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Canada's ICT Sector and the Digital Economy: ITAC Recommendations

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As Canada's national ICT business association, the Information Technology Association of Canada (ITAC) champions the development of a robust and sustainable digital economy in Canada. A vital connection between business and government, we provide our members with the advocacy, networking and professional development services that help them to thrive nationally and compete globally. A prominent advocate for the expansion of Canada's innovative capacity, ITAC encourages technology adoption to capitalise on productivity and performance opportunities across all sectors. A member-driven not-for-profit, ITAC has served as the authoritative national voice of the \$150-billion ICT industry for 60 years. More than 33,500 Canadian ICT firms create and supply goods and services that contribute to a more productive, competitive and innovative society. The ICT sector generates one million jobs directly and indirectly and invests \$4.8 billion annually in R&D, more than any other private sector performer.

ITAC Recommendations: Canada's ICT Sector and the Digital Economy

The digital economy is top of mind at all levels of government and within the private sector. The opportunities available point towards a more dynamic digital economy, provided Canada moves decisively to improve our capacity to innovate. Working together, industry and government need to focus on creating an environment that fosters innovation, unleashing the creativity and ingenuity to develop ICT-based solutions that meet the real needs of our society and our economy.

This document identifies key issues and opportunities where Canada's Federal Government, together with the private sector, can foster and promote adoption of digital technologies. Recommendations are organised under six broad headings:

1. Talent and Skills
2. Trade and Market Expansion
3. Transforming Canada's ICT Ecosystem
4. Leadership through Digital Government
5. Canada as a Global Leader in Cyber Security
6. Infrastructure and Critical Technologies.

1. TALENT AND SKILLS

ITAC recognises that the intellect, innovative thinking and ideas of highly educated men and women is the ICT industry's primary resource. However as the recently published *Job Market Outlook* makes clear, the availability of ICT talent will not be sufficient to meet the hiring requirements over the next five years. By 2019, the cumulative hiring requirements in Canada for ICT talent are expected to be over 182,000 positions.

Building a healthy talent supply through education and training is imperative, but the time and expenses involved can be prohibitive, especially for small and medium-sized businesses that need to focus on day-to-day operations for survival. Support for co-op opportunities, internships and other mechanisms that expose students to the mixture of business skills and technological savvy needs to be enhanced.

1.1 Improving Technological Literacy

Improving the educational system's responsiveness to the labour market needs must be a priority.

Government's role: The Government should take on a leadership role in communicating and promoting the role of ICT in economic competitiveness and enhancing innovation.

The Government should also play a greater role in providing financial support for apprenticeships and the provision of workplace training that can help both young people and the unemployed find meaningful work based on ICT skills.

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Industry's role: ITAC and its members commit to help in this work by disseminating positive stories on how ICT is improving the quality of life for all Canadians.

1.2 Honing Technology Skills

Canada must come to grips with the fact that we are not producing enough scientists, technologists, engineers and mathematicians (STEM) to guarantee our ability to compete in a knowledge-based economy. The importance of a healthy supply of highly skilled workers, whether from Canada or from abroad, must be acknowledged.

Canada currently ranks 20th in the OECD in STEM. While the recent *Spotlight on Science Learning: Shaping Tomorrow's Workforce* report found that 72% of young people believe that science is fun, the teens failed to make a connection between their interests and values and STEM learning.

Government's role: The Government should develop an integrated strategy that can adapt to changing business conditions in the short, medium and long terms. The commitment should be to move into the top ten OECD countries in STEM disciplines by way of a government-led national campaign that builds on ITAC's existing CareerMash and Business Technology Management (BTM) programs.

Both CareerMash and BTM currently receive government funding, but CareerMash will require at least \$250,000 (annualised) from the Government if it is to continue performing its valuable work. With this funding and a private-sector contribution a reasonable plan could be put in place to roll this program outside Ontario.

Industry's role: ITAC and its members should participate actively in both the development of a national strategy and the STEM campaign. The ICT sector is committed to contributing additional funding to what we hope will be a joint government-industry effort to ensure that CareerMash continues.

1.3 Enhancing the Development of Digital Skills across Canada

In the long run, Canada must rely on our own ability to generate the requisite pool of skills domestically. The improvement of our performance in scientific, technical, engineering and mathematics education should be seen as a national priority.

