



The Internet Association

Reasserting Canada's Competitiveness in the Digital Economy

Summary:

Canada has been an early leader in Internet adoption and access. But this advantage is slipping. Other industrialized economies are leaving Canada behind because businesses are under-utilizing digital technologies and missing out on the contributions they can make to employment, GDP growth, and economic competitiveness. In order to develop the digital economy and maximize the benefits for businesses of all sizes and types, Canada must focus on:

- **Mainstreaming usage** through Government use of online services, support for business uptake of technologies and consumer confidence building;
- **Promoting accessibility and affordability** through investment in infrastructure and attention to competitive markets; and
- **Creating an enabling environment for growth** by investing in workforce skills, knowledge clusters, crafting smart and enabling regulation, and supporting for R&D and venture capital attraction.



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I. Introduction: What We Do Every Day

The Internet economy is an integral part of life. Whether at home, at work, or on the move, Canadians purchase goods and access services online every single day. Canadians spend an average of 41.3 hours a month online, the second highest in the world (Comscore, 2013). During this time, Canadians communicate, collaborate, and engage in commerce. Holiday destinations are booked while sitting in front of the television. Reviews of nearby restaurants are found while walking down the street.

Canadians buy and sell on eBay, find flights on Expedia, connect with professional contacts on LinkedIn and use HootSuite to organize our social media networks. They use Google to access news and information, search for restaurants on Urbanspoon, download books from Indigo and buy consumer goods on Amazon. They use BlackBerry Messenger to send text messages while using the TimmyME mobile app to locate the closest Tim Hortons, refill their Tim Card or even pay with their mobile phone. These activities are so common that we seldom give them a second thought. They are simply a coffee, a weekend away, or a crib for the baby.

If you ask these consumers whether they are part of the digital economy, they may well say no - unless they work for a technology company. In fact, everyone is part of the digital economy. Information technology is spreading everywhere and into everything (CCA 2012).

The auto industry, for example, is one of the world's largest buyers of Information and Communications Technologies (ICTs). Talk to a Ford's Sync Infotainment System or tap its anti-lock brakes to see this in action. Then there is the power sector. To capitalize on the promise of big data, BC Hydro spent \$2 million to hire Cisco to roll out sensors at its plants and smart meters for its major customers. Some 60 terabytes of data have since been generated, saving these customers \$70 million (Maraqa 2013). Ottawa-based Shopify has revolutionized online commerce for small retailers by creating a single platform that lets them manage all aspects of their online shop. At a most basic level, incorporating a business, finding new office space, hiring employees, and interacting with customers and suppliers have all been simplified thanks to online services.

Canadian Success Story: Shopify

Founded in 2006 by Tobias Lütke, Daniel Weinand and Scott Lake, Ottawa-based Shopify now powers over 90,000 successful online retailers in over 80 countries. Its platform allows users to easily and quickly create their own online store without all the technical work involved in developing their own website, or the huge expense of having someone else build it. Shopify lets merchants manage all aspects of their shops: uploading products, changing the design, accepting credit card orders, and viewing their incoming orders and completed transactions. It's helped its customers sell over \$3,000,000,000.

Shopify has drawn international accolades from the likes of TechCrunch, The New York Times and Fast Company, and has received \$122 million in Series A, B and C funding from OMERS Ventures, Insight Venture Partners, Bessemer Venture Partners, FirstMark Capital, Felicis Ventures, and Georgian Partners.

Source: www.shopify.ca

The proliferation of Internet-enabled systems and devices allows businesses to innovate and grow, helps Governments to provide services, and expands human capacity to interact, collaborate, and share knowledge. As Canada's policy-makers struggle to improve the country's competitiveness, a key part of the answer is hidden in plain sight. The future performance of the Canadian economy is dependent on the dynamism of the Internet economy. According to Canadian Internet Registration Authority (CIRA 2013), the digital economy already accounts for 3% of Canada's Gross Domestic Product (GDP) or \$49 billion per annum. The resources are at hand to grow this amount significantly and doing so will jumpstart Canadian competitiveness.

To the average consumer, the digital economy is mainly about browsing the Internet for deals, content and news. But the Internet provides Canadian enterprises with a global platform from which they can:

- Develop new products for domestic and global markets;
- Understand and reach new customers at home and abroad;
- Provide 24/7 customer access through technology-enabled commerce, including e-commerce;
- Track and transport goods more effectively;
- Optimize just-in-time delivery strategies;
- Complete complicated data management tasks at a fraction of the time and cost of traditional methods;
- Reduce the costs of communications, travel and relocation;
- Generate opportunities for young entrepreneurs; and
- Make local brands global.

The digital economy encompasses the network of technologies that support the way Canadians live, earn, spend and invest, combining new and unprecedented technologies to generate value. For businesses, this means faster, higher quality and less expensive digital products and consumer experiences. For Governments, digital services provide greater transparency and effectiveness to constituents (Sondergaard 2013).

Canadian Success Story: Real Matters

Markham-based Real Matters is a leading provider of information and insights into residential and commercial properties to both the mortgage and property & casualty (P&C) insurance industries. Leveraging its cloud-based technology platform, redihive™, the organization provides its customers with subject matter expertise gathered through partnerships with more than 26,000 independent appraisers. This state-of-the-art analytical platform identifies the right appraiser for each assignment upfront, building efficiency and cost effectiveness into the appraisal process while ensuring the delivery of high-quality reports and superior performance for lender clients. As a result, Real Matters' core solution, Solidifi is now the third-largest independent provider of origination appraisals in the U.S.

The company recently raised \$40M in private equity funding, adding to the \$22 million of common equity and debt facilities Real Matters secured in 2012.

Source: www.realmatters.com

Building a robust digital economy requires smart policy choices by Government and a private sector that is willing to seize opportunities. This is easier said than done. Yet, the need for action cannot be over-stated. Canada is falling behind its key competitors and neglecting the productivity enhancements that the country needs to remain prosperous in the 21st century. This document will offer some suggestions on how Canada can get its house in order and grow its digital economy. Canadian policy makers must act soon. The pace of technological change and the global competition for advantage is only increasing.

Section One: Canada's Performance – Strong But Lagging Behind

Canadians actively participate in the Digital Economy

In absolute terms, Canada is an active participant in the digital economy. First of all, Canadians are prolific Internet users, ranking number one in the world in the number of webpages visited per month (Comscore, 2014), and second only to the United States for the average number of hours spent online per user (CIRA, 2014). Canadians are extensive users of social media, with 69 percent visiting at least one social networking site in 2013, giving Canada the most social networking users in the world on a per capita basis (eMarketer, 2012). Canadians are also second only to the United Kingdom in consumption of online video, with 74 percent of Canadians (Comscore, 2014) watching an average of 24.8 hours of online video per month (CIRA, 2014).

Canadians are also sophisticated users of online services, and with 93 percent reporting that they research online before buying, the Internet is now more influential in helping them make purchase decisions than family, friends and co-workers (Fleishman Hillard, 2012). Further, Canadians are big buyers of what online enterprises have to offer. More than half of Canadian consumers have used the Internet to order a good or service (CIRA 2014), purchasing \$122 billion worth of goods and services in 2012, more than double 2007 levels (Statistics Canada 2013). Earnings from online and mobile advertising exceeded \$3 billion in 2012, compared to \$1.8 billion in 2009 and a mere \$237 million in 2003 (IAC 2013). To manage their finances, 67% of Canadians now bank online (CBA 2013).

Secondly, Canadians are actively embracing mobile technologies. 3 out of 4 Canadians own smartphones, well above the rates in U.S. and other developed markets, giving Canada one of the world's fastest growth rates for smartphone adoption and highest smartphone penetration rate among the mobile phone subscribers

(Comscore, 2014). Canadian users generated over 77% more mobile data traffic per subscriber in 2012 than the global average (Gillies 2013). While Canada has the lowest rate of mobile subscriptions per 100 inhabitants among other industrialized economies (OECD 2013), suggesting that Canada lags in overall mobile penetration, mobile subscriptions grew 5 percent in 2013 to more than 23 million (Comscore, 2014). Further, Canadians are increasingly using smartphones for a variety of shopping behaviors, including making mobile commerce transactions.

