as technical requirements or language training.

Healthcare

Information, and the capacity to share it, is paramount in medicine, and nowhere does ICT hold as much promise, or have as much potential for positive change, as in healthcare. As significant as the advances in diagnosis and patient care have already been, substantial change is still to come, both in terms of providing better, more timely, services for patients and for making the healthcare system more efficient and effective. This is especially important in Canada, where our healthcare system has become clogged, costs have escalated, and where our vast geography leads to many inequities.

Through the ages, communication has been at the core of the physician-patient relationship. Today, ICT is enriching every aspect of it.

The new model begins with the increasing range of advanced diagnostic tools available to family physicians and specialists. Sophisticated medical imaging technology is now in widespread use for a variety of applications, and advancements in materials and circuitry have enabled smaller, less-expensive equipment. For example, portable electrocardiographs — which cost about 10 per cent as much as traditional models — are now in use by first-responders and remote clinics and are present in some homes. Broadband technology is utilized to share results with clinicians, who are rapidly taking the next steps toward expanding the benefits.

These next steps start with advancements in the doctor's office. The first stage was the introduction of electronic patient records, scheduling and billing. While the billing component is mandated in many provinces to comply with health insurance regulations, the shift to digital scheduling and record keeping has been slower.

Other health practitioners are surprisingly mobile and much of the focus on eHealth tools revolves around portability. An overwhelming percentage of residents and medical students now rely on PDAs for ready access to online clinical resource materials and time management tools.

The missing piece is a national medical record that would meet the needs of physicians, clinics, hospitals and patients alike. Canada has invested extensively in creating a national electronic health record. We must complete this task as quickly as possible if we are to harvest the benefits of improved health outcomes and the commercialization of innovations generated by this initiative.

Civil society

In his extensive report on the future of Canadian communities — informed by public submissions and consultations across the country — former British Columbia premier Mike Harcourt envisioned a time when our cities and communities are "sustainable places of exceptional beauty, neighbourliness and prosperity, rich in ideas, confidence, diversity, creativity and innovation, where all people are included economically, socially and politically." His findings align closely with those of ITIF, as reported in "Digital Quality of Life," which concluded that ICT is playing a primary role in building strong, sustainable communities and linking communities together into a more cohesive social fabric.

For many, a sustainable community equates to livability — a diverse city or town where you can live safely, with access to essential services and ample opportunities to participate in civic life. As the world becomes increasingly urbanized, technology will continue to dominate, both by providing the means to make life in cities more livable and by flattening the inequities between urban and rural life.

As one of the four pillars of sustainability — adopted universally by social planners — environmental concerns rely heavily on new technologies. When we speak of environmental technology, we conjure images of wind farms, fuel cells, biodegradable materials and ingeniously repurposed consumer goods. But we must not overlook the fact that ICTs are fundamental components in making these new breakthroughs fulfill their potential. ICT can also play a key role in making old technology and traditional processes better for the environment. The significant infrastructure investment the Obama administration has made in the U.S. in order to build a "smarter" electrical grid demonstrates an understanding of this at a national policy level. More locally, municipalities deploying smart sensors for better traffic management are using ICT to cut commute times and reduce carbon emissions. Telecommunications and Internet-based technology can also reduce emissions spent in travelling to business meetings. Any discussion of environmental technology and the role it will play in ensuring a sustainable environment must include ICT.

A second pillar of sustainable development — social concerns — also embraces ICT. As witnessed by the phenomenal success of Facebook, the past dominance of MySpace and the growing use of Twitter, we are driven by our need to communicate and share ideas, both large and frivolous, with each other. As with the cultural concerns discussed above, these demands are somewhat technology-agnostic, but they have become pervasive enough to give new credence to a concept that Canadian technology futurist Paul Hoffert championed in the early 1990s. His vision, presented before a

Canadian Radio-television and Telecommunications Commission hearing on broadband, was for a household server that would become as ubiquitous as the furnace and water heater. Given the range of communications devices that have proliferated and the desire to share information across platforms, the home-based server, combined with the application-sharing possibilities of cloud computing, may yet become a reality.

It is clear that ICT will continue to fuel our desire to reach out to one another and empower citizen engagement. As the ITIF report stated: "Achieving [a vibrant civil society] requires an active citizenry with the values, skills and knowledge to better their communities. IT can help by providing the tools to increase civic participation, improve community awareness and organize individuals for collective action."

The task of nation building requires the engagement and ingenuity of all, deploying all of the resources at their disposal. Canada has entered the digital age in a position of strength. Our geography and history have endowed us with a firm grasp of the importance of technology to overcome barriers of distance, terrain and human understanding. We can lead in this new era if we have the will to do so. This leadership will ensure a strong, prosperous nation for generations to come.

Bernard Courtois
President and CEO, ITAC

Foreword
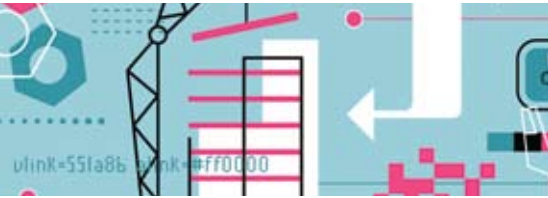
The information and communications technology (ICT) industry is the largest, most R&D-intensive and most mature segment of Canada's knowledge-based economy. It directly employs nearly 600,000 Canadians — about 20 per cent more than the auto sector even when that sector was at its peak. Its workforce is well-educated: 43 per cent of those who work in ICT have a university degree compared with the national average of 24 per cent; and it is well-paid, with compensation 47 per cent higher than the national average. The ICT industry accounts for 38 per cent of all private-sector research and development. Its annual $6 billion R&D spending is six times that of the aerospace sector. ICT's share of GDP is 4.7 per cent, compared with 3.5 per cent for forestry and 3 per cent for agriculture. Our rate of growth has been above the national average since 1997.

Yes, ICT is a large and important part of Canada's economy, with high-paying jobs and robust economic growth based on innovation-intensive commerce. But it also has a unique role as an enabler of innovation and economic growth. In fact, it is the key driver of productivity in a modern economy. For example, in addition to the 600,000 employees in the ICT industry itself, there are 500,000 ICT workers throughout the rest of the Canadian economy, an indication of the degree to which ICT is a fundamental and pervasive element of every sector of the economy. That is why studies show that productivity performance is largely a factor of the degree of ICT adoption.

The ICT industry is keenly aware of the structural changes taking place in the global economy. These changes are driving developed economies such as Canada's to look to innovation and creativity as the basis for their future success and prosperity. As technology, ICT is actually enabling many of the global shifts taking place. As an industry, ICT is in the front lines of globalization. Many of our companies export almost all of what they produce; even smaller firms operate as mini-multinationals.

Canada's ICT industry has a unique perspective on what Canada needs to do to succeed in this new environment, and a responsibility to advance thinking and strategy in this area. Some time ago, ITAC began work on devising a strategy, a structured approach, to improve Canada's global competitiveness. This led us to identifying key areas where we could and should target actions that would significantly improve our competitive position.

There is no doubt that Canada has valuable assets to enable it to succeed in today's environment, including a well-educated population, a relatively strong fiscal position, an increasingly competitive tax regime, a safe and stable business and social environment, a wealth of natural resources and an enviable quality of life. But there has been growing concern among policymakers and business leaders that these assets are not going to be enough to sustain a strong leadership position. There is a sense that we need to pursue with greater intensity the changes that are needed to strengthen our competitive position in an increasingly knowledge- and innovation-based global economy. The current global economic crisis simply heightens this need: the crisis will accelerate restructuring of the global economy and different countries will come out much stronger or much weaker, depending on how they have acted to position themselves for future long-term success. This point was eloquently made by the Science Technology and Innovation Council in its recent report:

Maintaining our investments in science, technology and innovation will help us ensure that we bounce back quickly from the current global economic downturn. Our investments in

science, technology and innovation can help us to build our current strengths, help us to leapfrog competitors who are not in as good financial shape as we are, and provide us with opportunities to shore up the areas where we are not among the world leaders. But failing to act, or making the wrong decisions, will turn the short-term problems we face in the current global financial crisis into a long-term, possibly permanent decline in our living standards. Now is the time to up our game.[1]

We have looked at the work of various organizations, such as the Conference Board of Canada, the Organization for Economic Co-Operation and Development (OECD), the Economist Business Unit and the World Economic Forum, that assess the relative competitiveness of different countries. While the rankings and measures used vary, there is much commonality about what Canada needs to change in order to significantly improve its competitiveness rankings. We have coupled this data with information from our own companies about how decisions are made to invest in different countries and attract global mandates, as well as about how to grow domestic companies to global scale.

We have identified the following key areas to pursue in order to meaningfully improve Canada's competitive position. In each case we have chosen the levers where we can have the most impact on improving our position, and we have looked for the course to work on and the metrics or targets we should set. In particular, we sought to identify where we need to pursue our objectives with greater intensity.

Talent

In an increasingly knowledge-based economy, it is requisite that Canada pursue a knowledge advantage for its workforce, and we are glad that the Federal Government has recognized this with its *Advantage Canada* strategy. This means we need to have sufficient numbers of people with the right skills here in Canada in order to build Canadian-based operations and to use ICT to drive growth. Recognizing that we do start from a good basic position, there are areas where we must do better in order to secure our future. We need: more children taking math, science and technology educational streams and more grads in related disciplines; more graduates with the right package of education (essentially more people with a combination of technology and business acumen); and better integration of skilled foreign workers.

21st century infrastructure

Infrastructure is consistently used as a measure of global competi-tiveness. But it is normally viewed in a "bricks and mortar" sense.