Government's role: The Government should increase its commitment to and funding of digital-skills training, notably through a focus on university- and college-led entrepreneurial programs. For example, the current funding for the rollout of the BTM program across the country should be sustained.

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Industry's role: ITAC and its members should work with the Government and academia to optimise the match between demand for skills and focus of training programs, and to improve the industry's take-up of co-op students.

1.4 Facilitating Access to Skilled Workers from Abroad

Modern trade agreements address the importance of access to global labour markets. In any case, Canada's ICT industry is particularly dependent on access to global talent to meet innovation challenges and to address shortages in our domestic labour market, partly due to this mismatch in education and training, and partly due to the rapidly growing demand for talent. Real obstacles to this currently exist to impede the ICT industry's ability to compete.

Government's role: The Government should develop a comprehensive policy of accessing the top international talent that Canada needs to be competitive globally. This means that all tools, such as immigration policies and the Temporary Foreign Worker and International Mobility Worker programs, are developed in consultation with industry (ideally through a joint forum) and are supported by sufficient resources to ensure timely labour-market opinions and processing of visa applications.

Industry's role: ITAC and its members must keep the Government apprised of its experiences with these programs so that any issues can be addressed quickly, and should propose new measure to improve access to foreign ICT workers.

2. TRADE AND MARKET EXPANSION

2.1 Improving Access to Markets Abroad

Trade is a key element of Canada's competitiveness in the global economy. In recent years, the international flow – and therefore adoption – of ICT equipment has been facilitated markedly by the World Trade Organisation's *Information Technology Agreement* (ITA). It is also important that the list of products covered by the ITA keeps pace with the convergence in ICT with what had previously been non-ICT equipment.

Government's role: The Government should continue to work to expand product coverage and geographical coverage of the ITA, and to deepening trade relations with other countries and regions.

Industry's role: ITAC and its members should actively and vigorously support government efforts and pay a more active role in identifying additional product categories that should be brought under the ITA umbrella.

2.2 Improving the Trade-Readiness of Canadian SMEs

Canadian companies must look beyond our small domestic market in order to succeed and grow. The Government's initiatives in expanding Canadian access to international markets are important, but we must continue to invest to help Canadian business understand the benefits foreign markets hold and to seize the opportunities the new trade agreements can present.

Government's role: The Government must continue to invest to help Canadian business understand the potential of international markets and to seize the opportunities presented by new trade agreements. Organisations such as ITAC need to be leveraged to a greater degree so that the Trade Commissioner Services (TCS) and services from other government agencies are presented to the business community actively and regularly. Also, policy tools such as GOA funding are very helpful in showcasing innovative Canadian companies in a global market and should be expanded.

Industry's role: ITAC and its members commit to work with the Government to assist small Canadian businesses in understanding and taking advantage of the potential of key markets such as the Middle East and North Africa, India and Latin America, through trade missions and market-intelligence webinars.

ITAC will continue to house a TCS advisor in our offices and promote the program among SMEs, and is committed to look for other ways to work with the Government on this key program, with the goal of exposing at least 100 new export-ready SMEs to the range of services that TCS provides.

ITAC and other industry organisations should develop, identify and bring together sets of SMEs from specific sectors (for example, health informatics, cyber security, digital media and enterprise solutions), that can be exposed to key foreign markets in a very targeted way – increasing the chances for success for subsequent trade missions.

3. TRANSFORMING CANADA'S ICT ECOSYSTEM

ITAC believes that government should focus its efforts on the broad, transformative goal of driving technology adoption across sectors of the economy, especially the adoption of internet-based technologies by government itself and by SMEs. Canadian companies must see the use of digital technologies as a fundamental element in the innovation growth equation – to make business processes more productive and efficient and to better serve existing customers and help reach new ones, whether in Canada or around the world.

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3.1 Promoting ICT Adoption by Small Business

One of the greatest challenges to Canada's long-range prosperity is our lagging performance in productivity, which is closely tied to our economy-wide under-use of technology. Unfortunately, Canadian businesses, particularly the SMEs that form such a significant part of our economy, have been slower to use digital technologies than firms of similar size in other countries.

Digital Canada 150 promises funding through the Business Development Bank of Canada, the Canadian Accelerator and Incubator Program, and other targeted investments, all aimed at encouraging SMEs to adopt digital technology and train their workers in the use of these technologies.