Canadian Success Story: Real Matters

The Canadian Mobile Consumer

- 93% of Canadian mobile phone users access the Internet daily
- The most popular mobile Internet activities are emailing, taking a photo or video, social media, and browsing/searching the Internet.
- 56% of Canadians use smartphones
- Nearly 40% of users have made a purchase via a smartphone

Source: Google, Our Mobile Planet, www.thinkwithgoogle.com/mobileplanet/en

From these statistics, it is clear that there is a high demand for online products and services in Canada and that the Canadian market provides tremendous opportunities for innovative companies.

Canada's Advantage in the Digital Economy

In addition to high Internet usage, Canada possesses several key advantages for participating in the Internet economy. Collectively, these advantages have contributed to several Canadian success stories in the technology sector, from pioneers in the telecommunications industry like Nortel and Blackberry to highly successful Internet start-ups like Hootsuite and Shopify.

Universities and colleges -- Canada's post-secondary educational institutions offer top-notch training and world-class research in an array of digital disciplines. The University of Waterloo is perhaps the best-known Canadian institution in the digital space, although there are strong capabilities across the country.

Research Infrastructure -- Canada's researchers have access to a number of ultra-fast networks dedicated to research. Founded in 1993, Canada's Advanced Research and Innovation Network (CANARIE) provides over 1 million researchers in 1100 institutions across the country access to speeds of 10,000 Mbps across the network and 100,000 Mbps in key corridors. Such speeds permit researchers to work on the most complex challenges, from advanced simulations to 3-D modeling. Compute Canada, which links together the country's high-performance computing resources, provides an excellent foundation for hundreds of researchers across Canada.

Talent -- Over the years, Canadian institutions have produced a very rich pool of talent in the technology and digital media industries. According to the Information Technology Association of Canada (ITAC) and the Entertainment Software Association of Canada (ESAC), skilled workers in the ICT and digital media industries are in extremely high demand and the unemployment rate in the sector hovers between 2% and 3% (statistically considered full employment). Due to the tight labour market the workforce is well-compensated, with the average wage 52% higher than the national average (ITAC/ESAC 2014).

Digital Content Creation -- Canada is a leader in digital content creation. Companies such as Corus Entertainment, Temple Street Productions and Blue Ant produce world-class entertainment across conventional broadcast and digital media. A new generation of local creators such as Corey Vidal, LuxyHair, Clean My

Space and Dr. Mike Evans have successfully leveraged new platforms such as YouTube to deliver their content and to global audiences. Similarly, according to ESAC, Canada has the third largest video game industry in the world (ESAC 2013).

Presence of Global Players -- Many of the world's major companies in the digital economy such as Google and Facebook have facilities in Canada. As The New York Times reported in February 2013, linkages between the university and the tech community have attracted top global firms to the Waterloo region (Austen 2013). Many of these companies also have offices and development centres in Canada's major cities. This gives Canadians direct access to the best players in the digital space.

Canada's Digital Challenge

However, while Canada ranks highly in terms of Internet usage and is well positioned to participate actively in the digital economy, it lags behind in several critical respects. Generally speaking Canadian businesses have been slow to adopt Internet technologies that are mainstream among key competitors globally. Only 45.5 percent of Canadian businesses have a website, and among small to mid-sized enterprises (SMBs), that figure is only 41.1 percent (CIRA 2014). Further, with only three percent of the Canadian retail economy online, Canadian retailers are falling significantly behind the United Kingdom (23 percent), the United States (7 percent) and others on e-commerce and digital marketing adoption, driving 68 percent of Canadian online shoppers to purchase from retailers headquartered outside of Canada (L2, 2014) and ceding the Canadian market to international competitors.

Given the significant discrepancy between consumption and adoption of Internet technologies, it is not surprising that virtually every major comparative study done in the past few years shows Canada to be firmly in the middle of the pack with respect to the digital economy's contribution to GDP. The average contribution of the Internet economy to Canada's current GDP is a full 25% below its G20 peers (CIRA 2013).¹ Moreover, the Boston Consulting Group (BCG) predicts that Canada's relative position will worsen, putting it 33% lower than the G20 average by 2016 (BCG 2012).

In assessing the Internet's contribution to growth, Canada falls even further behind. A report by the McKinsey Global Institute found that between 2004 and 2009 the Internet contributed approximately 10 percent to Canada's GDP growth (Pélissier du Rausas 2011). Impressive, but well below the average contribution of 21% to GDP growth in other advanced industrialized economies over the same five year period.

Why? Canada's poor performance in the digital economy stems from at least three factors. First, Canadian firms chronically underinvest in digital technologies even though, as Sonderberg (2013) points out, every company operating within the modern economy is a technology company. There is no easy explanation for why this is the case but the relatively strong Canadian dollar provides a window of opportunity for the private sector to generate value from capital expenditures.

Secondly, lack of access to capital investment from domestic and foreign sources creates a drag on dynamism in the digital economy. Lack of incentives for start-ups as well as inadequate fiscal and human resources to encourage companies to remain in Canada contribute to this gap.

Third, Canada's policy-makers have been slow to embrace the Internet economy as a source of dynamism, innovation, and productivity. Until recently, Canada was one of the few OECD countries that had not launched a coherent digital economy framework (OECD 2012). The Canadian Government remedied this by recently an-

¹ The Internet economy contributes an estimated 3% to Canada's national GDP, compared to the 4% average contribution among other G20 countries. By 2016, BCG estimates that the gap will widen to 3.6% and 5.3% respectively.

nouncing Digital Canada 150, its comprehensive plan for “ensuring Canada can take full advantage of the opportunities of the digital age” by Canada’s 150th birthday in 2017. However, countries that had already articulated a national digital strategy have a significant head start, putting Canadian firms at a disadvantage relative to international competitors.

Through the timely application of focused policy instruments, Government can help firms to leverage the digital technologies that will make Canada’s economy more competitive. Action is needed now. In August 2013, the Conference Board of Canada reported that from 1980-2011, Canada saw zero growth in multi-factor productivity, the part of the labour productivity equation derived from innovation (Hodgson 2013). If Canadian enterprises are to remain prosperous, Government must break this cycle of underperformance by putting digital technology use at the centre of Canada’s economic policies.

Fortunately, it is not necessary to start from scratch. Canada has a strong foundation upon which to build digital competitiveness. Over the past two decades, Government policy has laid the groundwork through contributions to public research and development, infrastructure, connectivity, a positive business and regulatory environment, and support for digital education. Digital Canada 150 builds upon this by setting out a clear framework for digital policy based on five key pillars - connecting Canadians, protecting Canadians, economic opportunities, digital Government and Canadian content – and establishing targeted programs aimed at supporting each. While this represents a strong start, Canada cannot afford to be complacent and must act quickly or it will continue to yield below-average results.

Section Two: The Dynamics of the Digital Economy

Internet computing will be the principal driver of economic growth for years to come. It is a general-purpose enabler because it reduces time and costs and expands reach and capacity no matter where it is applied. But, simply providing Canadians with broadband access is not enough; digital technologies must be added to the mix. The use of digital technologies generates three times more economic benefit than the benefits derived from access to broadband alone (Sabbagh 2012).

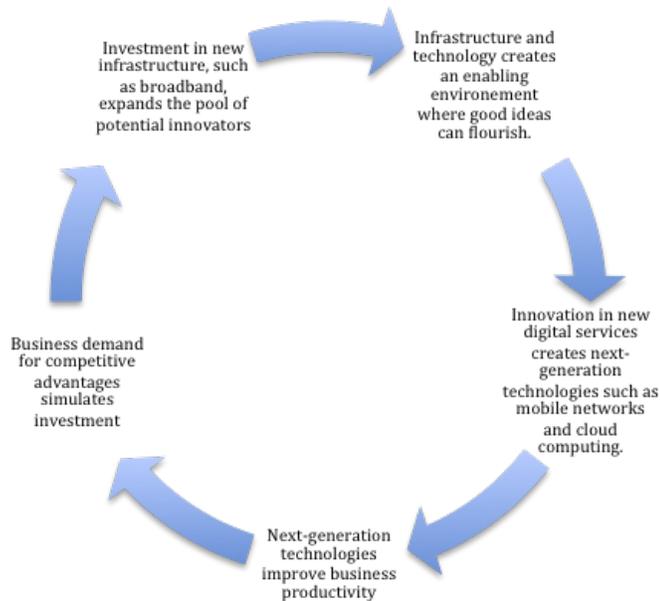
Internet Computing

What do we mean by internet computing? In the past few decades, many concepts have been used to describe computing over the internet, including “terminal computing,” “network computing,” “cloud computing,” etc., but they are *all one in the same*. Almost every form of computing device, whether it be a smart phone or a global data centre, can now utilize computing resources on the Internet to manage complex tasks. Attempts to subdivide internet computing into arbitrary terms and categories such as “private cloud”, “public cloud,” etc. could negatively affect the economic and technological growth of the Internet, thus internet-based computing should be treated holistically.