While Canada does need to continue to upgrade this traditional form of infrastructure, it is essential in a 21st century economy to recognize that infrastructure goes well beyond bricks and mortar. Here again, we are happy to see our Federal Government taking this direction in its January 2009 Budget. Broadband and electronic health records are now internalized in our view of infrastructure.

The modern view of infrastructure includes ICT generally, and specifically:

→ Broadband: this is the fundamental infrastructure of the 21st century;
→ eHealth: electronic medical and health records, prescription repositories, diagnostic imaging and their interoperability are the foundation of a sustainable, high-performance health system;
→ Digitized content: in the Internet world, we need to digitize our written archives; otherwise this would be like building museums, libraries and archive repositories without any roads by which to access them.

Innovation and technology adoption

Innovation is a key element of competitiveness in today's world, particularly for a country like Canada, but it is an area in which Canada consistently falls short. Innovation is not easily quantified. It is as much about doing things differently and meeting market needs as it is about technology, but it manifests itself through key quantifiable indicators, notably ICT adoption and R&D spending, particularly business R&D. While the means to improve our position in terms of innovation and business R&D spending have remained elusive, we need to take into account emerging thinking and devise ways of moving ourselves into a leadership position. As a country, we must develop a mind-set of leadership in the use of innovation and technology to drive business and governmental productivity in all sectors, to address environmental challenges and to transform our healthcare system.

Competitive tax regime

With a relatively high cost position and a market that is small in global terms and has less growth potential than developing economies, we need to be able to count on other competitive advantages. Here again our Federal Government is on the right track in pursuing a competitive tax advantage. Between our Federal and Provincial Governments, we are significantly improving our position in terms of our taxes on business and investment. The recent decision by the Ontario Government, with significant help from the Federal Government, to harmonize its sales tax regime with the GST is a highly progressive step in improving the competitiveness of our tax system. The key areas for further improvement are: the competitiveness of our personal

1 "State of the Nation 2008: Canada's Science, Technology and Innovation System," Science, Technology and Innovation Council 2009, page 5.

income taxes; and the shortcomings of our otherwise good fiscal support for business R&D.

Access to capital

Capital is essential to the development of home-grown technology enterprises. Canada has a solid banking system but its venture capital pool is thin and limited in size. This has been a barrier to the development of growth companies, particularly in the technology sector. While we cannot replicate the size and depth of the U.S. venture capital market, which is by far the largest and most mature in the world, we need to find ways to accelerate the development of this sector in Canada by removing barriers to foreign venture capital and growing the pool of venture capital within our country. During the current global economic crisis, which emanates from the financial sector, this situation has reached crisis proportions.

Smart legal and regulatory regime

Canada's legal and regulatory regime is well regarded, although we need to continue to work to make it "smart" — effective without being too cumbersome. And in today's world we need, over and above that, a legal and regulatory regime that will drive success and leadership in the Internet economy. The Internet is profoundly changing how we interact and do business, and how our traditionally regulated communications industries operate. We must look at our existing regime and any proposed regulatory interventions from the standpoint of whether they will foster world-leading investment in and adoption and development of technology.

National ICT strategy

Finally, Canada needs a national ICT strategy. We have explained that the ICT industry is uniquely important to drive growth and prosperity for Canada, both in itself and in its enabler role. As outlined above, we face significant challenges and opportunities, many of which are interdependent. This means that an integrated approach is required, which is where lead thinking is going on the international scene. Canada's ICT industry strongly believes that our country should develop a strategy that will coalesce our thinking and our efforts in order to maximize the ability of the ICT industry to realize its potential for Canada and Canada's ability to take advantage of ICT for competitive, cross-sectoral success and growth. That strategy should comprise the elements identified above and in the sections that follow.

In the pages that follow, we have elaborated in issue papers on each of the above topics, including a discussion of measurable targets and the role of various players.

Canada's got talent, just not enough
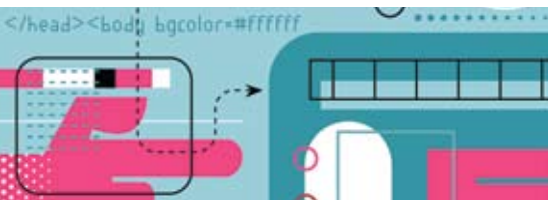
ITAC's ICT talent strategy for Canada focuses on two high-growth, value-adding job categories:
→ Business professionals who have the knowledge, skills and personal qualities to lead and support the effective, competitive use of information technologies;
→ Specialized technologists — both ICT-focused and multidisciplinary — who operate at the leading edge of innovation in every field, including the arts, logistics, energy, manufacturing, telecommunications and life sciences.

Our next economy is highly dependent on these people and the roles they will play in new and reinvented industries. The ICT job market has grown through the past seven years and is expected to exceed overall labour-market growth as the recession ends. But in every region of the country, employers can't find enough qualified business-ICT professionals. It is estimated that we will need some 65,000 more by 2015. And highly specialized ICT-skilled technologists are critical to innovation and productivity in every industry as we reinvent the economy for the post-recession 21st century.

The supply of qualified ICT professionals comes from three sources: the post-secondary education system, immigration and mid-career retraining. Immigrants have been especially successful in Canada's highly technical ICT occupations, but less so in business/ICT jobs where language skills and contextual knowledge are crucial. And retraining (of manufacturing workers, for example) is likely to be most effective for lower- and mid-skilled ICT occupations such as technicians (some 200,000 ICT workers).

Therefore, ITAC's priority focus is on the supply and quality of leadership ICT talent from Canada's post-secondary education system. As a secondary focus, we will support the recruitment and integration of qualified immigrants.

This is a multi-faceted issue. The central challenges are as follows:
→ Enrolments in ICT-related post-secondary programs have declined for most of the past decade;
→ Career choosers in high school, and the parents, teachers, guidance counselors, media and others who influence them, are typically unaware of the new, attractive ICT careers, or of the pathways that lead to them;
→ The structure and marketing of post-secondary programs by colleges and universities are not optimized to attract students to the new pathways — where they exist;
→ Female students, for a variety of social and cultural reasons, tend not to be interested in traditional "nerdy" ICT jobs. They are typically unaware of today's new, more relevant and multifaceted ICT career paths;
→ Educators, employers and government do not know whether we have the right mix of specialized and multidisciplinary ICT-related degree programs;
→ The many initiatives that aim to attract young people into technology and science careers have failed to substantially overcome the challenges described here, for a variety of reasons;
→ Coordination of employer involvement in attracting students, delivering education and facilitating workforce entry depends on individual employers and educational institutions;
→ Many employers need to do better at hiring, developing, motivating and retaining multi-faceted business/ICT professionals.

ITAC's talent agenda has the following five strategic objectives:

1 Increase enrolments and graduations in priority ICT-related post-secondary programs across the age cohort. Target: *10 per cent annual growth in university and college enrolments and graduations (specific programs TBD)*.

2 Increase share of female enrolments and graduations. Target: *38 per cent female participation in university and college enrolments and graduations of specified programs, by 2012*.

3 Better align the curricula and activities of specialized post-secondary ICT-related programs to ensure that their graduates are ready to meet employer needs. Action: *Conduct in-depth research on demand/ supply for ICT specialists (both ICT-focused and multidisciplinary)*.

4 Improve the competencies of employers to hire, develop, retain and motivate ICT professionals. Action: *ITAC foster a peer initiative through its HR committee*. Metric: *20 per cent improvement in retention rates, male and female*.

5 Improve Canada's performance in producing science and engineering graduates. Metric: *move from 20th to 5th in OECD rankings by 2015*.

To accomplish these objectives, ITAC will use its resources, and foster the involvement of its members, in selected industry activities that support the following initiatives:
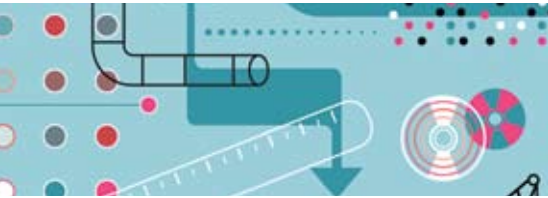
→ Increase awareness among high school students and influencers of the nature and attractiveness of 21st century ICT careers, as well as the educational pathways to these careers. Ensure distinctive messaging for young women and students with various interests. Support activities by members and other industry organizations, e.g. Canadian Coalition for Tomorrow's ICT Skills (CCICT) ICT Week; Information and Communications Technology Council (ICTC) Focus on Information Technology (FIT); etc. Metric: *Improved perceptions using as benchmark the 2009 CCICT Conference Board of Canada survey*;

→ Support formation of a nationally branded, widely recognized professional business/ICT undergraduate degree program. Action: *Talent committee to involve ITAC members in CCICT's initiative*;

→ Support creation of a national online marketplace for specialized and multidisciplinary ICT-related programs for career choosers, employers, educators, and government policymakers (multipartite — with various stakeholders). Action: *Talent committee to coordinate ITAC members to contribute to CCICT "IT★+You" website*;

→ Foster greatly increased employer participation in the design, delivery and workforce entry activities of priority post-secondary ICT-related education programs. Action: *Talent committee to work with ITAC members and industry organizations to optimize existing and potential activities in this area*;

→ Launch an executive peer program to improve the career value proposition for ICT professionals in member/client/end user organizations. Action: *Identify senior ICT human resources executive to lead this initiative*;

→ Support the efforts of the private, public and NGO sectors to promote Science Technology Engineering and Mathematics (STEM) literacy through a national campaign.

Recommendations

- Develop a national ICT skills strategy for Canada.

- Coalesce the efforts of the private, public and NGO sectors to promote STEM literacy through a national campaign. Aim to improve Canada's performance in producing science and engineering graduates (moving from 20th to 5th by 2015).

