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Improving Canada's Digital Advantage

Strategies for Sustainable Prosperity

Consultation Paper on a Digital Economy Strategy for Canada

Canada

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Message from the Minister of Industry

The Government of Canada is focused on building a stronger and more competitive Canadian economy. Understanding the important role that digital content and technologies will play in Canada's future, our government committed to developing a national digital economy strategy in Budget 2010 and the Speech from the Throne. A more prosperous and successful Canada will ensure a better quality of life for all Canadians.

Canada has a solid foundation of scientific and technological achievements to build on and be proud of, including the 2007 Science and Technology Strategy that invested more than $7 billion to foster innovation through research.

Last year, I delivered a keynote address at the Canada 3.0 digital conference and later co-chaired the forum on Canada's Digital Economy. Stakeholders told me that it is time for all of us to come together to make Canada a global leader in the digital economy.

Through this consultation paper, we are seeking the advice of Canadians on how Canada can improve its position in the digital economy. We must find solutions to the specific issues facing Canada and develop a plan to implement these solutions. This will require the concerted and cooperative efforts of the private sector, academia, governments and Canadians. We all have a stake in this goal, and all have a role in making it happen.

Collectively we have the talent and the will. Now we must channel our strengths into developing a comprehensive, multi-year strategy that will help Canada take our rightful place at the top. I look forward to hearing your views and reading your submissions in the weeks and months ahead.

The Honourable Tony Clement
Minister of Industry

Message from the Minister of Human Resources and Skills Development

Building Digital Skills for Tomorrow

The rapid development and adoption of digital technologies is changing the way we work, learn and communicate. From social networking to commerce to the workplace, digital skills are becoming increasingly important for all Canadians. Technology is now intertwined in our everyday activities, and the Government of Canada has a role to play in ensuring that Canadians acquire the skills they need to participate in society.

In the labour market, digital skills are in high demand across all sectors, not just the information and communications technology sector. The ability of Canadian businesses to innovate and position themselves along the global value chain will depend heavily on having access to workers with the appropriate skills. Through our policies and programs, Human Resources and Skills Development Canada is taking steps to make sure that Canadian businesses can attract and retain the workers they need.

Preparing Canadians for the economy of tomorrow will require a range of integrated and targeted efforts coordinated across government, industry and education partners. In *Advantage Canada,* we laid the foundation to create the best-educated, most skilled and most flexible workforce in the world. Building on this foundation, the recent Speech from the Throne and Budget 2010 committed to launching a digital economy strategy to drive the adoption of new technology across the economy.

Through this consultation, our government is taking action to keep Canada's economy strong and vibrant. Your feedback will provide direction for Canada's digital economy strategy, and I look forward to hearing from you.

The Honourable Diane Finley
Minister of Human Resources and Skills Development

Message from the Minister of Canadian Heritage and Official Languages

Digital Media: Creating Canada's Digital Content Advantage

There have never been a greater set of choices for consumers, more opportunities for producers, such a diversity of technologies or such a wide range of audiences for our content. In my opinion, there has never been a better time for us to look ahead, past the limitations that exist today, to imagine a future where Canada is a world leader in the global digital economy. Where Canadian creativity, innovation and foresight change the way we communicate, express ourselves as Canadians and engage with the world.

In today's world — where you can use a myriad of mobile devices to download a podcast of your favourite radio show and listen to it while walking to work, and where you can use that same device to take photos, watch videos on YouTube, post updates on Twitter, call or text your friends and family, and organize your schedule — digital media and content are essential to Canada's economy and culture. They are at the centre of creative industries, integrating all spheres of arts and culture to create innovative content that informs, educates and entertains a global audience.

The Government of Canada's role is to put in place a marketplace framework in which you as creators, inventors and entrepreneurs have the incentives to innovate, the confidence to take risks and the tools to succeed. The Government of Canada has made an important start to its work — it has revamped its cultural programs to reflect the digital reality.

Recognizing that it will be your talent, creativity and innovation that will be the ultimate driver, my colleagues and I are seeking your views on what elements of this marketplace framework are essential to your future success and to Canada's future in the digital economy.

I look forward to hearing from you.

The Honourable James Moore
Minister of Canadian Heritage and Official Languages

Introduction

In the March 3, 2010 *Speech from the Throne* the Government of Canada committed to "launch a digital economy strategy to drive the adoption of new technology across the economy. To encourage new ideas and protect the rights of Canadians whose research, development and artistic creativity contribute to Canada's prosperity, our Government will also strengthen laws governing intellectual property and copyright." This commitment was reinforced in Budget 2010 where the Government of Canada committed to "develop a Digital Economy Strategy that will enable the ICT sector to create new products and services, accelerate the adoption of digital technologies, and contribute to improved cyber security practices by industry and consumers." The purpose of this paper is to seek advice that will shape a multi-year digital economy strategy for Canada. The world is going digital, and the evidence is all around us.

WHAT IS THE DIGITAL ECONOMY?

The digital economy is the term used to describe the network of suppliers and users of digital content and technologies that enable everyday life. Digital content and technologies are ubiquitous and critical to almost every activity in our economy and society. These applications enable businesses to be innovative and productive; help governments to provide services; and allow citizens to interact, to transmit and to share information and knowledge.

Digital technologies are ubiquitous, enabling all sectors across the economy to be innovative, productive and competitive. The Internet and the proliferation of digital information and communications technologies (ICT) have given rise to new products and services — changing the way we live. The way our children learn and study, how we communicate with each other, how medical professionals keep us healthy, how we conduct research and how we conduct business across all sectors — all have been fundamentally transformed by digital technologies.*

The relentless pace of technology means that every day there is something newer, faster, better. To succeed in the global economy, Canada must keep step as the world races forward.

2010 *Speech from the Throne*

This digital revolution is not only coming from scientists, businesses and governments, it is also being driven by the users of these technologies, including the creators of digital content and consumers. Today's consumers — young and old — are demanding instantaneous information, products and services. This demand is growing, opening up new markets and creating tremendous opportunities for Canada.

Canada is responding to the opportunities presented by the digital economy. But so are other countries like Australia, the United Kingdom and the United States. Fortunately, Canada has a strong foundation from which to seize these new opportunities. We benefit from the presence of a number of established companies, excellent research institutions and an educated workforce. However, the evolution of the digital economy is relentless as digital innovations become embedded in our lives at a rapid pace — Facebook was made public in 2006 and the iPhone was launched in 2007. We must strengthen our focus to make Canada more competitive and prosperous, and ensure that Canadians can thrive in the future economy.

More and more each day, every sector of our economy and our society comes to rely on digital technologies. From the public and private sectors, to non-governmental organizations, academia and volunteer organizations, to students, consumers and citizens — we all have a vested interest in a dynamic and flourishing digital economy. A strong digital economy will be the backbone of Canada's future prosperity and success. Consequently, we all have a role to play in shaping the future of this key part of our economy and our lives.

* Digital technologies is another name for ICT. For the purpose of this paper, digital technologies and ICT refer to the same set of technologies and will be used interchangeably. Examples of digital technologies used in our everyday lives include devices such as BlackBerry smartphones, global positioning systems (GPS), music and video playing systems, television-on-demand and e-book readers.

Canada needs a strong, globally competitive ICT sector that supplies high value products and services, which increase productivity and competitiveness in every sector of the economy, and exports those products and services abroad. Canadian businesses, institutions and individuals must have the skills needed to adopt and apply digital technologies with confidence; and businesses and consumers must have trust in transactions that take place in the online marketplace. Canada needs a world-class digital infrastructure, on which Canadians will be able to locate, utilize and share Canadian digital content.

Government can support the provision of digital skills and tools needed to compete, thrive and innovate in the digital economy by developing sound economic framework policies, ensuring competitive corporate tax rates and creating a positive foreign investment and research and development (R&D) environment. Policies and programs must be adjusted, where appropriate, to maximize Canadian success in the digital economy. Governments and public sectors need to demonstrate by example as being model users of digital technologies.

Businesses will need to be attuned to global opportunities, continuing to adapt, to innovate and to compete to win. The private sector will be increasingly exposed to fierce global competition, and will need to take the lead role in driving the growth of Canada's digital economy.

Universities, colleges, research institutions and businesses will need to work more closely together to continue to conduct and commercialize research, moving ideas from university and college labs into the marketplace, where Canadians and the global economy can benefit from their discoveries. Recognizing this, Budget 2010 provided an additional $135 million for the National Research Council (NRC) Technology Cluster Initiatives program to develop networks of innovative businesses, NRC scientists and communities, levering Canada's investment in research into economic and social benefits for Canadians.

Our goal for Canada is to have a world-leading digital economy; to be a nation that creates, uses and supplies advanced digital technologies and content to improve productivity across all sectors.

"Competition matters. It brings dynamism to our economy. It means good jobs for our citizens. It is not merely an economic concept. Being open to competition serves Canada's national interest."