Not only do digital technologies make existing processes faster, less expensive, and more accessible, they make it possible to create new processes as well (CCA 2012). Traditional services can be delivered in entirely new ways, creating opportunities for innovative application in such sectors as agriculture, education, energy, transportation, financial services and healthcare (Wolfe 2010).

Investment in infrastructure and technology create an enabling environment for innovation in next-generation technologies and digital content. As Figure 1 shows, the availability of such new technologies and content stimulates business demand and increases economic competitiveness overall (Wolfe 2010).

Figure 1: A virtuous circle of digital innovation



Internet computing provides a global marketplace for local enterprises. More Canadian start-ups are global from the outset than ever before. These “micro-multinationals”² can specialize in the things they do best because they can easily purchase the back office, shipping, and other support they need online. The McKinsey Global Institute found that small and medium enterprises (SMEs) that take advantage of the Internet earn twice as much revenue from exports and create twice the number of jobs as those that do not (Pélissié du Rausas 2011).

The Internet also gives businesses access to a global talent pool, significantly expanding the scope of projects they can take on. As the economy evolves into an age of mass collaboration, “macro-multinationals” – the traditional large global firms – will increasingly rely on “micro-multinationals” as indispensable partners in developing and refining their products, services, and business practices (Mettler and Williams 2011).

Canadian Success Story: Polar

Toronto-based Polar (formerly Polar Mobile) has been focused on media platforms since 2007. Back before there were apps, tablets and mobile advertising, Polar was innovating, helping world-class media brands around the world transform the media industry with technology. Their newest platform, MediaVoice, helps the world’s largest publishers build a scalable native advertising business that leverages existing infrastructure, tools, workflows, and processes. MediaVoice is a platform that leverages your existing CMS and ad serving infrastructure, placing them in-stream across desktop and mobile sites. The company’s other platform, MediaEverywhere, makes it easy for media companies to create and monetize mobile sites and apps.

The company has raised over \$9 million in external capital to-date.

Source: www.polar.me

² Google Chief Economist Hal Varian coined the term “micro-multinational” in a New York Times OpEd in 2005. It refers to small companies that work with people and provide goods and services across more than one country.

For developed countries such as Canada, and for long-established firms, digital technology can be a disruptor. Emerging economies are embracing these new technologies in order to drive growth and productivity. The millions of first-time users coming online across the world each year create new competitors, new ways of working, and new products. The traditional notions of “exports” and “foreign investment” are being fundamentally transformed. For wealthy, industrialized countries, the pressure to change can be daunting. Yet, there is no off-ramp. As the World Economic Forum aptly warns, industrialized economies must “reinvent” their relationship to digital technologies or they will lose competitiveness, market share and jobs (WEF 2013).

While traditional business models may be disrupted, digital technologies present tremendous opportunities and are a huge wealth creator for industries new and old. Studies show that traditional industries capture 75% of the value created by the Internet (Pélissié du Rausas 2011). Canada’s choice is to embrace the networked world and prosper or shun it and falter.

Canadian Success Story: Desire2Learn

Founded in 1999, Desire2Learn is an educational software maker with more than 1,100 clients including grade schools, colleges, health care, Government and corporations. The company is based in Waterloo, Ontario.

Desire2Learn has developed the world’s first truly integrated learning platform. They partnered with clients to pioneer a next generation learning solution that provides an engaging experience capable of directly addressing key challenges related to learner engagement, retention, and outcomes. This represents a shift from the simple course management capabilities of an LMS to a highly pervasive, perceptive, and personal learning experience. Their offerings include their Enterprise eLearning Suite, which is comprised of the web-based Learning Environment, Learning Repository, and LiveRoom. With a focus on research and development and service and support for clients, their products lead the market in innovation and client satisfaction.

Source: www.desire2learn.com

Productivity and Employment Impacts

One of the persistent fears about the spread of digital technologies is that they replace jobs. While it is true that some jobs are lost, many more new jobs are also created. This dynamic has repeated itself over and over in the history of technology. For example, over the past three-quarters of a century, Canada has seen the share of its population employed in agriculture drop from 33% of the labour force to 1.7%. Despite this, the yield per hectare and total output is much higher than it was in the 1930s. Thanks to a surge in agricultural technology, thousands of Canadian workers have been freed to move from farm labour to higher-valued tasks and Canada’s per capita income and overall GDP is much higher because of it.

The McKinsey Global Institute (2011) estimates that new jobs created by the Internet are more than double the number that have been lost. This is because even though improved economic efficiency decreases the number of person hours required for each task, the expansionary effects of technology create whole new classes for jobs. Booz & Company, using an index for measuring digitization based on national levels of access, reliability, affordability and speed, found that unemployment rates drop by 1% and GDP rises by 0.75% for every 10-point increase in digitization (World Economic Forum 2013). As Atkinson and Miller (2013) note, about 15% of the jobs in developed economies are newly created every year.

Globally, there were some 6 million new jobs created by the Internet economy in 2011 (Pélissié du Rausas). Jobs directly linked to the emergence of the Internet include software engineers, application and game developers, online marketers, business intelligence, and logistics specialists to manage online purchases (Pélissié du Rausas 2011), to name a few. Although the specific number of jobs created by Internet computing alone is not available, Statistics Canada reports that Canada's ICT sector accounts for 3% of total employment. ³

It's well known that SMEs create most of the jobs in North America. Indeed, 68% of all new Canadian jobs each year are created by SMEs (Daze 2013). The Kauffman Foundation examined this assumption in the U.S. market and found that all new job growth between 1980 and 2008 came from firms that were less than five years old. So, the key variable is the newness of firms, many of whom also happen to be small. In a subsequent study, Kauffman examined common characteristics among the types of job-creating new firms. The findings are definitive: companies that use digital technology intensively create a disproportionate number of the new jobs because while they were able to perform tasks more efficiently (i.e. increase worker productivity), they also increased the volume of economic activity overall (Hathaway 2013).

The most powerful form of job creation comes from new businesses that leverage the power of Internet-enabled technology. If Canada wants to increase employment creation, it needs to encourage tech-oriented start-ups and technology use by SMEs across sectors.

GDP and Growth Effects

In 2012, there were more than 2 billion internet users. By 2016, almost half the world's population, some 3 billion people, will be using the Internet (Dean 2012). Among the developed markets of the G20, the Internet economy is expected to grow at an annual rate of 8 percent through 2016, far outpacing any traditional economic sector (Dean 2012). Internet-related consumption is now bigger than spending on agriculture or energy, accounting for about 3.4 percent of global GDP (Pélissié du Rausas 2011).

Even in slow economic times, ICT propels growth in Canada, generating \$155 billion in revenue in 2011 and expanding even as manufacturing industries are declining. Canada's ICT sector grew 3.2% in 2011, compared to across-the-board economic growth of 2.6% (Industry Canada 2013).

Increased productivity is the result of generating more output per unit of input. Put simply, this means getting more for the same amount of investment. One of the key drivers for growth in the coming years will be the shift of computing and storage to the cloud. Global spending on public cloud services hit \$109 billion in 2012 and could grow to \$207 billion by 2016. This will lead to the creation of 14 million new jobs worldwide (PRWeb 2012). By 2015, it is estimated that 1.17 million jobs will be created in North America (Gantz 2012). The extent to which Canada derives benefit from this shift will be determined by the speed with which Government and business embrace cloud computing as both a cost saver and productivity enhancer.

Small and Medium Enterprise Benefits

Internet computing allows small and medium enterprises to achieve the scale benefits that large firms already enjoy. Internet technologies make it easier for businesses to get established through effective and affordable business services, to grow through online advertising and marketing, to be more productive through cloud storage and analytics, and to compete globally by providing communications and logistics supports to reach new customers and suppliers. As Goldfarb (2011) notes, "digitization makes it easier to break down production into smaller tasks and to coordinate these tasks globally," creating many more opportunities for smaller companies to connect with and participate in global value chains.