- Industry and government should invest in programs that foster increased enrolments in next-generation ICT careers (business/ICT professionals and specialized/multi-disciplinary technologists). They should support national collaborations among post-secondary institutions, employers and career transition organizations that improve pathways to these next-generation careers.

- The ICT sector should collaborate more closely with the academic sector to strengthen existing cross-disciplinary programs and encourage the creation of more.

Building a 21st century infrastructure

In times of economic crisis, governments frequently undertake accelerated investment in infrastructure to create jobs and stimulate ailing economies. Since the New Deal, this type of investment has conventionally been the construction of roads, harbours, buildings and electrification projects.

Infrastructure is also a basic foundation for economic competitiveness. ITAC believes that in the 21st century, we must expand our view of infrastructure spending to include the modern infrastructure that underpins the data and Internet environment upon which so much of modern commerce and social interaction are carried.

This expansion of thinking is necessary to merely keep up with the times. A more modern perspective of what constitutes infrastructure will actually produce higher-value return than conventional thinking. As the Information Technology and Innovation Foundation (ITIF), based in Washington, D.C., has demonstrated, investment in digital infrastructure creates a network effect that offers superior job creation benefits because of a "network multiplier" effect. The network multiplier "arises from the new consumer and business behaviours, functionalities and downstream industries enabled by the ICT infrastructure. The network effect employment multiplier refers to the new jobs that will be created through the new applications and services — many manifested in entirely new industries and/or firms — that digital infrastructure makes possible."[2] ITIF argues that digital investments spur a host of innovative new products and services. And since wages in the ICT sector are higher than the national average (by 47 per cent in Canada), the jobs created are of higher value intrinsically and for the process of innovation that they seed.

In this regard, we applaud the Federal Government for explicitly identifying technologies such as broadband and electronic health records as infrastructure investments in its January 2009 Budget.

Recommendation

- Ensure that plans for infrastructure investment embrace modern concepts about what constitutes infrastructure, including investments in broadband, electronic health and the digitization of cultural content.

This land is broadband

Canada, by force of its immense geography, is a networked nation. We were early adopters of all forms of modern communications and were at one time global leaders in the use of advanced broadband networks. In recent years we have lost this leadership position as other countries have surpassed us in broadband penetration, Internet and electronic commerce use. With communications as a core Canadian competency, we must reassert our leadership and reclaim our place at the forefront of countries pioneering in the digital age.

The availability of broadband, throughout the country and at a fair price, is crucial if Canadian society and the Canadian economy are to take advantage of the benefits of greater connectivity — including enhanced access to government services, eHealth, e-education, information upon which to make investment and purchasing decisions, and so on.

Simply put, ITAC firmly believes that Canada should develop an approach that fits our

2 Atkinson, Robert D., Daniel Castro and Stephen J. Ezell, "The Digital Road to Recovery: A Stimulus Plan to Create Jobs, Boost Productivity and Revitalize America," Information Technology and Innovation Foundation, January 2008.

circumstances and repositions us among the world leaders. We need to finish the rollout of broadband to all Canadians across the country, and then we need to move to higher capacity and speed on a world-class scale.

As an illustration of what other countries are up to, Australia, which is also aiming to be number one in the world, has just embarked on a plan that calls for the expenditure of $43 billion to provide fibre to 90 per cent of Australian homes and 12-megabyte service to the remaining 10 per cent. This shows the economic and social value that Australia places on next-generation broadband. And in the United States, President Obama has said he would like his country to be a world leader.

Canada encompasses a vast territory and has a low population density, but our current position well ahead of the United States and Australia and our key advantage of competing wireline infrastructures serving more than 90 per cent of Canadians, coupled with coming advances in fixed and mobile wireless technologies, mean that we can and should aim to regain our place of leadership.

It must be stressed that the rollout of broadband must be accompanied by a commensurate focus on efforts to secure Canada's role and existing networks. A recent statement by U.S. President Barack Obama — "In short, America's economic prosperity in the 21st century will depend on cyber security" — is equally applicable to Canada.[3]

Recommendations

- Assess our current situation and public and private investment plans and devise a "Made in Canada" solution to get Canada into a position of next-generation broadband leadership by 2014.
- Complete and implement a comprehensive cyber security strategy for Canada.

A prescription for eHealth

The basic building blocks of a modern, sustainable and high-performing healthcare system include electronic health and medical records, prescription repositories, digital diagnostic imaging systems and related digital technologies that will enable high performance, better patient outcomes, and better use of our skilled medical personnel so they can treat far more patients. In the U.S., the Obama administration has identified this as a key target. So have Canadian governments, with strong provincial investments and collaborative federal investment through Canada Health Infoway. Indeed, in its January 2009 Budget, the Federal Government included the following in its Infrastructure spending:

An efficient and effective health care system continues to be a top priority for Canadians.

The implementation of health information systems in Canada, often referred to as electronic health records, is a critical element to achieving this goal by enhancing the safety, quality and efficiency of the health care system. Such systems will not only contribute to reducing waste and duplication within the health system, they will also contribute to preventing adverse drug events, improving the management of chronic disease, improving access to care and boosting productivity.

For the last several years, Canada Health Infoway has been working toward the goal of having electronic health records in place across Canada. Infoway's actions are already translating into real benefits for patients throughout Canada. For example, in Nova Scotia, the shared diagnostic imaging program provides the delivery of digital images of X-rays, MRIs, CT scans and ultrasounds to authorized health practitioners where and when they are needed. Nationally, Infoway estimates that investments in digital diagnostic imaging technology have already increased productivity to a level equivalent of adding more than 500 radiologists to Canada's health care system. Patients in remote northern communities are now connected with health care professionals in urban centres through telehealth — improving their access to care.

Budget 2009 provides Canada Health Infoway with $500 million to support the goal of having 50 per cent of Canadians with an electronic health record by 2010. In addition, this funding will be used to speed up the implementation of electronic medical record systems for physicians and integrated points of service for hospitals, pharmacies, community care facilities and patients. An electronic medical record system allows doctors and other health care providers to chart patient health information using a computer, thereby avoiding duplication of testing and helping to ensure patient safety and effective treatment.

This $500-million investment will not only enhance the safety, quality and efficiency of the health care system, but will also result in a significant positive contribution to Canada's economy, including the creation of thousands of sustainable, knowledge-based jobs throughout Canada.[4]

We must invest in finishing the job. In doing so, we will reap the great benefits that will come from an integrated, complete system. The improvements accruing to our prized health system will make our nation more competitive and will have a stimulating effect on jobs and globally competitive ICT operations. We already have a sound, federated model to pursue this in Canada Health Infoway. It is an organization with a proven track record in terms of its governance and results.

3 "Remarks by the President on Securing our Nation's Cyber Infrastructure," Washington, May 29, 2009.

4 Canada's Economic Action Plan: Budget 2009, page 152.

Digitizing Canadian content

Many countries have taken steps to digitize the repositories of knowledge that reside in centuries of written words and to make that digitized content freely available to their citizens and to the world electronically. Canada lags behind other countries in our productive use of the Internet for this purpose.

The Canada Online project, which involves the creation of a Canadian digital library, would address this deficiency by providing Canadians with the ability to access the entire output of Canadian publishing. This activity would be funded and executed in partnership with various levels of government and with the owners of the source content, who would maintain ownership rights but would commit to making the information freely available to all Canadians, most of whom are already online. As a next step, Canada Online would provide the content needed for Canadians to participate effectively in the new economy. As an objective, Canada can and should look to make its 21st century infrastructure a competitive advantage.

The need for innovation and technology adoption
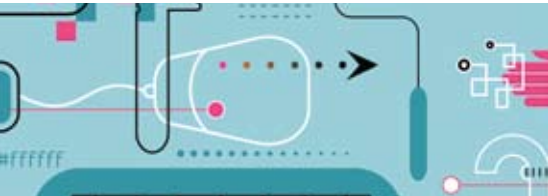
In its recent report, "Innovation and Business Strategy: Why Canada Falls Short," the Council of Canadian Academies explains the importance of innovation to our competitiveness and prosperity:

Innovation matters for businesses because novel products and more efficient processes are the principal means of making businesses more competitive. It is through innovation that businesses find ways to generate more value from existing resources. As will be argued in what follows, innovation is thus the main driver of productivity growth — the increased output of goods and services per hour worked. Productivity growth is, in turn, associated with the international competitiveness and commercial dynamism on which high employment and good jobs ultimately depend.[5]

The Council goes on to say that in tomorrow's world, innovation is going to be more necessary than ever, and expresses concern in the face of evidence suggesting that Canadian business is lagging in innovation relative not only to the United States, but also to many in our peer group of economically advanced countries in the OECD.

We have observed similarly poor rankings for Canada by a range of commentators and reports and have even seen this phenomenon in comparing the behaviour of our customers across different countries. In light of the role of ICT in driving competitiveness and productivity across a modern economy, ITAC is well-placed to understand that it is imperative for Canada to improve its performance.

By its nature, innovation does not easily lend itself to comprehensive quantitative measurement. Nor is it obvious what levers can be used to improve a country's performance. The key quantifiable metrics are Business Expenditure on R&D (BERD) and ICT adoption. These are important inputs to innovation, and they correlate with overall innovation performance and with the key outcome of innovation — multi-factor productivity — which in turn is the driver of competitiveness and prosperity.

We discuss the topic of BERD under the section on a Competitive Tax Regime.

In the pages that follow, we address ICT Adoption under four headings: *ICT adoption and productivity; Governments as lead users of ICT; ICT and healthcare; and ICT and the environment*.