Competition Policy Review Panel, 2008

There is a general consensus as to the importance for Canada to improve its overall productivity in the face of increasing competition. Businesses must capitalize on the productivity-enhancing benefits of digital technologies and opportunities to create new products and services. Consumers and citizens must be able to obtain public services and to participate in online interactions while protecting their personal information.

In the last year, industry leaders, creators, businesses, academia and Canadians have gathered to discuss some of the key aspects of the digital economy such as digital media, copyright issues, and requirements to ensure a secure online marketplace. Discussions at these venues — in particular at the June 2009 Canada 3.0 Conference in Stratford and the Canada's Digital Economy: Moving Forward forum held in Ottawa — have underscored the crucial importance of a digital strategy for Canada's future. Stakeholders emphasized that action was essential from all stakeholders and that the Government of Canada must play a leadership role to galvanize all sectors of the economy in order to achieve the shared goal of making Canada a global leader in the digital economy.

The Government of Canada recognizes the importance for Canada to have a strong and sustainable economy. *Advantage Canada: Building a Strong Economy for Canadians* laid down a vision for a prosperous Canadian economy, today and in the future. Given the critical role that technology and innovation will play in our future prosperity and quality of life, the 2007 Science and Technology (S&T) Strategy — *Mobilizing Science and Technology to Canada's Advantage* (hereafter referred to as the S&T Strategy) invested over $7 billion in fostering innovation through research and identified the ICT sector as one of four priority areas.

But more needs to be done. The Government of Canada is building on the foundations of *Advantage Canada* and its S&T Strategy to develop the digital economy of the future. Budget 2009 provided funding to extend broadband access to rural and remote communities. The government is updating policy and legislative frameworks for e-commerce, most notably on copyright reform, anti-spam law and privacy amendments.

Provincial and territorial governments have also responded with actions that range from the formation of new provincial departments focused specifically on innovation, R&D and advanced technologies, to increasing broadband access and upgrading network infrastructure. Some provinces have instituted tax credits for the ICT sector, while others have dedicated venture capital pools aimed at stimulating business innovation.

The private sector is also investing considerable sums in Canada's digital economy, notably in digital media, digital infrastructure and R&D. But more can be done to improve the sophistication, accessibility and affordability of Canada's digital infrastructure. More investments will be needed to provide online access to Canadian content, build next generation networks, and acquire the skills and capabilities that will sustain Canada's future prosperity, quality of life and competitiveness.

Key challenges that we face in moving forward include: the adoption of digital technologies in all parts of the economy; the competitiveness of Canada's digital industries; the state of our digital infrastructure; our ability to create Canadian content for a global marketplace; and ensuring that Canadians and businesses have the skills and knowledge to participate in Canada's economy of the future. These challenges must be addressed with coherent and collaborative action to help increase Canada's productivity and ensure our future prosperity.

YOUR VIEWS

The Government of Canada invites your views on the goals of a Canadian digital economy strategy, the concrete steps needed to reach these goals and how governments, the private and not-for-profit sectors can best collaborate to create a strategy for future success.

This paper proposes a set of key challenges to meet, describes what has been done to date and poses questions on what needs to be done in the future. We welcome your input.

Online submissions or comments can be posted at digitaleconomy.gc.ca.

The deadline for responses is July 9, 2010.

Capacity to Innovate Using Digital Technologies

CONTEXT

Success in the 21st century for an economy, a government, a business or an individual will require the intelligent use of digital technologies. Digital technologies are tools, capacities or knowledge assets that can be embedded in business processes, products and services to help firms and individuals in all sectors of the economy become more productive, innovative and competitive. As part of the March 2010 *Speech from the Throne,* the Government of Canada highlighted the importance of adopting new technologies across the entire Canadian economy to create jobs, foster growth and create new opportunities for Canadians.

The Internet, and the content and services provided online, are important elements of the digital economy. The online marketplace needs to be a safe and reliable environment that encourages citizens, content providers, governments and businesses to engage in online transactions and electronic commerce. The Canadian online marketplace accounted for $62.7 billion in sales in 2007, and the global e-commerce market grew from $23 million in 1998 to $7.3 trillion in 2008. Policy and legislative tools to protect personal information and ensure secure transactions are key to building and maintaining trust and confidence in the online marketplace.

It is important that Canadian industry sectors, and in particular small and medium-sized enterprises (SMEs), be more focused on adopting, using and continuously updating their use of digital technologies in order to sustain strategic competitive advantage throughout entire value chains. Canadian companies cannot hope to lead in any industry sector or global value chain without strategic investments in digital technologies and strategies. Yet Canadian firms have been slower to invest than firms in other countries, and this underinvestment in ICT has been linked to Canada's slower productivity growth.[1] In 2007, Canada ranked 11th among 21 Organisation for Economic Co-operation and Development (OECD) countries in total economic investment in ICT, down from 10th in 2005 and 9th in 2004.[2]

Enhancing our productivity and capacity to innovate is of paramount importance in today's increasingly digital world. The private sector has the primary role to play, but all sectors, including manufacturing, resources, service, aerospace, pharmaceutical and public sectors, must better integrate digital technologies into their business operations and value chains to innovate and become more competitive or more cost-effective. Certain key information gaps persist with regards to adoption and use of digital technologies across different sectors. This analysis is necessary to develop targeted sectoral strategies that will encourage greater adoption of digital technologies. Collaboration among companies, research centres and universities is key to driving innovation and building a digital advantage for Canada.

Governments have a role to play by ensuring that the right legal and regulatory frameworks are in place to protect consumers and businesses in the online marketplace and to make Canada a favoured location for work and business investments, as well as using digital technologies to streamline operations, improve services and cut costs. For example, the Government of Canada's NetFile and Record of Employment on the Web applications allow Canadians to file their tax returns online and businesses to share employment information accurately and efficiently. Governments must continue to employ digital technologies in innovative ways.

Public sector services such as health care and education would also benefit from greater adoption and use of digital technologies. Understanding this, as part of the *Economic Action Plan,* the Government of Canada allocated $500 million to Canada Health Infoway to support the goal of having 50 percent of Canadians with an electronic health record by 2010 and to speed up the implementation of electronic medical record systems for physicians. Budget 2010 confirmed that the government will move forward with this important transfer. Expanded use of advanced technologies to create electronic health records, mobile health applications, sensors for monitoring chronic disease and online and interactive educational tools would mean better and more efficient public services for our citizens, and new global market opportunities for innovative and entrepreneurial Canadian businesses.

Intelligent adoption of digital technologies will play a key role in addressing some current economic, social and environmental challenges. For example, ICT industry studies have estimated that the application of ICTs to create smart electricity grids, buildings, logistics and production processes could result in a 15 percent reduction in greenhouse gas emissions by 2020.[3] ICT adoption is increasingly playing an enabling role in the national strategies of other countries like the United States, which is investing in areas such as smart grids, e-health, educational software and electric cars as part of their *Strategy for American Innovation.*[4] Other national digital strategies actively support adoption and use of advanced ICT, including among SMEs. Australia's Small Business Online program, equips small businesses to go online and engage in e-business to help reduce their costs and improve their market opportunities and the United Kingdom's Regional Development Agencies assist SMEs to exploit advanced ICT to transform their business processes. Many OECD countries have strategies to encourage business investment in ICT, including tax incentives, ICT grants and subsidies, technology vouchers and special ICT-boosting infrastructure programs.[5]

Canada has also been active. Through Canada's *Economic Action Plan,* the federal government is helping businesses in all sectors of the economy by providing a temporary 100-percent capital cost allowance rate on new computer hardware and systems software acquired before February 1, 2011. Although, as indicated in Budget 2010, the stimulus measures in the *Economic Action Plan* will be phased out as planned in order to ensure a return to balanced budgets, this temporary 100-percent capital cost allowance rate increase is providing timely support to the economy by encouraging businesses to accelerate their investment in computers.

The *Economic Action Plan* also committed an additional $200 million to the Industrial Research Assistance Program (IRAP), part of which will support the adoption of advanced digital technologies by SMEs. Similarly, the federal and Ontario governments are investing in the Southern Ontario Development Program for the Canadian Manufacturers and Exporters (CME) SMART program to help small and medium-sized manufacturers increase their productivity and competitiveness, by funding projects focused on lean design and manufacturing, quality improvement, energy efficiency, information technology best practices and environmental impact reduction.

CHALLENGES

Overcoming Underinvestment in Information and Communications Technologies

On average, Canadian firms consistently invest less in ICT than their competitors in the United States and other advanced economies. Smart technology adoption is a complex process involving more than just investment in technology; it also requires changes to business processes, new digital skills, and technology management expertise. This is a challenge facing all companies, whatever their size, in all sectors. Similar challenges are faced by government agencies and public institutions as well.