³ All Canadian ICT statistics from Statistics Canada unless otherwise indicated

For small retailers, the Internet opens tremendous opportunities to sell their wares across town, across country or across the world. A local retailer can use effective e-commerce solutions to reach far-flung markets. Restaurants can entice customers by posting their menu online while food trucks can tweet their location for the day's lunch hour. Meanwhile, an architect from St. John's can work with an engineer from Germany on plans for a new office building in Shanghai without leaving Newfoundland. The benefits of Internet technologies are broad and deep, regardless of the types of firm that is using them. While total revenue hasn't fully recovered to pre-recession levels, investing in online advertising, ecommerce and moving to the cloud has enabled this business to increase profits during tough economic times.

Micro-multinational: The Scottish Lion

The Scottish Lion has been a reputable Halifax-based supplier of tartans, kilts and highland wear since 1972. In 2005, they were a robust catalogue company with three retail locations. However, the recession hit their business hard and prompted dramatic changes to the entire business model. The Scottish Lion closed their retail locations to focus exclusively on ecommerce, and transformed the business into a cloud-based organization, which significantly reduced overhead and helped keep the business afloat. The business also needed a new approach to marketing, and they started to advertise online. Acquiring customers became much less expensive, instead of spending \$800 on a print ad and not knowing if anyone saw it, they could spend less than \$1 per click and know exactly what action the customer took.

Despite the obvious advantages, too few Canadian SMES are leveraging the full power of the Internet. Statistics Canada (2012) reports that only 10.1% of small enterprises are selling online, compared to 30.5% of large enterprises. In terms of total sales, online commerce accounted for 17.3% for small firms and 59.1% for large firms. In Quebec, for example, more than 90 percent of small-businesses are online but much of their use is limited to basic banking, communications, and Internet presence. Quebec's Ministry of Finance and Economy (MFEQ) recently launched a PME 2.0 initiative to encourage SMEs to increase their use of productivity-building technologies in enterprise management, market information, production, planning, and training (CEFRIQ 2013).

Micro-multinational: Rampes et Balcons

Rampes et Balcons St.-Sauveur sells and installs aluminium railings for patios and treated-wood terraces, and also makes and installs cedar gazebos and verandas. Hoping to boost sales through his website, owner Patrice Cloutier turned to an online strategy. Working over the winter of 2012-13, Cloutier and his son used software tools provided by their domain host to improve his outdated, French-language website the site's look and refresh the content. They also launched an online advertising campaign early in 2013. Overall, the annual sales doubled after Rampes et Balcons redesigned their site and started advertising online. For much of the business' history, Cloutier handled most of the installation work himself. Today, he has three installation teams, and is training additional staff.

Part of the problem is that SMEs outside of the ICT sector -- accountants, contractors, engineers, etc. -- are much less likely to invest in productivity-enhancing technologies than their larger counterparts. Despite the proportionately higher benefits for smaller enterprises, some SME managers believe that digital technologies are not worth the investment in time and resources (CCA 2012). Canadian SMEs are more likely to rely on investments in labour and traditional machinery to generate growth because they lack information about how to effectively use digital technologies in their businesses (Wolfe 2010).

Micro-multinational: DECO Windshield Repair

When Calgary-based DECO Windshield Repair opened in 2005 they had just two locations and very little revenue. Today, the company has 200+ kiosks and sale of over \$5 million. DECO uses highly targeted online advertising campaigns to deliver website traffic from both desktop and mobile. This seasonal business also employs online advertising techniques to attract hundreds of student workers every year, completely eliminating the need for time-consuming and expensive on-campus recruitment. DECO has seen dramatic results from this strategy since 2009. Call volume has plummeted. The number of kiosks has quadrupled, sales are five times higher, and monthly website visits are roughly six times greater.

The greater the use of technology, the more likely it is that businesses will succeed. Internet-savvy SMEs bring in twice as much revenue through exports as a percentage of total sales and create twice as many jobs as less intensive Internet users (Pélissié du Rausas 2011). Sound public policy and business education programs are needed to encourage SMEs to make regular investments in digital technologies.⁴

Proposal: Digital Renovation Tax Credit

In order to address lower adoption of digital technologies among Canadian businesses, the Government should consider a targeted tax credit aimed at incentivizing SMEs to get their business online. Similar to how the Home Renovation Tax Credit incentivized Canadians to retrofit their homes, a Digital Renovation Tax Credit (DRTC) would encourage SMEs to retrofit their online presence. The credit could be claimed on eligible expenditures incurred by SMEs for projects such as:

- getting a website
- advertising online
- mobile optimizing an existing website
- application Development
- implementing ecommerce

The primary economic benefit of such a program would be realized in the fact that businesses which are online grow faster than businesses who are not. The DRTC would also spur a secondary economic benefit through contributing to the job ecosystem of web designers, graphic designers and other Internet professionals. This would improve the skill set and portfolio of Canadians working in this space.

⁴ Within the ICT sector, there is a heavy concentration of SMEs. Of the 33,000 companies that make up Canada's ICT sector, 85% have less than 10 employees. Only 75 of these companies have more than 500 employees. Most of these companies (about 87%) are in the software and computer services industries (Statistics Canada 2012).

Growth prospects

Cisco estimates that there will be 255 million networked devices in Canada by 2017, up from 140 million in 2012 (Cisco 2013). With the rise of digitally enabled technologies, Canada is building a globally competitive position in such sectors as:

- digital media and content;
- green industries that combine improved environmental performance with economic efficiencies;
- smart technologies for construction, agriculture, infrastructure and utilities;
- globalized and digitized financial services sector;
- cross-border logistics;
- wireless technologies, especially wireless infrastructure such as WiFi, wireless networking and satellite communications;
- semiconductor design;
- e-health technology hardware, software, and services; and
- professional services including business intelligence, enterprise content management, supply chain management, cross-border logistics, IT security, and e-commerce.

Canadian Success Story: Hootsuite

HootSuite is a social relationship platform for businesses and organizations to collaboratively execute campaigns across social networks such as Twitter, Facebook, LinkedIn and Google+ Pages from one secure, web-based dashboard. The platform permits users to:

- Launch marketing campaigns, identify and grow audiences, and distribute targeted messages using HootSuite's unique social media dashboard;
- Streamline team workflow with scheduling and assignment tools and reach audiences with geo-targeting functionality; and
- Invite multiple collaborators to manage social networks securely, plus provide custom reports using the comprehensive social analytics tools for measurement.

Advanced functionality includes tools for audience engagement, team collaboration, account security and comprehensive analytics for end-to-end measurement and reporting.

The Vancouver-based company, whose customers include PepsiCo Inc. and Sony Music, raised \$165 million in August 2013 from venture capital firms including Accel Partners, Insight Venture Partners and OMERS Ventures, and has been speculated to have a value of anywhere from \$500 million to \$1 billion

Source: www.hootsuite.com, Bloomberg, TechVibes

The future growth of the ICT sector in Canada depends to a large extent on the economic success of its large, export-oriented, R&D intensive firms. Most ICT entrepreneurs get their training while working at larger firms. But Canada has relatively few large flagship firms that can act as guides to the international marketplace and serve as incubators for future managers (Wolfe 2010).

How ICT clusters work

Clusters form when a few key firms are able to use local knowledge and expertise to develop commercially successful products or services. One or two anchor firms serve as a hub around which smaller start-ups draw expertise and investment in order to grow. The anchor firms are able to get off the ground because of public or private sector investment to help fill a services gap, such as the need for wireless communication in Alberta's oil and gas industry or the New Brunswick Government's support for the decision to create a provincial broadband network.

The anchor firms draw from existing capital, skilled local labour markets and linkages to customers to commercialize their products. Some choose to spin-off new firms to use new technologies that emerge during the development of core enterprises. Other anchors promote the growth of new firms through an affiliates program when new technologies are outside their core capabilities. The initial success of an anchor firm provides a model for other potential entrepreneurs in the cluster to emulate their success.

Summarized from Matthew Lucas, Anita Sands and David Wolfe, "Regional Clusters in a Global Industry: ICT Clusters in Canada," European Planning Studies 17:2 (February 2009), 193-4.

Canada is good at launching start-ups but, ultimately, the absence of flagship firms, lack of access to strong management talent, and preference by owners and investors to cash out once they hit a certain valuation means that there is missing middle impeding growth. The pattern has repeated itself over and over in the 183 acquisitions of high-tech firms that occurred in Canada over the past five years (Khera 2013). Technology companies now account 1.6 per cent of the TSX composite index compared to 41 per cent in July 2000 (Silcoff & Marlow 2012).