Government's role: The Government should fund a sustained communications program targeted particularly at SMEs that would lead to change in the way Canadian business views investments in technology.

The Government should also continue to develop and invest in programs such as tax incentives and credits for technology upgrade.

Industry's role: ITAC and its members will work closely with the Government to develop and deliver this communications program, providing case studies and a parallel communications program to stress the benefits of technology adoption.

Also, ITAC and similar industry organisations should investigate the creation of an industry showcase where large companies are exposed to new and innovative technologies developed by SMEs and a mechanism whereby larger companies can outline how they have incorporated innovations from SMEs in their solutions.

3.2 Supporting the Development of Advanced Applications

ITAC continues to believe in the importance of tax-based incentives to encourage investment in research and development to support the development of new applications. ITAC members continue to stress the importance of scientific research and experimental development (SR&ED) in their ability to locate research mandates and jobs in Canada. They also report losses in R&D jobs due to the changes in SR&ED credits announced in 2012.

Government's role: The Government should conduct a thorough review of the impact of shifting from indirect to direct measures of R&D support, and should investigate ways to restore some of the value lost with the 2012 changes.

Industry's role: ITAC and its members are prepared to assist the Government in its study of these and other potential changes to the SR&ED program.

4. LEADERSHIP THROUGH DIGITAL GOVERNMENT

Canada has a strong reputation for leadership in delivering public services and in e-governance, but we must move forward. Improving citizen engagement and satisfaction, economic competitiveness and public-sector productivity is certainly not beyond our capability, but will require strategic investments and a new focus on long-term solutions.

4.1 Increasing Government Adoption of ICT

The Government has done a great deal of good work in its efforts to become more of a 'model user' of ICT, and spends in the order of \$5 billion annually on ICT. Nevertheless, Canada's ranking is slipping when compared to other countries. Clearly, much remains to be done to ensure that the Government has up-to-date technology and approaches.

Government's role: The Government should consider what the United States has done successfully by having an ICT council advising the Office of the President. It might choose to take a similar approach and establish several strategic forums to advise key ministers on the evolution of technology evolution and the opportunities and risks they present.

The Government should also develop an internal campaign to promote the adoption of technology within government and to investigate, for example, new log-in and identity-management approaches to government services – ideally working with provincial, First Nations and other governments – that would deliver government services to Canadians seamlessly.

Industry's role: ITAC and its members need to engage with the Government to ensure that they provide the best possible solutions .

4.2 Moving Government Services into the Cloud

It is generally recognised that the adoption of cloud computing by government will serve Canadians better, respond better to the expectations of Canadian citizens and Canadian businesses, enable modernisation of government ICT capabilities and support the development of Canada's cloud economy.

Government's role: The Government must hasten the move of its operations to the cloud so that it can take maximum advantage of the benefits of scale in delivering services efficiently and securely. The Government also needs to clarify the policy on data residency – what is mission-critical and needs to stay in Canada and what can be handled following established business practices.

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Furthermore, all Government departments should remove, wherever possible, rules or policies that unnecessarily hinder the adoption of cloud technologies by companies or government entities – provided adequate security safeguards are in place to protect confidential and sensitive information.

Industry's role: ITAC and its members are ready and willing to help the Government implement effective approaches to establishing the infrastructure and applications required for cloud computing.

ITAC and its members will continue to promote the benefits and use of cloud technology and ensure that any customer information transferred to the cloud is protected by strong security measures.

4.3 Taking Advantage of Health Informatics

ICT is a vital component in improving outcomes in our national healthcare delivery system, although health falls primarily under provincial jurisdiction. Health informatics is an area where Canada has the technological capability but has lacked the conditions necessary for companies that can scale globally. Canada Health Infoway (CHI) was established by the Government to provide national funding and leadership on issues that impact industry policies. Ultimately, this will reduce the cost of healthcare delivery in Canada while improving the national capacity for research and commercialisation.

Government's role: The Government should recapitalise CHI in the amount of \$180 million over three years. This will allow CHI to expand the capacity of the sector, promote the deployment of electronic health records to facilitate easier access to care, and provide leadership in the areas of certification and standardisation.

Industry's role: ITAC and its members will continue to work closely with CHI in all of its activities, including joint ITAC-CHI work under an existing agreement to help standardise software through a certification process.