Recent work done by the Council of Canadian Academies (CCA) suggests that Canada lacks a culture of innovation with respect to ICT adoption. "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."[6] The Centre for the Study of Living Standards (CSLS), has conducted several studies on Canada's underinvestment in ICT, especially in comparison to the United States, and estimated that the average ICT investment per worker in Canada is only 60 percent of that in the United States.[7] This underinvestment in ICT has been linked to Canada's weak productivity growth over the last several years. From 1996 to 2006, labour productivity grew at an average annual rate of 1.8 percent in Canada, as opposed to 2.9 percent in the United States.[8]

In addition, the CSLS also looked at investment by industry. Overall, the business sector increased its investment in ICT, but there are some sectors that showed large declines, including mining, oil and gas extraction (-16.7 percent) and health care and social assistance (-10.3 percent).[9]

The aforementioned reports and others also suggest that Canada's underinvestment in digital technologies is part of a broader problem in innovation performance, which is largely due to a lack of business and managerial skills.[10] Complementary investments in labour, organizational design, digital skills and other areas are required to realize the full potential of general purpose technologies such as ICT. The 2006 Telecommunications Policy Review Panel estimated that the cost of these complementary investments in innovation may be as much as ten times the cost of technology investment.[11] The CCA report also highlighted that firms that are better managed are more likely to invest in leading-edge equipment and methods.[12] Canadian businesses will need both business and IT skills to be innovative and compete to win. Developing, educating, training and attracting professionals with both skill sets will be important to Canada's success in the digital economy.

There is also evidence that smaller firms are adopting less rapidly than larger ones when it comes to more advanced ICT applications. Running a small business is challenging. Investment decisions have huge consequences, but new technologies can be a key competitive advantage. In 2007, the Canadian Federation of Independent Business (CFIB) commissioned a report to better understand the role of SMEs, especially micro businesses, and the productivity lag. The study concluded that SMEs see value in ICT and are adopting them, however, as the applications become more complex, their adoption rates slow down. It is not clear whether some SMEs do not adopt more complex applications because they do not see value in adopting them, or rather, whether it is because the ICT solutions already in the marketplace do not serve SME needs.[13] Cost may also be a factor and some observers suggest that cloud computing may help increase SME adoption rates. It is important to support Canada's SMEs — they create new jobs for Canadians. In this vein, the 2010 *Speech from the Throne,* committed to support SMEs by continuing to identify and remove unnecessary, job-killing regulation and barriers to growth.

Going forward, it will be essential that firms and industry sectors examine where their respective opportunities to innovate using ICT are greatest, and develop strategies to take advantage of these opportunities. Governments must support these actions by ensuring that current programming and policy frameworks are aligned to support ICT investment across key industry sectors. The Government of Canada will examine its current program and policy regime to ensure that they are aligned to support business-led sectoral strategies and are well suited to the global nature of the digital environment.

Governments as Model Users

Governments are large buyers and users of digital technologies. Public procurement decisions can help drive smart ICT adoption in the private sector. For example, the Government of Canada is working with major stakeholders to plan its own adoption of IPv6 solutions, which will accelerate a wider Canadian adoption of this new Internet protocol. There are many other opportunities for governments to adopt ICT in the context of making government more efficient and effective. For example, increasing the use of advanced video conferencing technologies can reduce travel time and costs. The greater integration of social media, which the Government of Canada has begun to use, will serve to improve communication and collaboration within and among governments, recruit the next generation of public servants and better engage Canadians. Likewise, cloud computing solutions could further improve government operations and public service delivery. Governments can play an important role in acting as model users of ICT and leading by example.

Governments can help by making publicly-funded research data more readily available to Canadian researchers and businesses. Open access is consistent with many national strategies and holds great economic potential for Canadians to add value to machine-readable data, while ensuring that privacy rights are protected. In many cases, data are already available but are difficult to locate. Consistent methods of access will be reinforced.

Protecting the Online Marketplace

One of the greatest benefits of the Internet is the ability to collect, store and transfer large quantities of information. However, it can also facilitate the ability to steal and traffic personal information and copyrighted material for fraudulent purposes. A well-functioning marketplace governed by appropriate legislation and regulation is essential to increasing the take-up and use of digital technologies. If Canadians and firms do not feel secure using the Internet, we cannot expect them to adopt digital technologies that are connected to the Internet.

Copyright laws that give creators and consumers the tools they need to engage with trust and confidence in the digital marketplace are critical to a successful digital economy. In July 2009, the government launched a national consultation to solicit Canadians' opinions on copyright reform, including whether and how legislation needs to be revised to give Canadian creators and consumers the tools they need to thrive in the digital marketplace. The consultation closed on September 13, 2009, and submissions are now being reviewed with a view to updating the *Copyright Act*. An updated copyright framework that is forward-looking, principles based, flexible enough to accommodate technological development and effectively balances the interests of the various economic actors, whether they are creators, innovators, consumers, or intermediaries will help maximize creativity, innovation and economic growth.

The Government of Canada is putting in place a modern and efficient legal framework to protect the online marketplace and better protect Canadians from cybercrime with the reintroduction of anti-spam legislation, aimed at deterring the most damaging and deceptive forms of spam and related online threats from occurring in Canada, and with the creation of three new Criminal Code offences under *An Act to Amend the Criminal Code,* which came into force on January 8, 2010, providing police and justice officials with important new tools in the fight against identity theft. In addition, two complementary legislative initiatives aimed at enhancing law enforcement's ability to combat cyber-facilitated crime and modernizing investigative techniques, along with actions to better protect children from Internet luring and cyber abuse remain priorities of the federal government.

Canada's federal private sector privacy law will be amended to enhance privacy in the digital age by better protecting and empowering consumers, clarifying and streamlining rules for business, and enabling effective law enforcement. Once completed, the amendments will ensure Canadian privacy legislation continues to be a world-class model of privacy law.

Some emerging technologies and online applications raise new questions about the protection of personal information. Current concerns include third party use of personal information mined by search engine operators and collected through social networking sites, as well as the personal tracking capabilities of geo-location technologies. New privacy and security challenges are also posed by the development of web-based services and cloud computing (which replace dedicated ICT equipment and software under the direct control of individual consumers and business users with shared facilities managed by third party service providers). The Government of Canada tracks emerging issues and participates in domestic and international fora to ensure its policy and legislative regimes are up-to-date and promote the growth of the online marketplace.

There is a need for increased cyber security awareness in Canada. Businesses and industry associations have a key role to ensure that security practices that relate to the handling of personal information and confidential business information are able to meet the challenge. Canadians need to be aware of what they must do to protect their personal information in online transactions. All stakeholders need to collaborate to promote the use of best practices and educate online communities. The Government of Canada is also committed to working with provinces, territories and the private sector, to implement a cyber security strategy to protect our digital infrastructure, as stated in the March 2010 *Speech from the Throne*.

DISCUSSION QUESTIONS

Growing Canada's digital advantage in order to generate wealth, ensure future economic growth and productivity, create new jobs and maintain a high standard of living for Canadians will require an increase in ICT-enabled innovation across all sectors of the economy. Canada must become a country of technology leaders.

Private sector will play the primary role, but governments can assist by refocusing and realigning existing programs and policy levers to support the adoption of digital technologies across all sectors, while also protecting the online marketplace. Both public and private sector leaders need to define what they can do to encourage greater adoption and use of digital technologies within their sectors.

- Should Canada focus on increasing innovation in some key sectors or focus on providing the foundation for innovation across the economy?
- Which conditions best incent and promote adoption of ICT by Canadian businesses and public sectors?
- What would a successful digital strategy look like for your firm or sector? What are the barriers to implementation?
- Once anti-spam legislation, and privacy and copyright amendments are in place, are there new legislative or policy changes needed to deal with emerging technologies and new threats to the online marketplace?
- How can Canada use its regulatory and policy regime to promote Canada as a favourable environment for e-commerce?

Building a World-Class Digital Infrastructure

CONTEXT

The telecommunications industry is in the midst of a major shift towards next generation networks (NGN), which provide dramatic improvements in speed, functionality and integration of services using the flexible Internet Protocol (IP). Advances in wireless technology are driving the deployment of ubiquitous wireless broadband networks, which support new mobile devices that have a myriad of uses. Broadband networks are a critical component of the digital economy, enabling a range of new applications that include social media, video conferencing, new e-health applications and smart electrical grids.

However, in a number of key respects, the fundamental economics of the industry have not changed. Telecommunications service provision is still subject to strong economies of scope and scale and the large up-front sunk costs can act as barriers to entry. The costs of upgrading equipment, digging trenches, and erecting poles can be immense, especially in a country as geographically challenging as Canada. As a result, the industry is often characterized by competition between a relatively small number of large firms that are capable of absorbing these significant fixed costs. For example, the Canadian residential broadband market has largely settled into regionalized competition between the incumbent telephone company and local cable provider.