Section Three: Focus Areas for Future Competitiveness

Canada ranks well above the weighted average in terms of consumption of Internet technologies but lags in widespread adoption and mainstreaming of these technologies, especially in the SME sector. This affects Canada's overall competitiveness as an economy.

Canada has a strong foundation upon which to build a globally competitive digital economy. Since the emergence of the Internet age, Canadian public policy has aimed to develop top-notch infrastructure and encourage digital adoption by firms and citizens. While the combined efforts of business and Government have yielded strong results in the past, Canada is not the digital economy leader that it should be or that it once was. Canada's early-adopter advantages have been eroded by the surge in investment in infrastructure and content development in other parts of the world and the country is in danger of sliding further if urgent action is not taken.

In order to embed the benefits of Internet computing for all sectors of the economy, Canada must create a supportive regulatory environment that optimizes the conditions for growth. A central priority is to ensure accessibility for all Canadians and mainstream the use of Internet technologies across the social, economic and geographic spectrum.

The major focus areas for digital competitiveness are:

- 1. Distributive resources** – infrastructure and leadership to support adoption of new technologies;
- 2. Human resources** – actions to ensure an adequate supply of skilled workers and innovators
- 3. Fiscal resources** – access to investment and incentives to improve the profitability of operating in Canada; and
- 4. A supportive regulatory environment.**

1. Distributive resources

Infrastructure and access

Through a combination of private and public investment, Canada has succeeded in creating a world-class broadband and mobile telecommunications infrastructure but, lacking continual upgrades, this advantage is slipping. According to the Canadian Radio-Television and Telecommunications Commission (CRTC), some 97% of households have access to broadband Internet infrastructure (excluding satellite). Through the Economic Action Plan, the Government established Broadband Canada to further extend the reach of high-quality Internet by supporting the buildout of infrastructure in rural and remote communities. As a result, more than 80% of Canadian households have Internet access (IPSOS Reid 2013) but there are significant differences in the quality and price of urban versus rural access.

While the Government has supported network expansion, Canada's Internet infrastructure has been overwhelmingly financed and built out by the private sector. In the mobile telecommunications space, for example, Canada's three largest carriers have invested \$420 billion since 2000 in operating and capital expenditures (Trichur & Boyd 2012). Since the smartphone revolution in the mid-2000s, these networks have become conduits of data.

The growth in mobile broadband has been explosive. By mid-2012, the Canadian Wireless Telecommunications Association (CWTA) reported that traffic on their networks was growing by 5% per week (Knowlton 2012). According to the CRTC, 99% of Canadians now have access to 3G networks and 4G penetration is growing fast. Rapid growth has put pressure on Internet service providers and mobile operators, but it has also created a sizeable business. Of the \$43.9 billion in total telecommunications revenues in Canada in 2012, at least \$15 billion was related to Internet (CRTC 2013).

Canada's average advertised download speed is 66.83 Mbps, well above the OECD average of 44.4 Mbps. For mobile Internet downloads, Canada's average speed is 54.6, compared to the OECD average of 21.4 Mbps (OECD Communications Outlook 2013). But this performance does not come without cost. Canada's high speed Internet service ranks among the top 10 most expensive among 34 OECD members (2013). Service providers argue that Canada's remote geography and sparse population justify the higher costs (Telus 2013). Nevertheless, the October 2013 Throne Speech clearly linked increased telecommunications competition as key to lower prices and better service for Canadians.

Accessibility and affordability for Canadians requires public investment in infrastructure and dynamic policy choices. Canada's low population density and rugged geography increases the demand for

Internet services to bridge the distance gap – such as digital health and education services – and creates economies of scale for businesses. But, the nation’s geographic and demographic realities also mean that access and infrastructure costs will be higher than in countries where populations are more concentrated.⁵ Consequently, some degree of public funding will be a continuing necessity to ensure that all Canadians receive the services they need and Canadian businesses remain competitive in the digital economy.

Public-private partnerships (PPPs) should also be considered in order to maximize investment in infrastructure. One example of a successful PPP is the U.S. Connect-to-Compete initiative⁶ which is guided by the public sector but funded and run by the private sector. It provides a \$9.95/month Internet connection and an affordable computer to families in the poorest areas in the United States.

In addition to competition to encourage best-in-class infrastructure at affordable prices, Canada must focus on accessibility for rural and remote communities where businesses are least likely to have effective access to productivity-enhancing Internet technologies.

The first pillar of Digital Canada 150, Connecting Canadians, clearly acknowledges “an effective digital policy is one that connects Canadians through high-speed internet access and the latest wireless technologies” and specifically pledges that:

- Over 98% of all Canadians access to high-speed Internet at 5 megabits per second (Mbps)—a rate that enables e-commerce, high-resolution video, employment opportunities and distance education—providing rural and remote communities with faster, more reliable online services;
- Canada’s wireless policies will connect Canadians with competitive prices, more choice in services and world-leading technologies in all regions of the country; and
- The Government will optimize the use of publicly owned wireless airwaves to provide Canadians with the access they need on the devices they choose.

The Government also announced several specific programs intended to effect these commitments, including providing \$305 million to extend and enhance high-speed Internet services to a target speed of 5 Mbps for 280,000 Canadian households in rural and remote areas. While some have criticized these measures as insufficient, noting that that target of 5 Mbps access for 98 percent of Canadians is slower than many comparable targets around the world and comes years after the CRTC set the same goal (Jackson, 2014), it represents a strong start on which to build.

Mainstreaming Usage

Canada ranks third on the WEF index for business and innovation overall but ranks only 24th on the WEF index measuring Internet usage by businesses, Governments and individuals. This ranking takes into account the relative number of broadband subscriptions, the capacity of businesses to innovate and adapt to new technologies, and the number of Government services provided online. The conclusion is that Canada has taken the initial steps to foster entrepreneurship but has not yet committed to full participation in the digital economy.

⁵ CCA and Goldfarb 2011 discuss Canada’s relative decline vis-à-vis Europe and Asia. Canada’s position on the Information Technology Union’s international ICT Development Index in which broadband penetration is a major indicator, dropped from 18th in 2007 to 22nd in 2011.

⁶ For more information, see <http://www.connect2compete.org>.

In order to promote Internet usage by Canadians, Government needs to lead by example and increase the number of Government services offered online. Procurement of digital products and Internet-based delivery of Government services makes sense. Internet services cost a fraction of all other modes and they are more convenient. This saves the Government significant sums of money, which can be reinvested elsewhere.

Average transaction cost of Government services

Mail	\$18.40
Face to face	\$16.00
Telephone	\$5.00
Internet	\$0.12

Source: Study by PriceWaterhouse Coopers for UK Government, cited in Government of Australia, National Digital Economy Strategy, 2011.

The third pillar of Digital Canada 150, Digital Government, fully embraces this recommendation, pledging that “Government of Canada will demonstrate leadership in the use of digital technologies and open data,” and stating that:

- The Government of Canada will be a leader in using digital technologies to interact with Canadians, making it simpler and quicker to access services and information online; and
- Canada will open up its vaults and release datasets that can promote economic development, spark innovation and help find ways to make Government work better.

The Government of Canada has already taken steps to implement these goals, including:

- Creating Shared Services Canada to consolidate IT back office functions to save money, streamline processes and deliver better services;
- Launching the Open Government Initiative to provide Canadians with more opportunity to participate in Government and drive innovation and opportunities; and
- Creating the Open Data Portal to provide a single point of access for Government datasets for use by Canadian innovators

In Digital Canada 150, the Government announced further programs, including:

- publishing a new iteration of Canada’s Action Plan on Open Government, highlighting ambitious commitments to advance open information, open dialogue and open data;
- expanding the number of departments that permit making Access to Information requests online;
- publishing an Open Government Directive for federal departments and agencies to adopt a common set of practices; and
- creating an Open Data Institute to encourage the use of open data to raise productivity and create new products and services to benefit Canadians.

Promoting Adoption

To encourage business adoption and usage, the Business Development Bank of Canada (BDC) has made the adoption of information and communications technology a strategic focus, including consulting services to help companies enhance their use of new technologies and flexible financing to support ICT investments. BDC also has a venture capital arm through which it can provide, often in conjunction with global investors, large-scale funding for high-potential, technology-intensive companies. In its 2012-2016 Corporate Plan Export Development Canada (EDC) set out a number of strategies to link Canadian digital enterprises with global opportunities.