5. CANADA AS A GLOBAL LEADER IN CYBER SECURITY

5.1 Protecting Canadians Online

In any economy, market players must be able to interact with confidence. Online commerce presents additional complexities for the securing of consumer, enterprise and government communication, all of which call for security techniques and strategies optimized for cyberspace.

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Government's role: The Government, like any large enterprise, should continue to take serious steps to defend itself, adopting harmonised security standards for all devices connected to the internet and employing best cyber-defence practices.

The Government must work with the private sector in educating Canadians and Canadian SMEs about the benefits of using and investing in ICT while continuing to protect themselves and those they deal with from threats.

Industry's role: ITAC members, large and small, should take serious steps to defend themselves, and to adopting security tools and policies to protect their confidential and personal information as well as that of their clients and partners.

ITAC should work with the Government to educate Canadian SMEs about the benefits of investing in ICT while continuing to protect themselves.

5.2 Establishing a National Centre of Excellence in Cyber Security

Cutting-edge security research is being undertaken in Canada and products and services are developed in laboratories and offices across the country. However, there is no effective public-private-academic entity to ensure results and learnings are shared broadly, that viable discoveries and developments are commercialised, and that scarce resources are not wasted – and opportunities lost – on duplicative efforts.

Industry would like to see a not-for-profit national centre of excellence in cyber security, whether physical or virtual. The intent would be to leverage the capabilities of Canada's private and academic sectors to come together to build a truly global presence.

Government's role: The Government should stay engaged in ITAC's Canadian Cyber Security Leadership Council initiative, which is to explore the appropriate shape and mandate of a Canadian centre of excellence that would expand our national capacity in cyber security. To be successful, this initiative would require funding from the Government as well as from the private sector; and the IRB funding model should be explored as well.

Industry's role: ITAC will bring the appropriate players from industry and academia to engage in this initiative and will also provide leadership in planning the necessary incubation and commercialisation models.

6. INFRASTRUCTURE AND CRITICAL TECHNOLOGIES

6.1 Ensuring a Strong and Stable Network Infrastructure

Canada's networks will require continuous investment and renewal if consumers and businesses are to continue to receive the service levels they have come to expect, and if the potential of new technologies and capabilities is to be achieved. The regulatory regime for telecommunication has, however, become overly politicised and adversarial. This weakens our capacity to build a strong, competitive digital economy in Canada. A more fruitful discourse between industry and government is required.

ITAC would also like to see better collaboration with municipalities when network providers require municipal approval before they can access roads and other rights-of-way in order to upgrade networks. The current pattern of relationships needs to be improved if networks are to be expanded and improved.

Government's role: The Government must refrain from imposing undue obstacles to investment, given the costs and risks involved in infrastructure renewal.

The CRTC should consider hosting a meeting of major municipalities and network providers to develop an agreed framework on access to rights-of-way that will be applied generally.

Industry's role: ITAC and its members commit to continuing to work with the Government, in organising and promoting these initiatives.

6.2 Reducing Society's Carbon Footprint

It is clear that ICT has an important role to play in reducing society's carbon footprint: The following have been identified as large and 'accessible' opportunities for ICT to contribute: smart automotive systems; smart logistics; smart buildings; and smart grid.

Government's role: The Government should recognise the scale of the carbon-footprint reductions that can be achieved through ICT adoption, and use all available levers to take maximum advantage of that potential.

Industry's role: ITAC and its members should do what they can to assist the Government in understanding the potential.

6.3 Embracing the Internet of Things

The 'internet of things' (IoT) is a capability rather than a technology, a complex convergence of the various technologies and services from across the ICT sector.

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High-potential markets are expected to include asset tracking in retail and distribution and government, connected vehicles, process control in oil and gas and utilities, monitoring in healthcare, situational awareness for public-safety missions, and smart cities and smart buildings.

An important consideration in the rollout of the IoT will be the need for discrete internet addresses for each of many billions of connected devices. Networks in Canada and around the world will in many cases need to be extensively reworked to accommodate this.

Government's role: The Government should convene an IoT roundtable or series of roundtables where all stakeholders have an opportunity to discuss possibilities and potentials and identify and discuss what can and should be done. Big data, analytics and cognitive computing are very much related to the IoT and should be part of the discussion.

Industry's role: ITAC and its members should play a central role in any such consultative mechanism, or should consider establishing its own if required.