Convergence and competition between duelling network platforms has driven continued investment in network infrastructure. In 2008, the private sector devoted over $12 billion to capital expenditures, and the capital intensity of Canadian service providers is in line with global peers. Residential broadband providers have launched services with advertised download speeds of up to 50 and 100 megabits per second (Mbps) in certain markets, and several wireless providers have recently launched high-speed packet access plus (HSPA+) networks across the country with theoretical maximum speeds reaching 21 Mbps. Although network development is generally driven by private sector investment, Canadian governments (federal, provincial and territorial) also play an important role. Government of Canada initiatives include programs to expand broadband access in rural and remote areas and funding for Canada's Advanced Research and Innovation Network (CANARIE). CANARIE's ultra-high speed optical backbone network supports leading-edge research and is used by thousands of scientists and other researchers across Canada.

Despite these continued investments, concerns have been raised that Canada is lagging its peers. Canada compares well in measures of broadband penetration and traditional telephone service pricing, but tends to rank less favourably in other respects. For example, Canada ranks in the middle of the pack in average or median real-world download speeds according to sources such as Akamai and Speedtest. That being said, international comparisons should be treated with caution.

CHALLENGES

Promoting Competition and Investment

The twin issues of facilitating both investment and competition are foundational challenges in telecommunications policy. Policy-makers and regulators must ensure that there is a sufficient level of competition and consumer choice amongst a variety of services, while at the same time facilitating an environment that is conducive to continued network investment. Next generation networks require very large up-front capital investments. Ensuring that sufficient competition is in place to drive innovative service delivery at reasonable prices is a key concern given the level of industry concentration inherent to telecommunications markets, where economies of scale and scope are so fundamental.

Government of Canada policy has been to enable competition and promote private investment through market forces and streamlined regulation, in combination with targeted initiatives. The 2006 *Policy Direction* requires the telecommunications regulator, the Canadian Radio-television and Telecommunications Commission (CRTC) to rely on market forces to the maximum extent feasible and to regulate only where necessary in achieving Canada's telecommunications objectives. As steward of the spectrum resource, the Minister of Industry has established the policy objective to maximize the economic and social benefits Canadians derive from spectrum and issued management guidelines that call for reliance on market forces and minimal administrative burden among other things.

Since implementing the *Policy Direction*, the Government of Canada has taken additional concrete steps to maximize reliance on market forces by, for example, accelerating the deregulation of local telephone service. On December 10, 2009, the Government of Canada asked the CRTC to re-examine a wholesale regulatory decision on matching broadband speeds to ensure that the regulatory regime is coherent, cohesive and is not unnecessarily impeding investment while ensuring consumer choice. The Minister of Industry has also taken measures to strengthen competition in wireless services. The 2008 Advanced Wireless Services (AWS) auction included a set-aside of spectrum exclusively for new entrants to bid on, in conjunction with provisions for tower sharing and mandated roaming.

Market-led network-based competition continues to push investment in next generation infrastructure in Canada. Consistent with past government policy, it is expected that the private sector will drive future investment and innovation. However, the needs of consumers and businesses are constantly evolving and other industrialized countries are deploying advanced networks, which enable orders of magnitude increases in upload and download speeds. In a number of cases, countries have set targets for next generation network speeds and coverage. The basic question is whether domestic progress is fast enough for Canadians to be at the forefront of developments in the global digital economy. To that end, the Government of Canada is committed to more thorough analysis on how much progress is likely to be made under the status quo and where there may be persistent gaps.

Another key question is whether the right frameworks are in place to encourage competition and investment and the right pace of progress. Foreign ownership restrictions have been identified as a priority area of concern in the past and will receive renewed government scrutiny. Over the past decade, several independent review bodies have recommended that the government loosen or eliminate these restrictions, citing benefits such as increased access to capital, faster technological transfer, along with more competitive prices and choices for consumers. In the recent *Speech from the Throne*, the Government of Canada has committed to "open Canada's doors further to venture capital and to foreign investment in key sectors, including the satellite and telecommunications industries, giving Canadian firms access to the funds and expertise they need." The government has moved to address the first of these commitments, in tabling legislation to amend the *Telecommunications Act* for satellites as part of the *Jobs and Economic Growth Act*. In the coming months, the Minister of Industry will indicate the steps to be taken in regard to pursuing further liberalization in this sector.

The CRTC has been active on a number of infrastructure-related fronts. In October 2009, the CRTC established a comprehensive framework concerning Internet traffic management issues, sometimes referred to as "net neutrality." The framework is premised on the principles of transparency, innovation, clarity and competitive neutrality. It attempts to balance the freedom of Canadians to use the Internet for various purposes with the legitimate interests of service providers to manage the traffic on their networks. The CRTC concluded a review of its existing wholesale framework in 2008 and launched a proceeding in May 2009 to investigate whether large cable and telephone companies should be required to provide

competitors with additional wholesale broadband configurations. The proceeding was expanded following the Government of Canada's December 2009 order on speed matching and will examine how the wholesale framework should apply on a forward-looking basis to new types of Internet access infrastructure.

Other impediments to investment and competition may include difficult access to passive infrastructure for deploying fibre optics, such as rights-of-way, ducts and support structures. Passive infrastructure development such as digging trenches for ducts often represents a large portion of the costs in deploying fibre. Facilitating access through collaborative efforts by various stakeholders, including provincial and municipal governments, presents a significant opportunity to reduce deployment costs.

Access to Spectrum

Spectrum is continuously being used in new ways by a broad range of players including commercial telecommunications service providers, broadcasters, first responders/public safety organizations, the scientific community and government. The demand for spectrum is expected to increase due to the explosive growth predicted in wireless broadband usage.

Ensuring that radio spectrum is used efficiently and made available in a timely fashion is critical for growth and innovation in the wireless sector, and for users in the economy as a whole. Access to spectrum will continue to drive the emergence and adoption of new wireless devices, services and applications. To support interoperability and economies of scale for equipment, Canadian commercial spectrum is aligned with the U.S. and is generally harmonized on a regional or global basis. The challenge of effectively managing spectrum is exacerbated by an increasing number of competing interests, rapidly evolving technology, and the high and growing demand for wireless broadband. In order to meet these demands, Industry Canada intends to provide access to additional spectrum through re-purposing the 2500 MHz band to allow flexible use, including mobile broadband services, and making available the 700 MHz band for next generation wireless as the analogue broadcast services are transitioned to digital television in 2011. Consultations are also planned for the 70, 80, 90 GHz bands and the 1.4 GHz band for broadband use.

Providing timely access to spectrum will be key to ensuring network capacity is in place to meet wireless broadband demand growth. In view of international trends and rapidly growing demand, Industry Canada will inventory spectrum use with a view to better understand where opportunities exist for more intensive use or reallocation. For example, Industry Canada will investigate the use of television white spaces — portions of bands unused in certain geographical areas — to deploy new low power technologies. White space technologies would help meet the growing demand for spectrum and encourage innovation in applications development in Canada. Industry Canada will continue to investigate options to remove regulatory obstacles to the efficient functioning of markets, to facilitate secondary markets for spectrum authorizations, and to develop a fee structure that could incent a more efficient use of spectrum. In addition, to improve predictability and transparency regarding spectrum management priorities, Industry Canada will publish a timetable for upcoming auctions and consultations.

Rural and Remote Areas

Meeting the needs of consumers and businesses in rural and remote areas presents unique challenges. Advanced service deployment tends to trail that of urban areas, as the business case for deploying networks in these sparsely populated regions is far more difficult. A range of technologies can be employed and there is often greater reliance on terrestrial wireless and satellite solutions for rural and remote communities. Governments internationally have taken a variety of approaches to address this issue including direct funding, regulatory mandates and promoting market forces. The application and impact of measures such

as universal service obligations is also being discussed in many countries given the evolution of technology and competition. The approach of the Government of Canada has been to fund broadband directly through funding initiatives, rather than through cross subsidization through a universal fund approach. The CRTC is currently examining these and related issues as part of its proceeding launched January 28, 2010.

Concerning broadband funding initiatives, federal, provincial and territorial governments have made significant contributions to targeted initiatives such as promoting high capacity fibre access to anchor institutions such as hospitals and schools, providing fibre backbone capacity, and extending a basic level of high speed service to all households. The recently launched *Broadband Canada: Connecting Rural Canadians* program (hereafter referred to as Broadband Canada) is an example of the latter. Given the huge importance of access to high speed networks, governments will likely have an ongoing role to ensure that Canadians in rural areas are not left behind. In doing so, Canada must ensure that citizens and communities have more than just basic broadband, but the speeds and capacity needed for economic growth.