These investments are furthered under the Economic Opportunities pillar of Digital Canada 150. Under this pillar, the Government promises that “Canadians will have the skills and opportunities necessary to succeed in an interconnected global economy,” and specifically that:

- Canada will rank among world leaders in adopting digital technologies, and a dynamic and growing Canadian digital technologies sector will accelerate innovation across the economy. Ensuring students in schools can learn the skills of tomorrow by providing easier access to the digital tools needed for their learning;
- Canadian companies, large and small, will use digital tools to boost productivity, develop their businesses and capture growing markets at home and abroad; and
- Canada will be one of the global leaders in applying “big data” to change how we think about and carry out health care, research and development, as well as the myriad activities of business and Government.

To attain these goals, the Government pledges that the BDC will allocate an additional \$200 million to support SMEs with digital technology adoption, and will invest an additional \$300 million in venture capital for companies in the information and communications technologies sector.

2. Human Resources

Employment in information technology sectors is expanding. Forty-five percent of workers in the information technology sector have a university degree⁷ and ICT salaries are about 50% higher than the average Canadian salary (Statistics Canada 2012).⁸ But, unless there are a sufficient number of skilled workers and graduates with expertise in the STEM⁹ subjects, Canada will be unable to sustain its information economy. Canada has an expected shortfall of more than 100,000 ICT workers by 2020 (Dawson 2013). Sustaining Canada’s knowledge workforce requires focused attention in educational institutions and consultation with the business community to understand current and future demand.

⁷ Only 26% of Canadian workers have a university degree in the workforce as a whole.

⁸ In 2011, the average ICT salary was \$68,000. The average Canadian salary was \$45,488.

⁹ Science, Technology, Engineering and Mathematics

This issue is also addressed under the Economic Opportunities pillar of Digital Canada 150. Specifically, the Government:

- Highlighted the Canada Job Grant, a program where the federal and provincial/territorial Governments will match funds invested in training by employers;
- pledged to invest an additional \$40 million to support up to 3,000 internships in high-demand fields and \$15 million annually to internships with SMEs; and
- promised to continue support for the Computers for Schools Program to provide students and interns with access to digital equipment and skills training.

While it is unlikely that these programs will fully address the anticipated shortfall in ICT workers, it represents a pragmatic approach focused on developing skills that have practical utility to employers.

3. Fiscal Resources

Despite the relative decline in the number of firms, ICT still attracts the largest share of Canadian private-sector R&D expenditure, some 31% in 2011, representing nearly \$5 billion (Industry Canada 2013). Canada also provides extensive public research for ICT with the National Research Council acting as the main public conduit for research, development and technology-based innovation.

Budget 2012 provided \$110 million per year starting in 2012–13 to double support for companies through the NRC's Industrial Research Assistance Program (IRAP). IRAP supports research and development projects by innovative SMES and provides information to business through Industrial Technology Advisors. The National Research Council provides a concierge service to help SMEs make effective use of federal innovation programs.

The Scientific Research and Experimental Development (SR&ED) Tax Incentive Program provides cash refunds or tax credits for eligible R&D work done in Canada. The Government is considering putting in place a direct financing program for R&D activities, but nothing has yet emerged. A direct financing program would be attractive to those considering ICT research in Canada.

Digital Canada 150 does introduce a few new targeted funding programs. The Government announced that it would:

- increase support for the Canada Accelerator and Incubator Program to \$100 million to help digital entrepreneurs take the next step in developing their businesses; and
- commit \$20 million over two years to the Business Innovation Access Program, which supports innovative research and development that translates into products that benefit Canadians by connecting small and medium-sized enterprises with universities, colleges and other research institutions.

Restrictions on foreign participation in key market segments affects the pace and scope of domestic activity. Until 2012, Canada barred foreign mobile providers from participating in the Canadian market. In March of that year, then Minister of Industry Christian Paradis announced changes to the Telecommunications Act that would allow foreign firms to acquire Canadian carriers with less than 10% market share. (Industry Canada 2012).

On the broadcasting side, restrictions on foreign participation remain in effect. The policy also demands, as it has done for more than four decades, minimum Canadian content levels. The challenge for the Government is that the nature of “broadcasting” is changing rapidly. Over the past few years, entirely new platforms have emerged for the delivery of content online. While these emerging platforms fulfil a similar function for the consumer as conventional broadcasting, they operate in a highly dynamic and competitive global market that ensures they are responsive to both users and creators and extending conventional broadcast regulations to the Internet would be highly detrimental. At the same time, access to capital for Canadian film, television and digital media creators remains a critical issue.

4. Supportive Regulatory Environment

When assessed on a global basis, Canada ranks well in terms of economic freedom, has secure property rights, and a Government that generally leans toward evidence-based policy making. However, Canada also has unnecessary complexity in its rules governing the digital economy.

Privacy is a particularly challenging regulatory area. Companies whose business relies on data constantly seek to balance the utility of what can be provided to users through the analysis of data with the need for appropriate safeguards. Canada’s privacy regime, of which the Personal Information Protection and Electronic Documents Act (PIPEDA) is the cornerstone, attempts to protect both privacy and innovation, and firms have worked in good faith to apply these rules. In May 2013, however, the Privacy Commissioner called for substantial changes to PIPEDA. Specifically, the Commissioner is seeking the power to impose Administrative and Monetary Penalties (AMPs) for perceived violations of PIPEDA. Were this to happen, the Commissioner would acquire substantial new powers which, if misapplied, could prove disastrous for firms at the cutting edge of the digital economy. Similarly, any new requirements pertaining to data breach notification must be balanced, protecting consumers while at the same time providing business with sufficient flexibility to respond to a data breach in an appropriate manner without imposing undue regulatory burdens.

All sectors of the economy benefit from the ability to move data across borders. These benefits are due, in large part, to the advances in computing made possible by the Internet. Businesses, not just internet companies, rely on this global network to conduct business, store data globally and thus, provide faster, more reliable services at lower costs. Some Governments believe it would be better to make companies store data in their country. For example, both British Columbia and Nova Scotia have laws requiring certain public sector data be stored locally.

The arguments behind these initiatives are rooted in the idea that localized data will provide greater privacy and security for their citizens’ personal information. Unfortunately, mandating that data be stored locally does not help achieve this goal. In fact, it is bad for both security and economic growth.

Unlike geographically-limited and stand-alone infrastructure, global computing services offer uniform security, resiliency, redundancy, features, and settings, which lead to improved data protection. Companies that rely on Internet computing, like Google and Amazon, have invested hundreds of millions of dollars ensuring that their data network is secure. Attackers and criminals can more easily overwhelm a less sophisticated server or localized network. Local data storage is more vulnerable to attacks because they are generally harder to update with the latest security software. Forced data localization can also have a negative impact on both businesses and the economy. By forcing companies to store their data locally, it hinders their competitiveness and causes Governments to waste money because online storage reduces costs and complexities.

Similarly, when considering consumer protection measures, government must be extremely careful not to unintentionally introduce new barriers to digital commerce. Canada's recently enacted anti-spam legislation (CASL) and accompanying regulations are a good example. While CASL's objective of deterring the most damaging and deceptive forms of spam, such as identity theft, phishing and spyware, from occurring in Canada is laudable, industry remains very concerned that broad application of CASL to all forms of electronic messaging and software, the inflexible requirements and the potential for significant liability will have a negative impact on the growth of electronic commerce in Canada that outweighs the benefits.

Intellectual property (IP) laws are another area where Government must avoid unintended consequences that negatively affects innovation and technological development. While IP clearly must be properly protected, Canada's IP regime must include safeguards that protect against abuse and prevent harmful litigation. The recent reform of Canada's copyright law reflected such an appropriate balance, permitting creators to be fairly compensated and enforce their rights without imposing undue burdens on emerging technologies, and it is critical that this balance be maintained. Patent reform must screen out low quality patents, limit the ability of non-practicing entities (NPEs) of exploiting patents to make unreasonable demands of productive companies and prevent crippling damage claims.

Accordingly, to flourish in the digital economy, Canada needs "smart" regulation that grasps the realities of an increasingly digital and increasingly global marketplace, reflects the dynamic pace of change in knowledge-based industries, and builds confidence among customers and fosters new forms of high-value commerce. Accordingly, the Government must examine both existing regimes and any proposed regulatory interventions from the viewpoint of whether they will foster world-leading adoption and development of technology or will impede or promote investment and economic growth.