ICT adoption and productivity

Beneath the surface of Canada's current (and, it is to be hoped, short-term) economic problems, we face a systemic productivity challenge. There is a persistent 10 per cent to 20 per cent gap in labour productivity between Canada and the United States that troubles many economists and public policymakers. It is now widely recognized that the use of technology is a key contributor to productivity growth at both the enterprise and the macro-economic level. In a study conducted in 2003, the Centre for the Study of Living Standards attributed a significant share of Canada's productivity gap to the nation's comparatively poor rates of technology adoption.[6]

The chorus of concern about Canada's under-use of technology has grown. In its most recent annual report, the Institute for Competitiveness and Prosperity charted the technology investment gap between Canada and the United States from 1987 through 2007 and suggested "closing the investment gap offers the potential for closing the prosperity gap. With higher machinery, equipment and software investment our workforce could be more

5 "Report in Focus, Innovation and Business Strategy: Why Canada Falls Short," Council of Canadian Academies, April 2009, page 3.
6 Sharpe, Andrew, "Why are Americans More Productive than Canadians," Productivity Monitor, Spring 2003.

productive." The report also notes that, "Investment in assets like machinery and technology and in our own skills and knowledge is a crucial driver of increased productivity, and productivity growth is necessary if we are to realize our full potential."[7]

The Council of Canadian Academies says:

Investment in advanced machinery and equipment (M&E) is a principal source of productivity growth, both through its direct labour-augmenting effect and through its induced impact on innovation, including innovations in the business reorganization required to fully exploit new M&E. (Most of this induced impact is captured statistically as part of MFP growth.)

Investment in M&E by Canadian business has not always lagged the United States as has been the case with R&D, though a gap has opened up since the early 1990s. The gap has been almost entirely due to Canada's persistently weaker investment in ICT.

*The panel believes that the ICT investment picture is consistent with the view that Canadian businesses on the whole — but always with notable exceptions — are technology followers, not leaders, and are reluctant to adopt new practices until they have been well proven south of the border. In today's fast-paced world, that strategy is unlikely to work as well as it once did.[8]*

While there is general agreement that Canada should do more to increase our level of technology adoption, there is no clear consensus about the best measures to do so. Free market logic dictates that if businesses understand that technology investments can make them more competitive, they will make those investments without tax-based incentives to do so. Therefore, the logic continues, strategies to reduce overall tax burden should be sufficient to address this issue.

Research conducted for ITAC by IDC Canada in 2006, however, suggests that a number of factors may confound this logic. In particular, it appears that the pressures of operating a small or medium-sized enterprise complicate decision-making. IDC asked small and medium-sized business owners for their views on the

Canadian businesses under-invest in productivity-enhancing information and communication technology

Business sector machinery, equipment and software investment per worker, 1987-2007
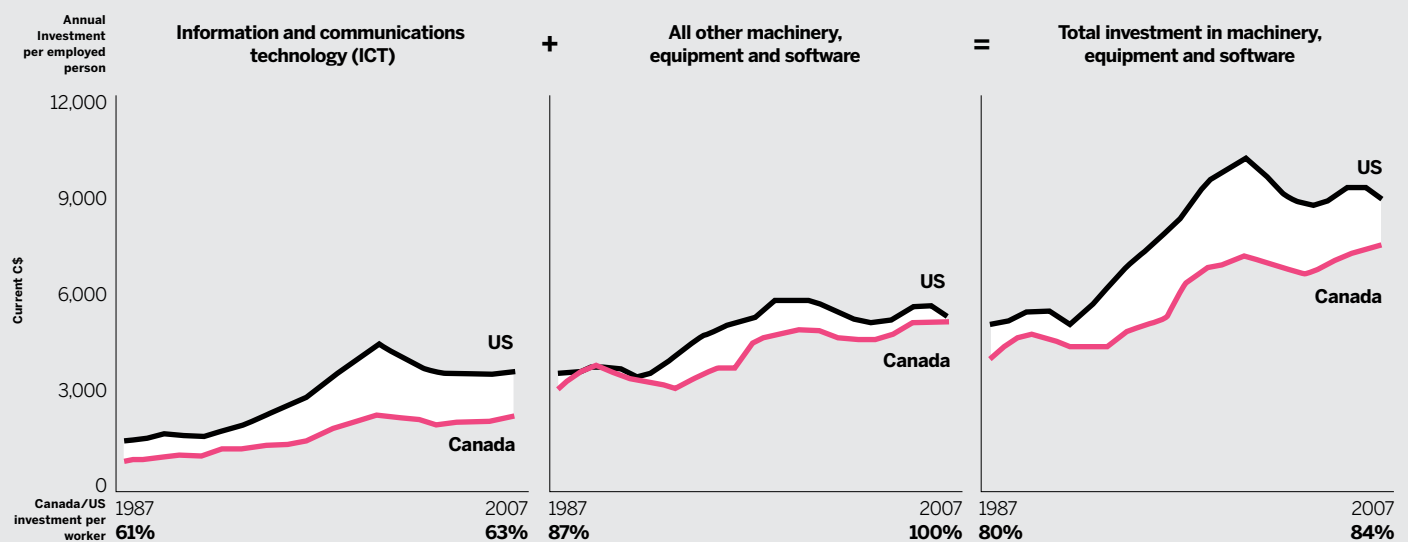
Note: US dollars converted to Canadian dollars using PPP for M&E.
Source: Institute for Competitiveness & Prosperity analysis based on data from Statistics Canada (special tabulations); Labour Force Survey (CANSIM Table 282-0002); US Department of Commerce, Bureau of Economic Analysis; US Bureau of Labor Statistics, Current Population Survey; CSLS Database of Information and Communication Technology (ICT) Investment and Capital Stock Trends: Canada vs. United States, available online: www.csls.ca/data/ict.asp

7 "Opportunity in the Turmoil," Institute for Competitiveness and Prosperity | Martin Prosperity Institute, Report on Canada 2009, page 42.

8 "Report in Focus, Innovation and Business Strategy: Why Canada Falls Short," Council of Canadian Academies, April 2009, pages 8-9.

impact of ICT investment on their businesses. Seventy-nine per cent of respondents reported that improving productivity was a leading business priority. And the majority of respondents clearly understood that ICT investments would help them achieve this goal. Yet they still ranked non-ICT investments over ICT investments as a critical priority for their businesses.[9] This study led us to conclude that in spite of their belief in the productivity-improving benefits of ICT investment, the owners of small and medium-sized businesses are much more ready to make further investments in labour, operating and non-ICT capital expense categories than they are in ICT.

Clearly, initiatives must be taken to persuade business owners to alter their investment behaviour. In its 2007 Budget, the Government of Ontario allocated $25 million for the Canadian Manufacturers and Exporters (CME) to create a program to promote lean, green and energy-efficient investments among its members, as well as the more widespread use of ICT. The SMART program, which CME created, aims to inform, educate and provide funding assistance to manufacturers to help overcome aversions to technology investment. ITAC is pleased to support CME in this program and looks forward to an assessment of the effectiveness of programs of this nature.

ITAC and others have advocated more direct, tax-based policy instruments to help boost productivity-enhancing technology investments. One of the most thorough and thoughtful recommendations came from the Telecommunications Policy Review Panel in 2006:

The Federal Government should introduce an ICT adoption tax credit targeted at small and medium-sized enterprises and having the following features:

a. It should apply to investments in ICT assets and to complementary expenses related to ICT adoption;

b. It should define ICT assets broadly as including computers, communications equipment, software and computerized manufacturing equipment;

c. Complementary expenditures related to the effective adoption of ICTs such as costs related to ICT training and process re-engineering necessary for ICT adoption should be eligible for the tax credit;

d. In order to increase its effectiveness and reduce the associated tax expenditures, the ICT adoption tax credit should apply only to incremental ICT adoption costs; and

e. The tax credit should be fully refundable when no tax is payable.[10]

In its January 2009 Budget, the Federal Government addressed

this need, with a time-limited, 100 per cent capital cost allowance and elimination of the half-year rule for investments in computers and their operating systems. Various provinces followed suit. This is an excellent measure, although it omits applications software, which is as important, if not more, in driving competitive performance today. It will remain to be seen whether this incentive, coupled with lower tax rates on investment, global economic restructuring and competition, will be enough to finally change this fundamental competitiveness gap, or whether and what further measures are required.

Recommendation

• Canada needs continued, clear and persistent communication from government and industry leaders that business needs to step up its investments in technology. We need to review our performance and the measures we have taken, such as capital cost allowance incentives, and determine whether further measures are needed. Our objective should be to close the Canada-U.S. gap in ICT investment per worker, currently at 37.4 per cent, to 13 per cent by 2015.

Governments as lead users of ICT

Governments, at all jurisdictional levels, are among the most important customers of information and communications technology companies. The value of the public sector market alone — well above $7 billion in Canada — would be sufficient to make them so. But beyond this purchasing power, governments are also prized in their role as "model users" of technology, inspiring other players in the economy to make similar investments and serving as important reference clients for Canadian exporters seeking new markets abroad. These two qualities combine to make public sector procurement a key priority for our industry.

Governments can achieve a major win-win by buying outcomes rather than inputs, and using ICT to drive improved performance — in fact, doing exactly what they are encouraging businesses to do. This will be particularly important if we are to dig out of massive deficits. In the meantime, it will help to sustain lasting jobs in an industry that will be the growth engine for our economy.

Governments sometimes encounter difficulties in managing large technology projects. However, best practices have evolved significantly in this area, including the development of requisite skills and the implementation of appropriate project governance. Canada's ICT industry is willing and eager to work with government in addressing these issues.

9 Hyjek, Michael and Jamie Sharp, "Does ICT Matter to SMBs in Canada?," IDC 2006.
10 "Report of the Telecommunications Policy Review Panel," Ottawa 2006, Recommendation 7-5.