Measuring Progress

Having good data is critical to accurately assessing the existing state of affairs and ongoing progress in meeting Canadian objectives. However, certain information gaps persist, particularly with respect to the deployment of advanced networks in Canada. This makes it difficult to accurately identify the extent of coverage and assess whether existing frameworks are effective. Industry Canada will examine the means to enhance statistical data collection. Network operators will also have an important role to play by indicating what additional information can be collected cost effectively.

DISCUSSION QUESTIONS

Ensuring a state-of-the-art network infrastructure to promote innovation, attract investments and support world-class health care, research and education will be key to making Canada a leader in the global digital economy. All Canadians should have access to high-speed networks as digitally savvy citizens, consumers, workers, entrepreneurs and artists — to connect them to the potential that the digital economy offers. With major investments by the private sector, Broadband Canada and other government investments, Canada is on its way to connecting all Canadians. However, reaching this goal will take the concerted efforts of all stakeholders — individuals, businesses and governments.

- What speeds and other service characteristics are needed by users (e.g., consumers, businesses, public sector bodies and communities) and how should Canada set goals for next generation networks?
- What steps must be taken to meet these goals? Are the current regulatory and legislative frameworks conducive to incenting investment and competition? What are the appropriate roles of stakeholders in the public and private sectors?
- What steps should be taken to ensure there is sufficient radio spectrum available to support advanced infrastructure development?
- How best can we ensure that rural and remote communities are not left behind in terms of access to advanced networks and what are the priority areas for attention in these regions?

Growing the Information and Communications Technology Industry

CONTEXT

Canada's information and communications technology (ICT) sector is an important part of the Canadian economy. The 31 500 Canadian ICT firms that create and supply goods and services contribute to a more productive, competitive, and innovative society. The ICT sector currently represents 5 percent of Canada's gross domestic product (GDP) and accounted for 11.5 percent of all real GDP growth since 2002. Employees in the ICT sector are well educated and earn on average $62 000 or 47 percent more than the national average.[14]

The performance of this industry sector is heavily influenced by global trends and major global firms. Competition from emerging economies is increasing and Indian and Chinese firms have now become world leaders and innovators. In the face of global competition, Canada needs to strengthen its ICT sector. The size of the Canadian industry sector falls below the OECD average, ranking 14th out of 23 countries measured as a share of total business sector GDP, well behind a number of our key competitors.[15]

As the global economy becomes increasingly digital, demand for digital products and services will grow, including in areas of Canadian strength. Canada has solid strengths in communications technologies (wireless and wired equipment, fibre optics and communications software), new media (e-gaming, animation and special effects software) and microelectronics. Other areas of potential technology and market opportunity for the ICT sector include cloud computing, microsystems, e-health applications and software as a service (SaaS).

To capitalize on these strengths and opportunities, Canadian firms will have to focus on high value-added activities and be especially innovative and agile to compete globally. Our goal is to increase the global competitiveness of Canada's ICT sector and grow its share of the Canadian economy and the global marketplace. But for Canada to succeed some key challenges will need to be addressed as we move forward.

CHALLENGES

Innovation

R&D and technology innovation are crucial to the continued growth and competitiveness of the ICT sector. The sector is the largest performer of private sector R&D in Canada, accounting for 39 percent of the total in 2009. However, the sector experienced slower R&D growth than other industry sectors over the 2002–09 period — 2.4 percent vs. 2.7 percent.[16] Internationally, Canada is a middling performer, ranking 10th among 21 OECD countries in ICT manufacturing R&D as a percentage of GDP and 7th in ICT services R&D.[17] Moreover, ICT R&D growth over the 2002–07 period was 2.1 percent in Canada, versus 8.7 percent in the U.S. Part of the reason is that the sector relies on a small core of key companies and industries for its R&D and innovation efforts. There are too few large R&D performers in Canada that are well positioned to develop new technologies and products for emerging global markets. With some of the most successful ICT companies in the world spinning out of universities, some have urged for increased collaboration between industry, universities and governments to spur innovation and R&D efforts.

The Government of Canada identified the ICT sector as one of four priority sectors in its 2007 Science and Technology Strategy, and has increased funding for research and innovation through the federal granting councils, the Institute for Quantum Computing, the National Optics Institute, the Industrial

Research Assistance Program (IRAP), the Microelectronics Innovation Centre, CANARIE, the Canadian Digital Media Network and the Graphics, Animation and New Media Canada Network. These investments are in addition to the Scientific Research and Experimental Development (SR&ED) tax credit, reductions in corporate income taxes, and the export-related support of the Department of Foreign Affairs and International Trade and Export Development Canada.

Other countries are taking aggressive steps to help position their ICT sectors for longer term growth by investing in R&D and innovation. Some Canadian stakeholders have been advocating for further support to R&D. There is wide recognition that Canada's small domestic market itself will not sustain the growth of Canada's ICT sector that is required to remain competitive, and that primary growth comes by increasing exports of goods and services. Some stakeholders would like to see more efforts directed at growing domestic ICT firms and are keen for new government innovation frameworks, including market-led innovation policies, public-private sector partnerships and robust IP protection, particularly to support new emerging technology products and services that could provide opportunities for Canada. It has also been suggested that the government should consider undertaking analysis to identify the conditions that would help foster "communities of innovation" in Canada. Others suggest that existing measures preventing foreign companies from sponsoring R&D should be removed to increase their R&D activities in Canada.

Nonetheless, it is important to recognize that federal expenditures in science and technology are at historically high levels: currently $10.7 billion a year. With *Advantage Canada,* the Science and Technology Strategy and Canada's *Economic Action Plan,* the Government of Canada has taken significant steps to put in place the foundations for research, development and innovation. To further ensure that federal research funding is yielding maximum benefits for Canadians, the government will conduct a comprehensive review of all federal support for R&D to improve its contribution to innovation and economic opportunities for business. This review will inform future decisions regarding federal support for R&D. The ICT sector must rise to these challenges, and increase business investment in innovation and the successful commercialization of new products and services.

Venture Capital Financing

Venture capital (VC) is crucial to the ability of promising ICT companies to innovate, commercialize technologies and fulfill their growth potential. In 2009, VC investments in ICT were 25 percent less than in 2008, and 50 percent less than in 2007.[18] Since 2003, the number of ICT companies receiving VC funding has also decreased by half.

In 2009, the Government of Canada invested $400 million in the Business Development Bank of Canada (BDC) to increase VC investment in promising Canadian-based technology companies. In addition, the government has provided $75 million to BDC for the Tandem Expansion Fund for VC investment in late-stage firms. Some provincial governments have also taken action in recent years with the creation of investment funds in partnership with the private sector to invest in strategic sectors, such as ICT.

The government will continue to build on these efforts to address issues related to VC financing, particularly those affecting SMEs. Some stakeholders have identified the reporting requirements under section 116 of the Canadian *Income Tax Act* as a barrier to foreign VC investments in Canada. Budget 2010 proposed to narrow the definition of "taxable Canadian property" in the *Income Tax Act,* thereby eliminating tax reporting under section 116 of the *Income Tax Act* for many investments such as those by non-resident venture capital funds in Canadian high-technology firms.

Talent

In order for Canadian companies to innovate and grow, they must be able to attract and retain highly qualified professionals. The digital sector is increasingly challenged to seek out and aggressively compete for these professionals. There are some indications of a shrinking talent base due to decreasing university enrolment in the areas of computer and information sciences, applied mathematics and computer software engineering. Between 2001 and 2007, information technology undergraduate enrolment in Canadian universities dropped by 45 percent, resulting in a 35-percent decline in graduates by 2007. Similarly, enrolment in graduate programs has declined by 21 percent since 2003, leading to a 16-percent drop in graduates by 2007.[19] Moreover, there has been a decline in immigrants, as fewer IT professionals in emerging countries seek employment in developed countries such as Canada, due to growing opportunities in their home countries. Overall, the growth and viability of the ICT sector is put at risk, including Canadian and foreign direct investment in R&D in Canada. It also undermines the entire economy, as 45 percent of all IT professionals work in other sectors.[20]

The Government of Canada has made it easier for employers to obtain the talent they need to remain competitive through improvements to foreign credential recognition. Leading suppliers and users of ICT, including key universities, have also formed the Canadian Coalition for Tomorrow's ICT Skills, aimed at ensuring that Canadian organizations can hire the ICT professionals they need to meet the changing and diverse needs of the 21st century workforce.

It will be important for governments and the private sector to identify ways to attract more students to university ICT degree programs and attract more foreign ICT professionals to immigrate to Canada. Canada must be seen as a destination of choice and must retain its graduates, building a talent pool of individuals with strong technical, management and soft skills if Canadian ICT companies are to grow and Canada's economy is to increase its development and use of ICT. As such, the Government of Canada will explore how to better attract international students and permanent immigrants along sectoral needs, such as ICT.