Section 4: Conclusions and Recommendations

Canada is underperforming in the global economy because of insufficient investment in technology, especially productivity-enhancing Internet technologies. Lower levels of investment results in lower levels of innovation. If left unchecked, the competitiveness gap between Canada and the rest of the world will become impossible to bridge.

Digital Canada 150 represents a strong step towards addressing the many issues the Canadian digital economy faces, including adoption and usage of digital technologies by Canadian businesses. However, more can be done. Given its strong endowment of resources and know-how, Canada

should be able to build a digital economy that meets and even surpasses its G20 peers within five years. The following are some recommendations for how Canada can build upon its strong foundation and reconnect as global leader in Internet-based productivity and competitiveness:

Actions to improve usage and accessibility:

1. The Government of Canada must demonstrate leadership in modernizing the public sector, using technology to improve and grow Government services online. The efficiency and cost benefits will reduce the burden on public servants, citizens and businesses.
2. Increase STEM and computer science graduates to ensure Canadians have the skills to be competitive in the labour market. This includes measures to increase enrollment in post-secondary institutions, facilitate cross-disciplinary training, and encourage digital literacy in younger Canadians.
3. Encourage regional development agencies (FedNor, ACOA, FedDev, others) to collaborate in studying how digital economy can help rural businesses find and serve new markets.

Actions to improve profitability and access to capital:

1. Facilitate easier access to capital at every stage of a business' development, including foreign investment. This may include further opening Canada's market in telecommunications and broadcasting sector.
2. Consider policies that proactively shift goals of Canadian media production from serving domestic markets to growing global audiences.
3. Ensure a strong commercial logic in the development and application of electronic commerce laws, including privacy laws. The standard for evaluating new rules should be that they foster world-leading adoption and development of technology and do not impede or promote investment.
4. Implement the Digital Renovation Tax credit program to spur SME adoption of digital technologies and to support the technology ecosystem in Canada.

References

Atkinson, Robert and Ben Miller (2013). Are Robots Taking Our Jobs, Or Making Them? Information Technology and Innovation Foundation. <http://www2.itif.org/2013-are-robots-taking-jobs.pdf> (accessed Sept 17 2013)

Austen, Ian (2013). Once Blackberry Focused, A Campus Widens its View. The New York Times. http://www.nytimes.com/2013/02/04/technology/a-canadian-campus-focused-on-tech-and-enterprise.html?pagewanted=1&_r=0 (accessed Nov 12 2013)

Blais, JP (2013). Speech to the Banff World Media Festival. Canadian Radio-television and Telecommunications Commission. <http://www.crtc.gc.ca/eng/com200/2013/s130612.htm> (Sept 24 2013)

BCG - Boston Consulting Group (2012). The \$4.2 Trillion Opportunity: The Internet Economy in the G20. <http://www.bcg.com/documents/file100409.pdf> (accessed Sept 11 2013)

CBA - Canadian Bankers' Association (2013). How Canadians Bank. http://www.cba.ca/contents/files/backgrounders/bkg_technology_en.pdf (accessed Nov 11 2013)

CBoC - Conference Board of Canada (2012). How Canada Performs - Innovation. Conference Board of Canada. <http://www.conferenceboard.ca/hcp/details/innovation.aspx> (accessed Sept 25 2013).

CBoC (2013). Percentage of Graduates in Science, Math, Computer Science, and Engineering. <http://www.conferenceboard.ca/hcp/details/education/graduates-science-math-computer-science-engineer.in.aspx> (accessed Sept 25 2013)

CCA - Council of Canadian Academies (2012). Catalyzing Canada's Digital Economy: A Response to a Public Consultation on Canada's Digital Economy Strategy. http://www.scienceadvice.ca/uploads/eng/assessments%20and%20publications%20and%20news%20releases/digital%20economy/2010-07-12_catalyzing_digital_economy.pdf (accessed Sept 15 2013)

CEFRIQ (2013). Le numérique en effervescence : portrait de l'utilisation des TIC dans l'industrie de la mode et du vêtement. <http://www.cefrio.qc.ca/projets-recherches-enquetes/numerique-entreprise/pme-20/> (accessed Dec 9 2013)

CIRA (2013). Fact Book 2013. The Canadian Internet Registration Authority. <http://www.cira.ca/factbook/2013/index.html> (accessed Sept 18 2013)

CIRA (2014). Fact Book 2014. The Canadian Internet Registration Authority. <http://www.cira.ca/factbook/2014/index.html> (accessed Mar 19, 2014)

Cisco (2013). Cisco Visual Networking Index: 2012-2017. http://www.cisco.com/en/US/solutions/collateral/ns341/ns525/ns537/ns705/ns827/white_paper_c11-481360.pdf (accessed Sept 25 2013)

Comscore (2013). Canada Digital Future in Focus 2013. http://www.comscore.com/Insights/Presentations_and_Whitepapers/2013/2013_Canada_Digital_Future_in_Focus (accessed Nov 11, 2013)

Comscore (2014). Canada Digital Future in Focus 2014. http://www.comscore.com/Insights/Presentations_and_Whitepapers/2014/2014_Canada_Digital_Future_in_Focus (accessed Apr 2, 2014)

CRTC (2011). Communications Monitoring Report July 2011. Canadian Radio-television and Telecommunications Commission. <http://www.crtc.gc.ca/eng/publications/reports/policymonitoring/2011/cmr.htm> (accessed Sept 24 2013)

CRTC (2013). Communications Monitoring Report September 2013) Canadian Radio-television and Telecommunications Commission. <http://www.crtc.gc.ca/eng/publications/reports/PolicyMonitoring/2013/cmr.htm> (accessed Nov 12 2013)

CRTC (2013b) The Wireless Code. http://www.crtc.gc.ca/eng/info_sht/t14.htm (accessed Nov 13 2013)

Dawson, Laura (2013). Skills in Motion: U.S. Workers May Hold the Key to Canada's Skills Shortage. Conference Board of Canada Briefing. <http://www.conferenceboard.ca/e-library/abstract.aspx?did=5784> (accessed Dec 18, 2013)

Daze, Stephen (2013) Entrepreneurs Create Jobs, So How are we Helping?. University Affairs. <http://www.universityaffairs.ca/entrepreneurs-create-jobs-so-how-are-we-helping.aspx> (accessed Nov 10 2013)

Dean, David et al. (2012) The Connected World: The \$42 Trillion Growth Opportunity, The Internet Economy in the G-20. The Boston Consulting Group. <http://www.bcg.com/documents/file100409.pdf> (accessed Sept 16 2013).

EAP - Economic Action Plan 2013 Update. Government of Canada. <http://actionplan.gc.ca/en/initiative/venture-capital-action-plan-0> (accessed Nov 13 2013)

eMarketer. Where in the World Are the Hottest Social Networking Countries? (2012) <http://www.emarketer.com/Article/Where-World-Hottest-Social-Networking-Countries/1008870> (accessed Feb 28, 2014)

Entertainment Software Association of Canada (2013). Canada's Video Game Industry in 2013. <http://theesa.ca/wp-content/uploads/2013/10/ESAC-Video-Games-Profile-2013-FINAL-2013-10-21-CIRC.pdf> (accessed Dec 29 2013)

Fleishman Hillard (2012). Understanding the Role of the Internet in the Lives of Consumers. http://www.harrisinteractive.com/vault/HI_UK_Corp_Insights-Fleishman-Hillard-DDI-2012.pdf (accessed Mar 20, 2014)

Goldfarb, Danielle (2011). Canada's Trade in A digital World. The Conference Board of Canada. <http://www.conferenceboard.ca/reports/briefings/tradingdigitally/default.aspx> (accessed Sept 19 2013).

Gantz, John F. et al (2012). Cloud Computing's Role in Job Creation. IDC. <https://www.google.ca/url?>

sa=t&rct=j&q=&esrc=s&source=web&cd=2&ved=0CEUQFjAB&url=http%3A%2F%2Fpeople.uwec.edu%2FHiltonTS%2FITConf2012%2FNetApp2012Paper.pdf&ei=wSlgUpLeDZO4yAHuoYDACQ&usg=AFQjCNFDeXKfB6SVSE5P7JdNFhqmqrKGw&sig2=nErFFii7YDMhXaqUfrG6gw&bvm=bv.54176721,d.aWc (accessed Sept 16 2013).