ICT and healthcare

While the adoption of technology is key to productivity growth throughout our traded economy, its benefits in healthcare are even more profound.

Canada's publicly funded healthcare system, acclaimed as one of the most accessible and universal systems in the world, is a source of pride for Canadians. However, healthcare costs in Canada are escalating rapidly, threatening the system's ability to remain affordable and effective. Since 2000, for example, costs have increased an average of seven per cent annually, exceeding the growth rate of Canada's economy. Canada now spends $121 billion, or 10 per cent of its gross domestic product, on healthcare. The Conference Board of Canada predicts that if the trend in rising costs continues, provincial governments will soon be devoting half of their budgets to healthcare, a clearly unsustainable situation.

Meanwhile, with the greying of baby boomers, pressures on the system are mounting. According to a study released by PricewaterhouseCoopers, the number of working taxpayers out-numbered non-working pensioners in the developed world by three to one in 1999. But by 2030, the ratio will fall to 1.5 to one, putting an even greater strain on healthcare budgets.

Strategic investments in ICT are one measure that can reduce this strain. For example, the Commission on the Future of Health Care in Canada (2002) recommended that Canada invest in healthcare ICT as a cost-effective way to improve efficiency, enhance productivity and provide better patient care. There is a growing body of research evidence that demonstrates that the increased use of ICT in healthcare settings can result in significant improvements in health outcomes.

Unfortunately, Canada's overall investment in healthcare ICT is low compared with those in other developed economies. A recent report from the Conference Board of Canada compared Canada's performance in healthcare delivery with six other OECD countries deemed to be among the best in terms of health status outcomes. The paper noted that Canadian acute care organizations spend between 1.8 per cent and 2.5 per cent of their budgets on ICT. This compares unfavourably with Sweden, which invests 4 per cent on ICT. The Conference Board ranks Sweden second (after Switzerland) in the overall performance of its health system, while Canada is ranked 13th. Sweden achieves its ranking despite the fact that its population has a higher percentage of people older than 65 than that of any other country studied. The report concludes, "When the healthcare workforce is able to use tools such as ICT and participate in continuing education, it results in substantial enhancement to patient care and greater productivity."

Canada is known for its world-leading capabilities in ICT. Yet we spend less in healthcare ICT than other countries and less than in other service sectors. This is despite the fact that ICT investments have been proven, time and time again in most other industries, to significantly reduce costs, enhance productivity and improve service. Equally important, this lack of investment belies the fact that healthcare ICT is a burgeoning global market. By investing in and building the capacity for Canadian companies to innovate in healthcare ICT, Canada could make lucrative inroads into this growing market.

ICT and the environment

The ICT industry believes strongly in environmental stewardship. The planet must be preserved for future generations. ITAC believes that by taking a resolutely pro-innovation and pro-technology approach, we can solve our environmental challenges without affecting our prosperity. Indeed, in doing so we can build significant knowledge-based economic opportunities.

Canada's ICT enterprises are already leaders in waste reduction and eco-efficiency initiatives in their own operations. A number of years ago, the Canadian ICT industry promoted the creation of the Electronic Products Stewardship Canada initiative. Our industry is also involved with Natural Resources Canada on energy efficient and stand-by power initiatives and with Environment Canada on

chemicals management and toxic reduction. However, these efforts are relatively modest compared with the environmental gains that can be made through the application of ICT across other sectors of the Canadian economy. Such applications will serve to significantly enhance efficiency in the use of resources — to the great benefit of the environment, productivity and innovation.

Studies show that substantial environmental advances can be achieved through the use of information and communications technology and ICT-related process improvements such as tele-working. These are often overlooked in favour of other measures or technologies that may actually be of less impact.

The Global eSustainability Initiative's 2008 study, for example, suggests that 15 per cent of global carbon emissions in 2020 can be cut through application of ICT across all sectors of the economy — smart motor systems, smart logistics, smart buildings and smart grids.[11] A subsequent report published by Bell Canada and the World Wildlife Fund, "High Tech Key to Low Carbon Future," provided Canada-specific findings: "By making better use of Information and Communications Technology (ICT), Canada's GHG emissions can be reduced by 20 million tonnes a year ... That's equivalent to taking 3.2 million cars off the road, or 7 per cent of Canada's annual Kyoto obligation. With more aggressive implementation, reductions as high as 36 million tonnes a year are realistically achievable in a 2020 timeframe. Because most of these cuts come from improving energy efficiency, cost savings to business, government and individuals are conservatively estimated at $7.5 billion - $13 billion per year."[12]

Recommendations

- Industry and government should work together to further investigate the potential environmental benefits of ICT among various industrial sectors, and to identify the most effective means by which investment in ICT can be encouraged across the Canadian economy. Canada's environmental and greenhouse gas action plan should include an explicit component of performance improvement to be achieved through increased use of information and communications technology, as well as ICT-related process improvements such as tele-working.

---

11 "SMART 2020: Enabling the low carbon economy in the information age," 2008.
12 "High Tech Key to Low Carbon Future," 2008.

Canada needs a more competitive tax regime

By 2010, the tax policy measures implemented in recent budgets (both federal and provincial) to reduce the taxation burden will move Canada from a position of one of the highest-taxed members of G-7 to the lowest. Particularly praiseworthy is the measure announced by the Ontario Government (with significant support from the Federal Government) to harmonize the Retail Sales Tax with GST. This measure will not only improve Ontario's Marginal Effective Tax Rate (METR), but it will significantly reduce the administrative tax burden on Ontario-based business. It is an excellent example of bold and timely tax policy. The ICT sector believes Canada can and should pursue an ongoing tax advantage in order to ensure our competitiveness in the face of larger, faster-growing and lower-cost economies.

Low effective marginal tax rates will certainly have an impact on the success of Canadian businesses. And they will influence the decisions of businesses from other jurisdictions to invest in Canada. But low METR alone will not be sufficient to ensure that high-risk investments, such as those made in research and development, are made here. Jurisdictions all around the world highly prize and compete fiercely for R&D investments. Canada pioneered tax policy innovations to attract this investment by establishing the Scientific Research and Experimental Development (SR&ED) tax credits in the 1980s.

But in the past two decades many other nations have created or improved their own programs to stimulate R&D. Some of these programs are specifically targeted to industrial R&D, such as the SR&ED program, but some take other forms of support such as property tax relief, targeted government programs or other indirect means of support for R&D. France has increased the attractiveness of its tax credit program, and other countries, notably the U.S., provide much more direct funding for R&D. This is an indication of the extent to which R&D activity and the ancillary economic benefits accruing from it, such as high value jobs, innovation, productivity and spin-offs, are prized by governments around the world.

Another factor that fuels the global competition for R&D investment is the mobile nature of this investment. R&D can occur virtually anywhere in the world with the right pool of highly skilled knowledge workers. This reality has helped to fuel the economic transformation occurring in relatively low-cost jurisdictions in Asia and Eastern Europe. The combination of lower wage rates, mass production of engineers, scientists with advanced degrees, and government support (direct or indirect) place Canada's position as an R&D active nation under strong competitive pressure. Like any other economic activity, companies will locate their R&D operations wherever it makes the most economic sense.

Those responsible for managing Canada's R&D facilities live and breathe this reality daily. They face pressure not only from their business rivals but internally with their own companies as well. They must regularly justify, based on the quality and cost of outputs, why research and development operations should remain in Canada.

The Federal Government contends that the SR&ED program is "one of the most advantageous systems in the industrialized world for promoting business investment in R&D." Without question, SR&ED has helped to fuel Canada's growth as a technology-creating nation. But logically, we should expect that a country with the most advantageous incentive program should be among the top performers in business research and development investment. This is not the case. Canada ranks 14th among OECD member countries for business expenditures on R&D — a middle-of-the-road position at best. Clearly our SR&ED program is not sufficient to put us in a leadership position. The Science Technology and Innovation Council notes that while Canada's tax credits for R&D are one of the highest in the world for small and

medium-sized companies, "… other countries, notably economies such as Mexico, France, China, India and Singapore offer much higher credits for R&D performed by large firms."[13]

The Council of Canadian Academies elaborates on this point:

A rigorous cost-benefit analysis of the SR&ED estimated a net economic benefit of 11 cents per dollar on tax expenditure, or a benefit of about $400 million annually for the economy. Although the SR&ED program is generally popular with business, there has also been persistent criticism of its design because the incentive is of much less benefit for large firms when tough economic conditions reduce or eliminate taxable income and there is pressure to delay R&D spending. A refundable SR&ED credit (which is available for very small R&D performers) would strengthen the incentive for larger firms to sustain the pace and continuity of R&D through downturns.[14]

Over the past ten years, speaking from the perspective of the largest industrial sector investor in R&D in Canada, ITAC has advocated reform of the SR&ED program to fulfill one simple principle. We believe that the credits should be refundable so that all R&D investors should have access to the credits that they have earned.

Recommendation

• SR&ED plays a sustaining role in the life of knowledge-based companies. Broadening eligibility and access to refundable SR&ED credits will help high-growth companies weather tightened credit markets. Broadening SR&ED's refundability will have an immediate impact on key jobs and projects. We recommend reform of SR&ED to ensure all R&D investors can benefit from the program.