Government as a Model User

Governments can promote private sector innovation by being a smart and demanding purchaser and a model user of advanced technologies and services. The Government of Canada purchases approximately $2.5 billion per year of ICT goods and services. The Council of Canadian Academies notes that the "prospect of government procurement contracts for ICT firms that established a substantial presence in Canada provided in some cases an initial attraction that grew into major activities with global product mandates."[21]

Governments in some other countries set aside a percentage of their procurement budgets for small and medium-sized enterprises. Others are identifying their future technology needs and contracting out pre-commercial R&D work to the private sector to support the development of products and services to meet these needs. By being an early adopter of emerging and next generation technologies (e.g., Green IT and cloud computing models), governments can help drive ICT uptake in the private sector. This approach also helps SMEs to develop global sales and provides them with a powerful and credible client reference. Some Canadian stakeholders are advocating for changes to government procurement to better support private sector innovation. Recognizing this, Budget 2010 announced $40 million for the Small and Medium-sized Enterprise Innovation Commercialization Program, a two-year pilot initiative through which federal departments and agencies will adopt and demonstrate the use of innovative prototype products and technologies developed by SMEs.

DISCUSSION QUESTIONS

Governments have a role to play in putting in place the policies and programs that encourage businesses to innovate and compete. As well, governments must ensure that Canada has an investment climate that attracts and retains strategic investments. At the same time, the private sector has the primary role in growing the ICT sector.

The Government of Canada would like your feedback on the following key issues to help grow the digital industry in Canada:

- Do our current investments in R&D effectively lead to innovation, and the creation of new businesses, products and services? Would changes to existing programs better expand our innovation capacity?
- What is needed to innovate and grow the size of the ICT industry including the number of large ICT firms headquartered in Canada?
- What would best position Canada as a destination of choice for venture capital and investments in global R&D and product mandates?
- What efforts are needed to address the talent needs in the coming years?

Digital Media: Creating Canada's Digital Content Advantage

CONTEXT

For generations, we have sought as a country, through appropriate market frameworks and policies, to promote the creation of and access to Canadian creative content made by Canadians, designed to inform, enlighten and entertain, and that is reflective of our linguistic and ethnocultural diversity. Today, Canadian artists, producers and creators are admired in Canada and around the world, and our public policies are emulated by many. Nevertheless, the digital revolution has profoundly affected how all Canadians create, share and consume creative content. Rapidly emerging digital services and applications stretch and challenge the bounds of creativity and imagination, and provide Canadians with an unparalleled opportunity to seize a digital advantage on the creative global stage. As more and more everyday activities (entertainment, communications, work, learning etc.) are done on digital platforms like TV, computers, cell phones and other portable devices, the Canadian economy needs a strong and competitive digital media industry (creators, enablers and aggregators) to be well positioned and take a leading role in shaping the global digital economy.

"Digital content will increasingly become the basic creative infrastructure underpinning the knowledge economy and be at the centre of health, educational, and cultural activities."[22] – OECD

Average Weekly Hours by Media			
	2007	2008	2009
TV	25.0	24.6	24.6
Radio	19.6	19.8	19.3
Internet	13.7	14.0	15.9
Newspapers	3.2	2.8	2.8[23]

Weekly hours spent by English and French Canadians were respectively: 9.7 and 10.7 hours listening to satellite radio; 7.1 and 5.6 hours listening to iPod and MP3; 5.3 and 5.4 hours streaming online audio; 4.2 and 4.6 hours streaming online radio; 2.2 and 2.5 hours Podcasting; and 1.5 and 1.2 hours viewing online TV in 2008.[24]

Ninety percent of Canadians (6 years old to adult) spent an hour or more per week playing computer and video games in 2009.[25]

Mobile phone penetration in Canada increased to 64.41 percent in 2008 from 42.0 percent in 2003.[26]

Digital media creators are at the centre of all creative industries, producing information, entertainment, services and applications using digital technology. The sector includes, but goes beyond arts and culture traditionally defined, and is driven by the same creativity that inspires Canadian artists. Digital media has been described as the 'soft infrastructure' that is equally as important as the 'hard infrastructure' like broadband connectivity. Both elements have a profound impact on Canada's ongoing success in the digital economy.

With the right framework, digital media entrepreneurs have the ability to create Canada's digital content advantage with vision and boldness to unleash the potential of content to capitalize on our investments in digital infrastructure and drive more innovation in the years ahead. Those who get it right will find ways to meet the needs of Canadians as citizens, consumers and creators, and in doing so, will drive the uptake of infrastructure and devices, distinguishing Canadian digital offerings in a crowded global marketplace.

As broadband networks spread around the world, digital media and the content are the advantage; they will be what attracts continued investment and talent, improves productivity, promotes prosperity in the digital economy and secures Canada's place in the digital world. This diverse sector will contribute in new ways to citizen engagement, quality of life and will open up new opportunities for all Canadians to participate in Canada's democratic, economic, cultural and social life.

Canada has reasons to be confident. Right now, the Canadian arts and culture sector generates about $46 billion to Canada's GDP or 3.8 percent of Canada's real GDP and directly employs approximately 662 000 people, or 3.9 percent of national employment.[27] As the composition of this sector and opportunities expand in the digital economy, the economic potential of Canadian creative industries producing Canadian content will be recognized as central to Canada's success. We have world-class companies, entertainment software developers, architects and filmmakers. From Derek Gour the Ottawa developer of a local application on iPhone that helps commuters access their bus schedules to big-budget and award-winning productions, such as ReGenesis, the Canadian animated series for children, Iggy Arbuckle, and the popular website and television program Têtes à Claques, Canadian entrepreneurs and creators are turning to new ways to engage and reach audiences. We have public organizations, such as the National Film Board of Canada (NFB) and the Canadian Broadcasting Corporation (CBC/Radio-Canada) who are also leading the way in attracting users at home and abroad to cutting-edge Canadian content and applications. We have community groups who are seeking ways to use digital media content and applications to innovate and interact. And none of this would be possible without Canadians who, whether at home, school, work or play are using digital media more and in new ways.

There is great opportunity and with that comes uncertainty. Content producers continue to struggle to attract audiences given the extensive amounts of foreign content available online. As well, a major transformation is under way in the structure of the digital media sector. The environment is volatile and change is happening at breakneck speed. The challenges are particularly acute for legacy players that are accustomed to an orderly marketplace. They have the dual task of meeting consumer demand for their established products while at the same time creating the business opportunities of tomorrow.

Canada has no time to lose — this is our moment to define how we will create Canada's digital content advantage.

CHALLENGES

New business models and new market strategies will be needed if the Canadian digital media sector is to succeed in the global digital economy. The Government of Canada recognizes that while growth will be influenced by public policy, ultimately the private sector will bear the risks and reap the rewards. Changes in behaviour and adjustments to policy in both public and private sectors will be required. The Government of Canada's role is to put in place a marketplace framework in which our creators, inventors and entrepreneurs have the incentives to innovate, the confidence to take risks and the tools to succeed.

New and increasingly more affordable technology is putting creative control directly in the hands of consumers and creators. When the value of our digital infrastructure depends on the content it carries, when carriers and content creators, applications and services are converging, the way the money flows — the value chain — is undergoing a fundamental shift and multiple value networks are emerging.

Consumer demand, in particular the increasing desire for on-demand content on every platform, is putting pressure on companies to adjust their offerings and, at the same time, is opening up new business opportunities. As businesses respond to changing consumer expectations they are seeking to protect the value of their assets while growing new, strategic business lines. From the individual creator to the multinational company, experimentation and taking risks will be critical, knowing that success is not guaranteed and definitive business models remain elusive.

While the Government of Canada has undertaken a significant body of research and analysis[28] to identify the conditions necessary for Canadians to meet future market demands, we are seeking your views on what elements of this marketplace framework would be most essential to your future success.

This framework should support the development of the digital media sector and recognize the important role of this sector to Canada's prosperity. The talent is here; if the framework is right, more talent will surface, the demand will be there and Canada will be a destination of choice for investment and innovation.

The Government of Canada recognizes that it plays an important role in creating a climate for innovation and economic growth for the digital media sector in Canada. This is done through direct investments, incenting and encouraging other sources of financing, ensuring national institutions do their part and by promoting modern rules and regulations.

Investments

Targeted and strategic public investments, both direct and indirect, can and do make a difference.

The Government of Canada recently renewed a suite of programs in digital media and content, listed below, representing a total federal investment of $290.2 million per year. Together with our private sector funding partners, over $450 million is invested in Canadian creative industries each year through direct funding programs. These programs will support the creation of compelling content on multiple platforms and an enhanced capacity to innovate. They are already leading to new partnerships and experiments among various creators — gamers and producers, software developers and distributors, interactive media producers, telecommunications companies and broadcasters, book publishers, music producers, technology developers and consumers. It will be these new alliances that will spark development of the new products and services that will improve prosperity in the digital economy. These programs provide powerful examples of how the Government of Canada is using its investments to support the creative industries to innovate and to leverage private investments, in some cases at a ratio of 3:1.[29] Government investments also foster the creation of Canadian content for under-represented communities, including official language minority, Aboriginal and ethnocultural communities. The Government of Canada will continue this work, and plans to review federal policies related to feature film.