Gillies, Matt (2013). "Canadian Mobile Data Usage on the Rise, Inspiring Innovation for Service Providers." Techvibes. <http://www.techvibes.com/blog/canadian-mobile-data-usage-on-the-rise-2013-11-28> (accessed December 18, 2013).

Government of Australia (2011). National Digital Economy Strategy: Leveraging the National Broadband Network to drive Australia's Digital Productivity. http://www.archive.dbcde.gov.au/__data/assets/pdf_file/0016/173050/National_Digital_Economy_Strategy.pdf (accessed Sept 16 2013).

Government of Canada (2012). Economic Action Plan 2013: Jobs, Growth and Long-Term Prosperity. <http://www.budget.gc.ca/2012/plan/pdf/Plan2012-eng.pdf> (accessed Sept 25 2013).

Hathaway, Ian (2013). Tech Starts: High Technology Business Formation and Job Creation in the United States. Kauffman Foundation. http://www.kauffman.org/~media/kauffman_org/research%20reports%20and%20covers/2013/08/bdstechstartsreport.pdf (accessed Nov 10 2013)

Hodgson, Glen (2013). Canadian productivity: Even worse than previously thought. The Globe and Mail. http://www.conferenceboard.ca/press/speech_oped/13-08-28/canadian_productivity_even_worse_than_previously_thought.aspx (accessed Sept 17 2013).

Industry Canada (2013). Canadian ICT Sector Profile. [http://www.ic.gc.ca/eic/site/ict-tic.nsf/vwapj/EN_ICT_Profile_2012-OECD-2006-Definition-4-Sectors.pdf/\\$file/EN_ICT_Profile_2012-OECD-2006-Definition-4-Sectors.pdf](http://www.ic.gc.ca/eic/site/ict-tic.nsf/vwapj/EN_ICT_Profile_2012-OECD-2006-Definition-4-Sectors.pdf/$file/EN_ICT_Profile_2012-OECD-2006-Definition-4-Sectors.pdf) (accessed Sept 18 2013).

Industry Canada (2012). Harper Government Takes Action to Support Canadian Families. <http://news.gc.ca/web/article-eng.do?nid=662619> (accessed Nov 12 2012)

Industry Canada (2010). Improving Canada's Digital Advantage: Strategies for Sustainable Prosperity. http://www.ic.gc.ca/eic/site/028.nsf/eng/h_00025.html (accessed Sept 17 2013).

Information Technology Association of Canada & Entertainment Software Association of Canada (2014). The Importance of Global Workers in Canada's ICT and Digital Media Industries. <http://itac.ca/wp-content/uploads/2014/01/ITAC-ESAC-White-Paper-on-Global-Workers-FINAL.pdf> (accessed Feb 28 2014).

Interactive Advertising Bureau (2013). 2012 Actual + 2013 Estimated Canadian Internet Advertising Revenue Survey. http://iabcanada.com/files/Canadian_Internet_Advertising_Revenue_Survey_2012-13English.pdf (accessed Nov 10 2013)

IPSOS Reid (2013). Close to Half of Canadians Now Own a Smart Phone. <http://www.ipsos-na.com/news-polls/pressrelease.aspx?id=6005> (accessed Nov 11 2013)

IPSOS Reid (2012). The IPSOS Canadian Inter@ctive Reid Report: 2012 Fact Guide. http://www.ipsos.ca/common/dl/pdf/lpsos_InteractiveReidReport_FactGuide_2012.pdf (accessed Nov 11 2013)

Jackson, Brian (2014). "Critics say Moore's digital strategy effort falls short". ITBusiness.ca. <http://www.itbusiness.ca/news/critics-say-moores-digital-strategy-effort-falls-short/47854> (accessed Apr 15, 2014).

Khera, Neha (2013). Borderless Investments: IT, Communications and Entertainment 2013. MaRS Reports. <http://www.marsdd.com/news-insights/mars-reports/borderless-investments/> (accessed Sept 26 2013)

Knowlton, Thomas (2012). Canadian Wireless Carriers Seeing Data Traffic Increase by 5% per Week. TechVibes. <http://www.techvibes.com/blog/canadian-wireless-carriers-are-seeing-data-traffic-increase-by-5-per-week-2012-06-06> (accessed Sept 23 2013)

L2 Think Tank (2014). L2 Intelligence Report: Omnichannel Retail: Canada. <https://www.l2thinktank.com/research/omnichannel-retail-canada-2014> (accessed Mar 20, 2014)

Maraq, Anmar, Vice President of Corporate Development and Strategy, Cisco Systems (2013). Remarks to National Association for Business Economics (September 8).

Mettler, Ann & Williams, Anthony (2011). The Rise of the Micro-Multinational: How Freelancers and Technology-Savvy Start-Ups are Driving Growth, Jobs and Innovation. The Lisbon Council. <http://www.lisboncouncil.net/publication/publication/81-the-rise-of-the-micro-multinational-how-freelancers-and-technology-savvy-start-ups-are-driving-growth-jobs-and-innovation.html> (accessed November 10, 2013)

NRC (2013). Report on Plans and Priorities 2013-2014. National Research Council. http://www.nrc-cnrc.gc.ca/eng/reports/2013_2014/rpp_index.html (accessed December 1, 2013)

OECD (2012). OECD Internet Economy 2012. <http://www.oecd.org/sti/ieconomy/ieoutlook.htm> (accessed Nov 11 2013)

Ookla Net Index (2013). <http://www.netindex.com> (accessed Sept 23 2013)

Pélissié du Rausas, Matthieu et al. (2011). Internet matters: The Net's Sweeping Impact on Growth, Jobs, and Prosperity. McKinsey Global Institute. http://www.mckinsey.com/insights/high_tech_telecoms_Internet/Internet_matters (accessed Sept 17 2013)

PRWeb (2012). Gartner Predict Cloud Computing Spending to Increase by 100% in 2016, Says AppsCare. <http://www.prweb.com/releases/2012/7/prweb9711167.htm> (accessed Sept 16 2013)

PWGSC (2013). Harper Government Announces Build In Canada Innovation Program. <http://news.gc.ca/web/article-eng.do?nid=756339> (accessed Nov 13 2013)

Sabbagh, Karim et al. (2012). Maximizing the Impact of Digitalization. Booz & Company. http://www.booz.com/media/file/BoozCo_Maximizing-the-Impact-of-Digitization.pdf (accessed Sept 16 2013)

Silcoff, Sean & Marlow, Iain (2012). Canada's vanishing tech sector. The Globe and Mail. <http://www.theglobeandmail.com/report-on-business/economy/canada-competes/canadas-vanishing-tech-sector/article4396596/?page=all#dashboard/follows/> (accessed Sept 26th 2013)

Sondergaard, Peter (2013). The Digital Industrial Economy. Gartner Blog Network. <http://blogs.gartner.com/peter-sondergaard/the-digital-industrial-economy/> (accessed Dec 1 2013)

Statistics Canada (2013). Survey of Digital Technology and Internet Use. <http://www.statcan.gc.ca/daily-quotidien/130612/dq130612a-eng.htm?HPA> (accessed Nov 11 2013)

Statistics Canada (2012). Survey of Digital Technology and Internet Use. http://www23.statcan.gc.ca/imdb/p2SV.pl?Function=getSurvey&SDDS=4225&Item_Id=131990&lang=en (accessed Sept 17 2013)

Trichur, Rita & Erman, Boyd (2012). CEO calls for "level playing field" if Verizon moves in. The Globe and Mail. <http://www.theglobeandmail.com/report-on-business/telus-ceo-urges-level-playing-field-for-wireless/article13300039/> (accessed Sept 23 2013)

West, Darrell M. et al. (2012). Building an Innovation-Based Economy. The Brookings Institute <http://www.brookings.edu/research/papers/2012/11/13-innovation-technology-west-friedman-valdivia> (accessed Sept 18 2013)

Wolfe, D.A. & Bramwell, A. (2010). Growing the ICT Industry in Canada: A Knowledge Synthesis Paper. Report prepared for the Social Sciences and Humanities Research Council Project on the Digital Economy in Canada. http://www.utoronto.ca/progris/presentations/pdfdoc/2010/Growing%20the%20ICT%20Industry%20in%20Canada_synthesis%20paper_edited%2014DE10.pdf (accessed Sept 16 2013)

WEF (2013). Global Information Technology Report 2013. World Economic Forum. <http://www.weforum.org/reports/global-information-technology-report-2013> (accessed Sept 19 2013).