---

13 "State of the Nation 2008: Canada's Science, Technology and Innovation System," Science, Technology and Innovation Council 2009, page 22.
14 "Report in Focus, Innovation and Business Strategy: Why Canada Falls Short", Council of Canadian Academies, April 2009, page 18.
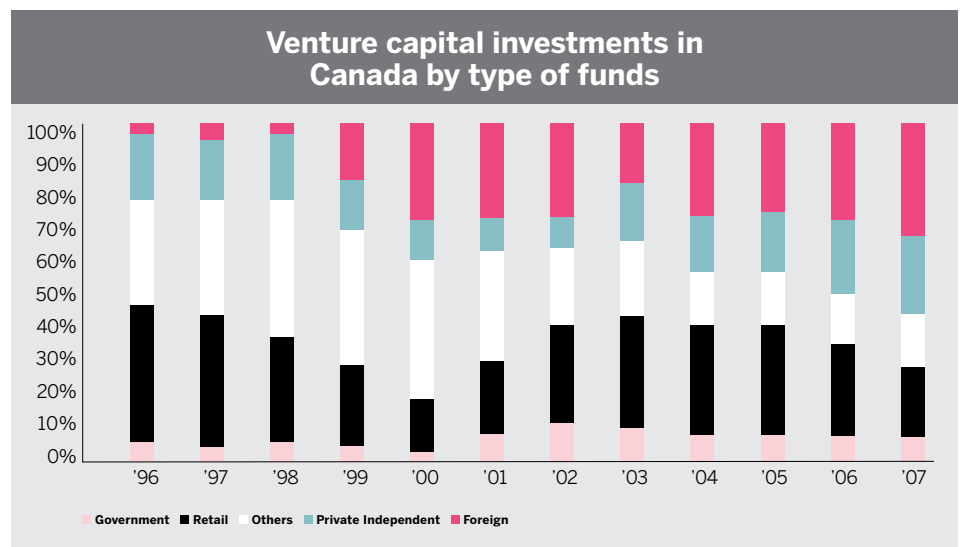
Opening up access to capital

The global financial crisis has focused significant public policy concern upon the sustainability of financial institutions. Much of the discourse leading up to the 2009 Federal Budget revolved around maintaining the liquidity of banks themselves and the industrial-economy businesses that depend upon them.

However, innovation-based businesses in ICT and in other knowledge-based sectors are generally not as dependent upon bank financing as other businesses.

Because of the high-risk, high-potential-return characteristics and the relatively long gestation time of R&D-intensive ventures, these companies typically do not build their businesses on loan financing. Financing generally begins with an initial "friends and family" round. Angel investment might supersede or follow this round. Government programs can also be helpful at the early stages of a technology company's evolution. The National Research Council's Industrial Research Assistance Program and the Ontario Centre of Excellence's Investment Accelerator Fund are two examples of government programs that provide funding and management consultation for young ventures.

As a company evolves and prepares to bring its products to market, its costs escalate, precipitating an initial round of venture capital backing. The venture capital industry in Canada is young in comparison with other jurisdictions. Ninety-two per cent of Canadian funds were started after 1994. This relative immaturity hurt performance and left many funds particularly vulnerable to the downturn in the technology sector in 2001. This, in part, explains the current crisis in Canadian venture capital funding. Canadian venture capital markets are at the lowest level of funding we have seen since 1997.

This could spell the demise of many promising companies currently seeking financing rounds, companies that represent the next generation of potential technology success stories. It also places heavier pressure on entrepreneurs to seek funding in more robust VC markets, such as the United States. The table below illustrates clearly the influx of foreign-based venture capital. And, while foreign investment is generally perceived as a positive force, it can present

Venture capital investments in Canada by type of funds

Legend: Government | Retail | Others | Private Independent | Foreign

Source of data: Thomson Reuters

a challenge to our desire to build home-grown technology champions. Venture capitalists like to keep a close eye on their investment. This frequently requires the funded Canadian enterprise to locate staff or even move the whole operation closer to the funding source.

Number of seed and start-up companies financed by VC in Canada
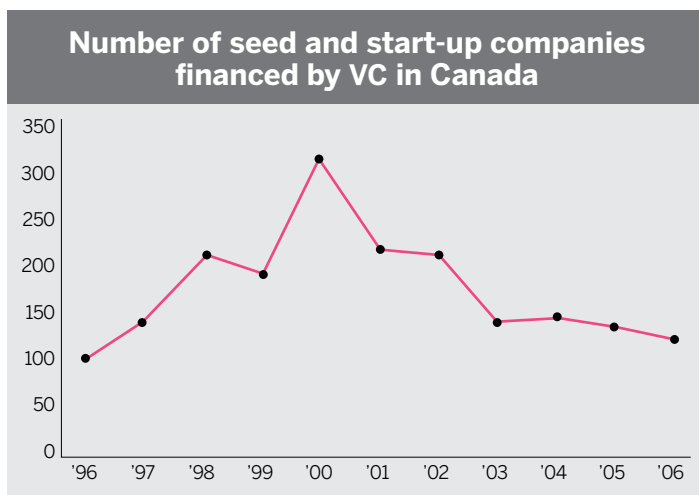
To return our innovation-based sector to health, to help ensure the evolution of the next Canadian tech ventures to achieve the $1-billion revenue threshold, we need to attend to the troubles in Canada's venture capital market. These problems are many and, in combination, effectively snarl the venture capital industry. Labour-Sponsored Investment Funds (LSIFs) were introduced in Canada in 1988 to encourage Canadians to invest in small and mid-sized companies. LSIFs have been among the most active players in the early-stage funding of technology ventures, but they did not generally perform well. In the summer of 2005, the Ontario Government announced its intention to eliminate the 15 per cent tax credit that served as an incentive for LSIF investors, a move that has effectively ended any new LSIF investment in our largest province. Recently, the Canadian Retail Venture Capital Association has suggested new measures to stimulate the supply of retail venture capital. Their proposal would allow individual investors in the best Canadian companies to target specific sectors with increased investment up to a threshold of $10,000, help eliminate red tape, reduce investment costs and redefine reserve requirements. Increasing the investment ticket will encourage marginally higher levels of investment and help to secure a greater pool of venture capital.

Other suggestions for expanding the VC pool have centred around government involvement in the creation of "Fund of Funds" programs. Fund of Funds programs are a collective investment scheme that manages a portfolio of investments in funds rather than direct investments in companies. In Canada, British Columbia and Ontario have launched Fund of Funds initiatives that, with matching private sector investment, will theoretically flow significant resources into the venture capital market. In a climate of venture capital conservatism, however, it is unclear how much of this will actually fuel new ventures.

Quebec has taken strong measures to increase the flow of venture capital in its 2009 Budget.

The Federal Government's two major vehicles for fostering emerging companies are the Business Development Bank (BDC) and Export Development Canada (EDC). BDC provides both loans and venture capital to businesses in all industries, with a focus on small and medium-sized firms. EDC provides Canadian exporting companies with trade finance and risk management services. In Budget 2009, the Government increased the authorized capital limits of EDC and BDC by $1.5 billion each. In November 2008, the Government had announced $350 million of new funding for BDC. It also appears to grasp the urgency of bringing additional financing to the marketplace. But it is not clear how much of the announced funds will go to venture capital, and more needs to be done to mitigate the downward trend in the financing of knowledge-based ventures.

Recommendations

- Adopt the Retail Venture Capital Association's proposal for enhancements to Canada's retail venture capital market.
- Ensure that "Fund of Funds" programs' funds find their way into the market to support emerging ventures directly. This may take the form of a short-term earmark from the funds and a temporary mandate to enable direct investment.
- Ensure that BDC programs address liquidity issues for venture-backed firms as well as conventionally financed firms. This may require temporary mandate changes.

It is time for a smarter legal and regulatory regime

Like most business organizations, ITAC favours a light-handed approach to regulation. However, even the most freely competitive pursuit requires rules of engagement, and an innovation-driven Canadian industry needs more than forbearance from the regulatory regime.

Canada needs a regulatory and legislative philosophy that grasps the new realities of an increasingly digital and global marketplace. ITAC believes that Canada's laws and regulations should reflect the dynamic pace of change in the knowledge-based industries. We also believe that they should reflect our place at the leading edge of a technological revolution. This requires a regime that builds confidence among customers and fosters new forms of high-value commerce. In short, Canada requires a regulatory regime that is smart.

Canada's current legal and regulatory regime is well regarded, but there is certainly room for improvement. In today's world, we need a legal and regulatory regime that will drive success and leadership in the Internet economy. We must look at our existing regime and any proposed regulatory interventions from the standpoint of whether they will foster world-leading adoption and development of technology and, in particular, whether they will impede or promote investment. ITAC notes that the recently introduced Bill C-27, the *Electronic Commerce Protection Act*, is a clear step forward. We look forward to the opportunity to work with government on this bill and others to ensure they will enhance confidence in the Internet.

But we have larger issues to tackle. The Internet is profoundly changing how Canadians interact and do business, as well as the business of our traditionally regulated communications industries. Yet key framework legislation, including our Broadcasting Act, Telecommunications Act and Copyright Act, essentially pre-date the Internet era. We need a concerted effort to update our legal and regulatory regime to reflect where things are going rather than where they've been. The recent CRTC decision to extend the exemption of new media from broadcasting regulations (Broadcasting Regulatory Policy CRTC 2009-329) makes this point quite vividly. It also calls for a national digital strategy.

Furthermore, our policy regime must reflect the trend toward RFID and sensor networks, an "Internet of things" where a wide variety of devices will be networked and will communicate with people and with other devices. Canada must recognize this trend and seek to be a leader in this area as well. In addition, there are specific policy issues that will arise. For example, this "Internet of things" must be secured, and must have the means to "authenticate" the "identities" of all endpoints, whether human or otherwise, if they are to be relied upon to fulfill their designated functions.

Recommendations

- Work aggressively toward a comprehensive approach to a legal and regulatory regime that will foster leadership in investment, development and use of technology in the Internet economy.