The Canada Media Fund[30] recognizes the change in how Canadians create and access media, and will support multi-platform projects. The fund will also encourage the development of experimental, non-linear content and applications.

The Canada Interactive Fund[31] will encourage official language minority communities, Aboriginal, ethnocultural and other not-for-profit cultural organizations to take advantage of new and emerging technologies, including social networking tools. The Virtual Museum of Canada and the Works of Reference Licensing Initiative provide access to extensive, innovative heritage collections.

The Canada Book Fund[32] will support the creation of digital content and will encourage new approaches to reaching readers on digital platforms.

The Canada Music Fund[33] will support digital market development to expand markets for Canadian artists through the digital promotion and sale of music online in Canada and abroad.

The Canada Periodical Fund[34] will provide publishers with the flexibility to manage funds strategically; enriching their web content and incenting online publishers in finding innovative and profitable ways to reach Canadians.

Opening the Doors to Other Sources of Financing

A challenge for the creative industries can be access to early stage financing. Digital media projects are often considered to be high risk, and can involve significant upfront costs before prototypes can be shown to potential investors. The Government of Canada recognizes that the ability to access early stage financing has a significant impact on the rate of digital media innovation and the medium-term viability of companies.

The Government of Canada is prepared to examine whether there is sufficient access to capital and whether existing mechanisms should be more open and accessible to the creative industries. Federal lending institutions, for example, play a key role in stimulating business development and economic growth.

Venture capital funding will also be investigated for its potential to increase the financial capacity of the digital media sector to take risks and achieve commercial success. This exploratory work will examine whether the creative industries face particular issues or have specific needs when it comes to venture capital and how this could be addressed.

Talent and Sector Development

With a near-constant evolution of technologies, and an emerging industry comprised often of small and medium-sized companies, the Government of Canada recognizes that there is a need to develop skills, and share expertise and best practices. The federal government is interested in exploring with the private sector and the provinces and territories, the emergence of both physical and virtual digital media clusters, such as the Stratford Institute of the Canadian Digital Media Network, that would bring together the diverse richness of Canadian creative talent, provide exposure, contribute to building strong companies, generate new business opportunities, develop entrepreneurial skills and showcase Canada as a world-class producer of digital media and content. Further, given the Government of Canada's commitment to explore how to better attract and retain international students and permanent immigrants along sectoral needs, it will review which areas of activity digital media businesses most need to bolster their talent.

National Institutions

Federal cultural institutions, such as CBC/Radio-Canada, the National Film Board of Canada, Telefilm Canada, the Canada Council for the Arts, and Library and Archives Canada, continue to be redefined by changes in technology. Those who produce content will need to continue to make digitization of their collections part of their ongoing activities to serve Canadians. While priority collections in Canada's cultural institutions have been digitized over the past decade, some have suggested that the pace of digitization should increase.

Canada must also ensure that investments already made in our digital infrastructure and economy in digital and digitized Canadian content can be leveraged for long-term access and use. The government is interested in exploring whether this could be achieved through the establishment of a pan-Canadian network of trusted digital repositories (TDRs).

Further, the CBC/Radio-Canada and the NFB have reached beyond their traditional roots in broadcasting and film, to show a strong commitment to the new digital platforms to distribute content and interact with users, as a core component of their service to Canadians. The CBC/Radio-Canada and the NFB

offer access to extensive online collections, social media tools, games and smartphone applications. Both organizations have been recognized, both nationally and internationally, for their innovation, including two Canadian New Media Awards in 2009 to the NFB for Best Cross-Platform Project for its "Waterlife Interactive"[35] and Best Online Video Portal for its "Online Screening Room."[36]

As part of the marketplace framework, the Government of Canada will ensure that our public institutions have the tools they need to continue to take risks, lead by example and serve Canadians. These institutions can be a hotbed for research and development, organizational and team structures, and a training ground for the next generation of creators. They can play a leadership role in providing Canadians with access to leading edge digital content while not unfairly competing with the private sector. To that end, the Government of Canada expects the CBC/Radio-Canada and the NFB to maximize their presence on all digital platforms.

Modern Rules and Regulations

As much as digital media and content are key to prosperity, individuals and companies in this area will face stiff and growing competition from other countries. They will need modern rules and regulatory certainty.

Some have argued for legislative change, making the case that the *Broadcasting Act,* the *Telecommunications Act* and the *Copyright Act* do not line up with the digital media reality and changing market dynamics.

Canada's copyright regime is the mechanism by which much of the economic value flows through the networks of creation-production-distribution-consumption. The *Copyright Act* is an important marketplace framework law and cultural policy instrument that must give Canadian creators, citizens, and consumers the tools they need to compete in the global digital economy. Innovation and creativity will grow where investments of time, energy and money are secure and fairly rewarded. Throughout the summer of 2009, Canadians were invited to participate in national consultations to provide an understanding of their experience with copyright and to inform the modernization of the *Copyright Act,* and the Government of Canada is committed to taking action.

Legislative reform is but one means to address issues around digitization. The digital environment is posing particular challenges for creators, both for how they create, and for the business environment in which they operate. On the one hand, there are growing possibilities for new forms of content and new channels of distribution and access to current and emerging markets; on the other hand, new technologies have disturbed existing means of control or appropriate compensation for the use and copying of their works. New business models are developing — some complement while some compete directly with more established copyright industries. Fair and appropriate remuneration for creators is essential to the growth of digital media content in Canada. The Government of Canada recognizes that copyright reform, in addition to legislative change, must include engaging with creators. This will allow for an examination of, and practical approaches to fair and appropriate remuneration for creators, which is essential to growth and prosperity.

Another key issue is the approach to regulation in the converged digital media context. Regulatory agencies, such as the CRTC, are being challenged to find ways to transform their approach, away from complex and micro rules, put in place when access could be controlled, roles were well defined and interdependencies could be managed, to devising simpler rules to reward success and require innovation. Regulators also now have access to technology that will allow them to fulfill their public service mandate by empowering the consumer and ensuring meaningful public participation in the regulatory process.

DISCUSSION QUESTIONS

The economic impact of the transformation of media from analogue to digital engages a significant part of the Canadian economy. Canadians' use of digital media continues to grow each year. Digital technologies are being integrated into the production, distribution and consumption of content. In parallel, the digital media sector is shifting away from linear production chains with distinct players and discrete products into three main areas of activity: 1) the *creation* of content; 2) *enabling* content creation and distribution; and 3) the *aggregation* of content. A significant part of the innovation taking place today and the prospects for future prosperity are related to these activities. An up-to-date marketplace framework for Canada's digital media sector will create Canada's digital content advantage and position Canada as a destination of choice for creativity and innovation.

- What does creating Canada's digital content advantage mean to you?
- What are the core elements in Canada's marketplace framework for digital media and content? What elements do you believe are necessary to encourage the creation of digital media and content in both official languages and to reflect our Aboriginal and ethnocultural communities?
- How do you see digital content contributing to Canada's prosperity in the digital economy?
- What kinds of 'hard' and/or 'soft' infrastructure investments do you foresee in the future? What kinds of infrastructure will you need in the future to be successful at home and abroad?
- How can stakeholders encourage investment, particularly early stage investment, in the development of innovative digital media and content?
- How can we ensure that all Canadians, including those with disabilities (learning, visual, auditory), will benefit from and participate in the Canadian digital economy?

Building Digital Skills for Tomorrow

CONTEXT

The rapid development and adoption of digital technologies is changing the way we work and communicate. Firms have recognized the need to embrace technology in order to remain competitive in the global marketplace; artistic creators have embraced digital technologies to enhance their art; and individuals have recognized the value of technology to become effectively connected. Creating the right conditions for a world-class digital economy will require digital skills for all Canadians.

WHAT ARE DIGITAL SKILLS?

While there is no standard or agreed upon definition, digital skills can be understood as the ability to locate, organize, understand, evaluate, create and share information using digital technology.* It involves a knowledge of current communications technology and an understanding of how it can be used. Digital skills are a suite of skills that help Canadians connect in today's world and function in the labour market of today and tomorrow.

* Adapted from a definition for digital literacy in Educational Testing Service, *Digital Transformation: A Framework for Digital Literacy — A Report of the International ICT Literacy Panel,* 2002.

HOW ARE DIGITAL SKILLS MEASURED INTERNATIONALLY?