- Review our existing framework legislation and regulatory regimes (including the Broadcasting Act, the Telecommunications Act and the Copyright Act) in order to coherently reflect the Internet world and the interdependencies that it brings.

- Review the need for new legislation or for amendments to existing legislation to help secure confidence in the Internet economy and implement the appropriate legislative changes in areas such as privacy, spam, spyware, identity theft and pretexting.

- Review other potential barriers to Internet-based commerce in areas such as border, customs and postal rates, rules and procedures.

- Develop a comprehensive policy to promote Canadian leadership in the deployment and use of the Internet of things, including RFID.

A national ICT strategy for Canada

Summary of recommendations

Canada's got talent, just not enough
Recommendations
→ Develop a national ICT skills strategy for Canada.
→ Coalesce the efforts of the private, public and NGO sectors to promote STEM literacy through a national campaign. Aim to improve Canada's performance in producing science and engineering graduates (moving from 20th to 5th by 2015).
→ Industry and government should invest in programs that foster increased enrolments in next-generation ICT careers (business/ICT professionals and specialized/multi-disciplinary technologists). They should support national collaborations among post-secondary institutions, employers and career transition organizations that improve pathways to these next-generation careers.
→ The ICT sector should collaborate more closely with the academic sector to strengthen existing cross-disciplinary programs and encourage the creation of more.

Building a 21st century infrastructure
Recommendation
→ Ensure that plans for infrastructure investment embrace modern concepts about what constitutes infrastructure, including investments in broadband, electronic health and the digitization of cultural content.

This land is broadband
Recommendations
→ Assess our current situation and public and private investment plans and devise a "Made in Canada" solution to get Canada into a position of leadership in next-generation broadband by 2014.
→ Complete and implement a comprehensive cyber security strategy for Canada.

A prescription for eHealth
Recommendation
→ Complete the task of building an integrated Canadian Electronic Health Infrastructure by 2015.

Digitizing Canadian content
Recommendation
→ The Federal Government should proceed with the Canada Online project.

The need for innovation and technology adoption
ICT adoption and productivity
Recommendation
→ Canada needs continued, clear and persistent communication from government and industry leaders that business needs to step up its investments in technology. We need to review our performance and the measures we have taken, such as capital cost allowance incentives, and determine whether further measures are needed. Our objective should be to close the Canada-U.S. gap in ICT investment per worker, which is currently at 37.4 per cent, to 13 per cent by 2015.

Governments as lead users of ICT
Recommendations
→ That governments adopt a policy to be the best in the world in the use of technology.
→ That governments adopt the objective of remaining at the top of world rankings in e-government.
→ That governments continue to address streamlining of cumbersome procurement processes and contractual terms that impede the ability of technology firms to compete for their business.
→ That governments be knowledgeable buyers, buying solutions rather than inputs.
→ That governments play the role of lead user of new innovations through programs outside the procurement process.

ICT and healthcare
Recommendation
→ Increase the amount of operational healthcare funding dedicated to ICT to at least 4 per cent, to match the ICT investment in healthcare of the world's leaders in healthcare technology and services.

ICT and the environment
Recommendation
→ Industry and government should work together to further investigate the potential environmental benefits of the application of ICT to various industrial sectors, and to identify the most effective means by which investment in ICT can be encouraged across the Canadian economy. Canada's environmental and greenhouse gas action plan should include an explicit component of performance improvement to be achieved through increased use of information and communications technology as well as ICT-related process improvements such as tele-working.

Canada needs a more competitive tax regime

Recommendation

→ SR&ED plays a sustaining role in the life of knowledge-based companies. Broadening eligibility and access to refundable SR&ED credits will help high-growth companies weather tightened credit markets. Broadening SR&ED's refundability will have an immediate impact on key jobs and projects. We recommend reform of SR&ED to ensure all R&D investors can benefit from the program.

Opening up access to capital

Recommendations

→ Adopt the Retail Venture Capital Association's proposal for enhancements to Canada's retail venture capital market.

→ Ensure that "Fund of Funds" programs' funds find their way into the market to support emerging ventures directly. This may take the form of a short-term earmark from the funds and a temporary mandate to enable direct investment.

→ Ensure that BDC programs address liquidity issues for venture-backed firms as well as conventionally financed firms. This may require temporary mandate changes.

It is time for a smarter legal and regulatory regime

Recommendations

→ Work aggressively toward a comprehensive approach to a legal and regulatory regime that will foster leadership in investment, development and use of technology in the Internet economy.

→ Review our existing framework legislation and regulatory regimes (including the Broadcasting Act, the Telecommunications Act and the Copyright Act) in order to coherently reflect the Internet world and the interdependencies that it brings.

→ Review the need for new legislation or for amendments to existing legislation to help secure confidence in the Internet economy and implement the appropriate legislative changes in areas such as privacy, spam, spyware, identity theft and pretexting.

→ Review other potential barriers to Internet-based commerce in areas such as border, customs and postal rates, rules and procedures.

→ Develop a comprehensive policy to promote Canadian leadership in the deployment and use of the Internet of things, including RFID.

2008/2009 Board of Directors

ITAC Executive

Chair
Robert Courteau
COO
SAP North America

Vice-Chair
Tom Turchet
VP, Software, General Business
IBM Corp.

Vice-Chair
Robert Watson
President & CEO
SaskTel

Treasurer
Robert Crow
Vice President, Industry,
Government & University Affairs
Research In Motion Ltd.

ITAC Directors

Terry Ansari
Vice President,
Business Solutions Group
Cisco Systems Canada Co.

Ben Bar-Haim
General Manager, AMD Canada
Corporate Vice President,
Software, AMD

Mirko Bibic
Senior Vice-President,
Regulatory and Government Affairs
Bell Canada

Frédéric Boulanger
President
Macadamian Software
Engineering

Adam Chowaniec*
Chairman of the Board
Tundra Semiconductor
Past Chair of ITAC

Paul Cooper
Vice President & General Manager,
Relationship Sales
Dell Canada

Brian Doody
Chief Executive Officer
DALSA Corporation

Henk Dykhuizen
Vice President,
Oracle Government,
Education & Healthcare
Oracle Corporation

Yves Mayrand
Vice President Corporate Affairs
Cogeco Cable Inc.

Doug McCuaig
Senior Vice President &
General Manager, Western Canada,
Ontario and Atlantic Canada
CGI Group Inc.

Michael Murphy
Vice President &
General Manager, Canada
Symantec (Canada) Corp.

Jim Muzyka
Vice President &
General Manager,
Xerox Global Services
Xerox Canada Ltd.

Eugene Roman
Chief Information Officer
Open Text Corporation

Michael Sangster
Vice President,
Government Relations
TELUS

Phil Sorgen
President
Microsoft Canada Co.

David Ticoll
CEO
Convergent Strategies

Immediate Past Chair
David MacDonald*
President & CEO
Softchoice Corporation

Past Chair
Doug Cooper*
Country Manager
Intel of Canada Ltd.

Chair, Board of Governors
Paul Tsaparis*
President & CEO
Hewlett-Packard (Canada) Co.

President
Bernard Courtois*
President & CEO
Information Technology
Association of Canada

John Broere
Chief Operating Officer
Sierra Systems Group Inc.

Richard Campitelli*
Senior Vice-President
SAP Education North America
SAP Canada Inc.

Andy Canham
Senior Vice-President,
Systems Line of Business,
Global Sales and Services
Sun Microsystems

Ross Chevalier
President & Chief
Technology Officer
Novell Canada

Jen Evans
President
Sequentia Environics

Wayne Karpoff
CEO
Yotta Yotta Inc.

Bob Leech
Partner
Deloitte LLP

Vito Mabrucco
Managing Director
IDC Canada

Darren Nippard*
Client Group Managing Director
Accenture Inc.

Brian O'Higgins
Special Assistant To The CTO
Trend Micro

David Rathbun
President
xwave

Rick Reid
President
Tech Data

Dave Wattling*
Managing Partner, Courtyard-Group
ITAC Health Chair

Charlie Whelan
President
Computer Sciences Canada Inc.

Photo not available:

Dino DiBernardo
President
Freescale Semiconductor Inc.

*ex-officio

ITAC Members

Regular Members
3M Health Information Systems
4 Office Automation Limited
Abacus.ca Web Services
ABELSoft Corporation
Accenture Inc.
Accreon
ACT Canada
Adjuvant Informatics Corp.
Adlib Software
Advanced Micro Devices, Inc.
AGFA Healthcare
Aizan Technologies Inc.
Aliant Inc.
Aliant Telecom
Allan Wilson and Associates
Alleyne Inc.
Alphaglobal – IT Inc.
Anyware Group
Aon Canada
Applied Informatics for Health Society
Applied Technology Solutions Inc. (ATS)
Atria Networks LP (incorporating Telecom Ottawa)
Austco Communication Systems
Autodesk Canada
B Sharp Technologies, Inc.
Banyan Commerce
Beacon Partners, Inc.
Bell Canada
Bell Enterprise
Bell ExpressVU
Bell Globemedia
Bell Labs Ventures
Bell Mobility Inc.
Bell Nordiq Group Inc.
Bell Security Solutions Inc. (BSSI)
Bell West
bitHeads inc.
BMC Software (Canada)
Bramwell Management Services
Branham Group Inc.
Canada Post – Emerging Services
Carefx
Cerner Corporation
Certicom Corp.
CGI Group Inc.
Chartwell Inc.
Chelsea Consulting Group
Cherniak Software
Chipworks Inc.
Cientis Technologies
Cinnabar Networks
CIO Summit, The
Cisco Systems Canada Co.
Clarity.ca Inc.
Clinicare Corporation
Clinicvault Inc.
Cogeco Cable Inc.
Cogeco Data Services
Cognos Inc.
Compugen Inc.
Computer Sciences Canada Inc.
Consulting Cadre International Inc.
Contingent Workforce Solutions Inc.
Convergent Strategies
Corporate Microsystems Inc.
Courtyard Group
CSI Consulting Inc.

Cyberbahn Inc.
Cyberklix Inc.
DALSA Corporation
DapaSoft Inc.
Dassault Systemes Inc.
Data Management Suite Inc.
Datazoom Solutions Inc.
DA-Test Inc.
Dell Canada
Deloitte LLP
Digital Boundary Group
Digital Fortress Corporation
DMR (a Fujitsu Company)
Donovan Data Systems Canada Ltd.
Dynamic Disaster Recovery, Inc.
eBay Canada
Eclipsys Corporation
EDS Canada Inc.
Elliptic Technologies Inc.
Eloqua Corp.
Elviano International Corp.
EMC Corporation of Canada
EMIS Inc.
EMR Healthcare Informatics Ltd.
Enomaly Inc.
Eric Moss Consulting
Ericsson Canada Inc.
eSentire, Inc.
ESRI Canada Inc.
EWA-Canada Ltd.
Exact Software Canada Ltd.
Facet/Teletrips
FlexITy Solutions
Freescale Semiconductor Inc.
Fresco Microchip Inc.
Fujitsu Canada, Inc.
Fujitsu Consulting (Canada) Inc.
Galazar Networks Inc.
GE Healthcare
GEF Consulting Inc.
Gennum Corporation
GeNUIT Inc.
Grant Thornton LLP, Technology Risk Management
GRCSI (Governance Risk Compliance Security Intl.)
Group Telecom, A Bell Canada Division
Health Information Strategies Inc.
Healthscreen Solutions Incorporated
HelpCaster Technologies Inc.
Hewlett-Packard (Canada) Co.
HInext Inc.
Hollander Glass Canada Inc.
htx.ca – The Health Technology Exchange
IBM Canada Ltd.
ICDL Canada Limited
ID Alarm Inc.
IDC Canada
Idea Technosoft Inc.
IDT Canada
Imex Systems Inc.
Impact Group, The
InfoClin
Infonaut Inc.
Infosys Technologies Ltd.
Innovapost
Innovatia Inc.
Innusec Inc.
Intel of Canada, Ltd.
Intelliware Development Inc.

IT/NET Group Inc.
KDM Analytics
Kifinti Solutions Inc.
Knowsys Group Ltd.
LGS Inc. (Group)
Lyngsoe Systems Ltd.
M.H. Nusbaum & Associates Ltd.
Macadamian Software Engineering
Mapador Inc.
Marksal Inc.
Marlabs Canada Inc.
McKesson Information Solutions Canada Ltd.
MDG Computers Canada Inc.
Med Access Inc.
MED2020 Healthcare Software Inc.
Microbridge Technologies Corp.
MicroQuest Inc.
Microsoft Canada Co.
Miradore Ltd.
MPowered Healthcare Inc.
MTS Allstream Inc.
Navantis Inc.
Navigata Communications Inc.
Neoteric Technology Limited
Netrus Inc.
NetSecure Technologies, Ltd.
Network Design and Analysis Corporation (NDA)
Nightingale Informatix Corp.
Nortel
Northwestel
Nova Marketing Group Inc.
Novell Canada Ltd.
NucleusLab Information Technologies (Canada) Ltd.
Omnitech Labs Inc.
OnX Enterprise Solutions Inc.
Open Source Order Sets
Open Text Corporation
Optimed Software Corporation
    (A QHR Technologies Company)
Oracle Corporation Canada Inc.
Orion Systems International
Ormed Information Systems Inc.
Osler Systems
P & P Data Systems Inc.
Paradigm Infotech
Platform Computing Inc.
PMC-Sierra Ltd.
Polaris Software Lab Canada Inc.
Practice Solutions Software Inc.
Praxia Information Intelligence
Procura
PROPHIX Software Inc.
Purkinje Inc.
Pythian Group
QHR Technologies Inc.
QuadraMed Corporation
R3D Consulting
Research In Motion Ltd.
RFID Canada
Rogers Business Solutions
Rogers Cable Communications Inc.
Rogers Communications Inc.
Rogers Media Inc.
Rogers Shared Services
Rogers Telecom Inc.
Rogers Wireless Inc.
Route1 Inc.
RSA Security Inc.

S5 Systems
Salumatics
Sandvine Incorporated
SAP Canada Inc.
SAS Institute (Canada) Inc.
SaskTel
SecuritySage Overdrive Inc.
SecurTek Monitoring Solutions Inc.
Sequentia Environics
SHI Canada (Software House International)
Shore Consulting Group
Siemens IT Solutions and Services Inc. (Canada)
Siemens Medical
Sierra Systems Group Inc.
Sigma Designs Technology Canada Inc.
SKE Inc.
SMA
Smart Thought Technologies
Softchoice Corporation
Solutions in Context
Sophos Inc.
Stars
Statusfirm Inc.
Strata Health Solutions
Streamlined Management Group
Streamlogics
Summerhill Venture Partners
Sun Microsystems of Canada Inc.
SyLogix Consulting Inc.
Symantec (Canada) Corp.
Symbiotic Group
Synopsys, Inc.
System Soft Technologies
T4G Limited
Tandberg Canada Inc.
Tata Consultancy Services
Tech Data
Telesat Canada
TELoIP Inc.
TELUS
TELUS Business Solutions
TELUS Mobility Inc.
TeraGo Networks
Teranet Inc.
Test Matters
Themis Program Management & Consulting Ltd.
Thindesk Inc.
Thinkage Ltd.
TIA Advisory Inc.
TIBCO Canada Inc.
Trecata Corp.
Trend Micro Canada Technologies Ltd.
TRM Technologies, Inc.
True North Consulting & Associates Inc.
Tundra Semiconductor Corporation
UNIS LUMIN Inc.
Unisys Canada Inc.
Valeurs Mobilieres Desjardins
VAULT Solutions Inc.
ViXS Systems Inc.
VMWare
Vonage Canada
Websense Inc.
Whitenoise Laboratories (Canada) Inc.
Wolf Medical Systems
workopolis.com
Xerox Canada Inc.
xwave

Zarlink Semiconductor Inc.

Associate Members
Access Copyright
Acorn Partners
Ajilon Consulting
Arun Malhotra & Associates
Asset Computer Personnel Ltd.
BC-TIA
Bereskin & Parr
Bevertec CST Inc.
Blake, Cassels & Graydon LLP
Borden Ladner Gervais LLP
Boyden global executive search
Brainhunter Inc.
Brock University
Canada-China Business Council
Canada-India Business Council
Canada's Technology Triangle Inc.
Canadian Health Information
    Management Association
Canadian Imperial Bank of Commerce
Canadian MedicAlert Foundation
Canadian Pharmacists Association
Canadian Standards Association
Canadian Wireless Telecommunications Association
CANARIE Inc.
Cassels Brock & Blackwell LLP
Centennial College
CFN Consultants
CIPI/ICIP
    (Canadian Institute for Photonic Innovations)
CMC Microsystems
Courses4IT
CRIM (Centre de recherche informatique de Montréal)
CTCanada
Dalton Timmis Insurance Group
De Lage Landen Financial Services Canada Inc.
Deeth Williams Wall LLP
Eagle Professional Resources
Edelman Canada
eHealth Ontario (SSHA)
Employment Solution ,The
Ernst & Young LLP
Export Development Canada
Fasken Martineau DuMoulin LLP
Forrester Research Inc.
Four Corners Group
Fraser Milner Casgrain LLP
Gardiner Roberts LLP
Gowling Lafleur Henderson LLP
GS1 Canada
Hasham Consulting
High Performance Computing Virtual Lab (HPCVL)
Information and Communications
    Technology Council (ICTC)
Information Technology Industry
    Alliance of Nova Scotia (ITANS)
InterComponentWare
Interis Consulting Inc.
IT World Canada
KPMG
Macleod Dixon LLP
McCarthy Tetrault LLP
McMaster University
MEDITECH
Miller Thomson LLP
MISA (Municipal Information Systems Association)

National Angel Organization
National Capital Institute of
    Telecommunications (NCIT)
National Research Council:
    Institute for Information Technology
Nestor System Inc.
Newfoundland and Labrador Association
    of Technology Industries (NATI)
Nova Scotia Business Inc.
Novacap
OACCAC (Ontario Association of
    Community Care Access Centres)
Ontario Centres of Excellence (OCE)
OntarioMD
OriginHR (division of Sapphire Canada)
Ornge
Osler Hoskin & Harcourt, LLP
Ottawa Centre for Research and Innovation (OCRI)
Pivotal Decisions
Planet 4 IT
PPI Consulting Ltd.
PRECARN Incorporated
Present Profit Inc.
PricewaterhouseCoopers LLP
Procom
ProVision IT Resources, Ltd.
Public Sector Research
Ray & Berndtson / Lovas Stanley
RIT Experts
Ryerson University
Sapphire Technologies Canada Ltd.
Sheridan College Institute of Technology
    and Advanced Learning
SolCom Inc.
St. Lawrence College
Stikeman Elliott LLP
Think Green Alliance
Underwriters' Laboratories of Canada
United Church of Canada
Universal Medical History
    & Information (Medi-Call) Inc.
University of Calgary, Sport Medicine Centre
University of Ontario Institute of Technology
University of Waterloo
Waterloo Institute for Health Informatics Research
Wilfrid Laurier University

ITAC
INFORMATION TECHNOLOGY
ASSOCIATION OF CANADA

ACTI
ASSOCIATION CANADIENNE
DE LA TECHNOLOGIE DE L'INFORMATION