Efforts are currently being made by the Organisation for Economic Co-operation and Development (OECD) to gather information globally on digital skills. The Programme for the International Assessment of Adult Competencies (PIAAC) survey will be conducted in 2011 to assess how adults of working age are able to apply their technological competence in workplace and social situations.*

* Organisation for Economic Co-operation and Development, *Programme for the International Assessment of Adult Competencies,* 2010.

Arguably the backbone of the digital economy is a strong, globally competitive information and communications technology sector. For a strong ICT sector, it is essential that Canada have a sufficient quantity of qualified ICT workers across occupations and geographical regions. But, ICT workers are not alone in grappling with the effects of advances in digital technologies. The entire workforce, from highly skilled scientists to production line workers, is increasingly affected by rapid changes in the use of digital technology in the workplace.

These advances in technology are having profound impacts on Canada's learning system, both how we teach and how we learn. The Internet, social media and virtual realities have opened up new channels for learning. But, there are concerns that a digital skills divide is emerging, where some groups have less access to new technology and are falling behind in their adoption of digital skills.[37] This is of particular concern because effective participation in the labour market is increasingly linked to digital competence.

CHALLENGES

For Canada to become a leader in the digital economy, digital skills development must be fostered in all Canadians. Digital skills are important, not only for the ICT sector, but for the entire workforce, as well as all other Canadians, be they homemakers, students or seniors.

A significant challenge in determining if Canadians have the skills and competencies required for the digital economy is a lack of a precise understanding of what digital skills are, and how Canada is faring in this regard compared to its competitors.

Addressing Skills Shortages in the ICT Sector

Focusing first on the ICT sector, over the past several years, employers have reported difficulty in recruiting skilled ICT workers. As mentioned in a previous chapter on growing the ICT sector, despite a downturn in ICT employment since mid-2008, skills shortages continue in some areas. In many cases, these skill shortages are more related to workers not possessing the right combination of specific skills and experience required by Canadian employers, rather than a lack of formal qualifications. Solving these ongoing skill shortages will require a range of integrated and targeted efforts coordinated across government, industry and education partners.

A significant gender imbalance also exists in the ICT workforce; women are fewer than one-quarter of workers in ICT occupations. Similarly, Aboriginal Canadians are under-represented in ICT occupations, comprising just 1 percent of workers in 2006. A digital strategy needs to seek opportunities to increase the participation of under-represented groups, particularly through encouraging more post-secondary enrolment in ICT-related programs.

In the short-term, the Government of Canada's Temporary Foreign Worker (TFW) program has responded to the skills needs of the ICT industry by facilitating the entry of temporary foreign workers for several ICT fields. In 2006, there were 4663 temporary work permits issued for ICT occupations, 7092 in 2007, and 11 845 in 2008.

A longer-term solution to ICT skills gaps will require a focused and sophisticated strategy that could combine at least three components:

1. Expand post-secondary programs that combine ICT with other fields, and increase the role of co-op and internship placements;
2. Expand programs to integrate under-represented groups and internationally educated professionals; and
3. Strengthen opportunities for continuing professional development of ICT workers currently in the workforce.[38]

As a component of the longer-term solution, permanent immigration will be key to the health of the ICT sector's labour force. In 2006, internationally educated professionals (IEPs) accounted for 14 percent of workers in ICT occupations.[39] However, several factors suggest that integration and retention are issues.

The Government of Canada's Sector Council Program (SCP) will also continue to be part of the strategy to address skills issues through its support of the two industry driven sector councils that address human resource issues in the digital economy: the Information and Communication Technology Council (ICTC) and the Cultural Human Resources Council (CHRC).

The ICTC, and its promising Focus on Information Technology (FIT) project, is one example of how this federal program works in partnership with provinces and territories to provide grade 11 and 12 students with a foundation of technical, business, and interpersonal skills and the option of direct access to the workplace.

The CHRC also supports skills development in the digital arena. In 2008, the CHRC produced the Canadian Digital Media Content Creation Technology Road Map, which identified a number of high priority technology projects to assist Canadian digital media content creators in meeting human resource demands. The CHRC has developed a competency chart and profile for new media content creators that assist youth and other job seekers in making career choices.

Improving Digital Skills in Workplaces Across the Economy

The ability of Canadian businesses to innovate and position themselves along the global value chain will depend heavily on investments made in ICT platforms, the success of which, in turn, depends on workers having the appropriate skills.

SMEs are likely to face the greatest challenge both in financial capacity to invest in ever-changing newer ICT technologies and in the capacity to support workplace training for these technologies. Effective SME participation in the new digital marketplace will involve ongoing up-skilling and training.

Large employers and institutions will face their own challenges in terms of digital up-skilling. For example, in the health sector, steps need to be taken to ensure that large scale investments in electronic health information systems are not undermined by a shortfall in the supply of health informatics and health information management professionals.[40]

In sectors undergoing economic restructuring, particularly automobile manufacturing and forestry, there is ongoing, large-scale displacement of workers in need of reintegration into the workforce. Many of the job losses have occurred among older and lower-skilled workers. Transitioning these workers to new employment will require programs that support digital skills.

Narrowing the Digital Skills Divide

As Canada builds towards a world-class digital economy, it is essential that all Canadians have the skill sets to be able to access, use and interpret a growing and increasingly complex range of digital information. The benefits of obtaining digital skills extend beyond improved work and learning outcomes presenting opportunities for improvements to our quality of life. Technology is pervasive in our society, intertwined in a range of everyday activities, and those with impediments are at a disadvantage as it can lead to a lack of access to information, government services, health care and education.

EMERGING DIGITAL SKILLS DIVIDE

International and Canadian evidence suggests the existence of a digital skills divide.*

* Organisation for Economic Co-operation and Development and Statistics Canada, *Learning a Living: First Results of the Adult Literacy and Life Skills Survey,* 2005.

A Statistics Canada report on Internet use rates echoes the international evidence in indicating that digital experience in Canada varies by income, education and age.[41] Essential skills, such as literacy, are also strongly connected with digital abilities, and improving essential skills will be a key part in assuring that Canadians have adequate skills.

The Government of Canada's Office of Literacy and Essential Skills (OLES) works with a wide range of partners to improve the literacy and essential skills (LES) of adult Canadians to help them enter the workforce, to succeed and make transitions in the workplace, and to contribute to their communities and families. The mandate of OLES complements provincial and territorial investments in education and training through research on what works, the development of tools and the promotion of partnerships.

Technology advances, and in particular social networking, have the ability to enhance learning through the use of new media. Social networking can change both formal and self-directed learning through improved communication and collaboration. The positive implications of this are far reaching, from improved classroom learning to better workplace training. But, there is also a risk that the gap in skills could grow as the process of learning is increasingly connected to digital competence. People of all ages will have to be sufficiently competent, digitally and otherwise, to be aware of their learning opportunities, and have the ability to access and leverage them quickly and efficiently. Those who are not digitally savvy may fall behind.

DISCUSSION QUESTIONS

Training and learning is a complex area of shared federal and provincial/territorial jurisdiction. While the provinces and territories have primary responsibility for training and education, the Government of Canada has overarching responsibility to ensure Canada's economic security and prosperity by: growing the labour force by reducing barriers; improving the quality of the labour force by supporting skills development; and enhancing labour market efficiency through facilitating labour mobility and adjustment.

To further inform the policy directions of the Government of Canada in improving the quantity, quality, and efficiency of the workforce in the area of digital skills, we are seeking your feedback on the following questions:

- What do you see as the most critical challenges in skills development for a digital economy?
- What is the best way to address these challenges?
- What can we do to ensure that labour market entrants have digital skills?
- What is the best way to ensure the current workforce gets the continuous up-skilling required to remain competitive in the digital economy? Are different tactics required for SMEs versus large enterprises?
- How will the digital economy impact the learning system in Canada? How we teach? How we learn?
- What strategies could be employed to address the digital divide?

Conclusion

Canada has a proud tradition as a digital innovator. Canadian ICT manufacturers were leaders in developing key digital technologies such as satellites, fibre optics, digital switches, wireless devices and networking equipment. Canada's telecommunications and cable companies were leaders in deploying broadband networks and services to businesses and homes.

In recent years, our performance has slipped in some key dimensions. Growth rates have declined in the Canadian ICT sector in the face of increasing international competition, and we lag other countries in the adoption and use of digital technologies. On the other hand, Canada is building an international reputation in emerging areas such as e-gaming, animation and special effects software.

To prosper in the global digital economy, Canada must build on its many strengths and foundations to seize new opportunities and regain its digital leadership. Other countries have set clear targets and timelines for reaching these targets.

- Should we set targets for our made-in-Canada digital strategy? And if so, what should those targets be?
- What should the timelines be to reach these targets?

Developing and implementing a digital economy strategy will require the active engagement of all stakeholders, including ICT producers, consumers, researchers, teachers and users. It will also require cooperation between governments.

Moving forward, we welcome your input to shape the development of a digital economy strategy that positions Canada to compete globally and succeed.

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