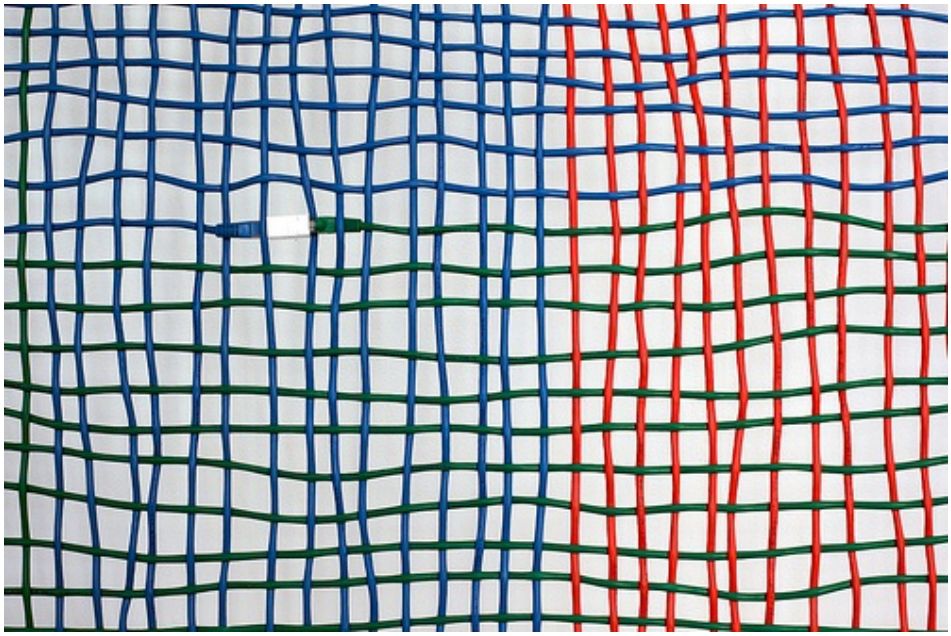
Interim
Consensus Submission

to the federal government consultation on a

Digital Economy Strategy for Canada



A document prepared through a consensus-based roundtable process

convened by
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supported by
Faculty of Information
Identity, Privacy and Security Institute (IPSI)
Knowledge Media Design Institute (KMDI)

University of Toronto

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Executive Summary

We the participants in the online and face-to-face collaborative process convened at the University of Toronto, call upon the Government of Canada to consider the digital economy as one element of a digital society.

Our submission highlights Canadian values foundational to a digital society, such as social inclusion, affordable universal access, the legal right to internet access, and the promotion of privacy, civil liberties and participatory opportunities for citizenship. These should serve as overarching goals in digital strategy formulation.

We addressed many of the major consultation themes with a view to advancing the broad public interests at stake in Canada's digital future.

In **promoting innovation using digital technologies**, we call for the Canadian Government to focus on developing a foundation for innovation across the entire economy and not just in a few priority areas. It needs to recognize that innovation occurs widely and not just in large private sector organizations. Furthermore, the generativity that is vital to social and economic innovation should be promoted through open, neutral networks and not be subordinated to excessive concern about security or protection of industry incumbents.

In **developing the digital infrastructure**, we call for defining a basket of basic services regarded as essential to contemporary life. This would include affordable access to open, neutral, high quality broadband networks as a right. In addressing the challenges of the still emerging digital infrastructure close attention should be paid to Internet architecture and operation. e.g. expanding the IP address range through the promotion of IPv6, architecting the 'internet of things' in ways that promote new applications while protecting privacy and national sovereignty, promoting environmental sustainability measures such as 'green broadband'.

In **creating Canada's digital content**, we call for greater recognition of the variety of contexts in which content relevant to Canadians is produced and used. Open access principles should be made central to a digital strategy, and care given to balancing the various competing interests over copyrighted material. e.g., all publically funded research publications and public sector information should be readily accessible and freely available, long term preservation of all digitally produced content should be a priority, content and tools for accessing it should adopt inclusive design principles to ensure that it is accessible to all Canadians.

In **building digital skills**, it is not just employment that need to be considered, but the wider range of abilities that people need to be citizens fully participating in the rapidly changing social, political and economic life of the 21st century. This requires learning programs based on principles of accessibility, continuity and flexibility. The federal government already has some training and access programs, such as the

current Community Access Program (CAP), that are effective in addressing digital divide issues. These should be supported and extended.

Finally, the recent report of the Standing Senate Committee on Transport and Communications' *Plan for a Digital Canada* contains many valuable recommendations which we support.

We welcome endorsements of this Submission until July 9. See:
http://ipsi2010.pbworks.com/Endorsement-and-Participant-list

Endorsements

A provisional list of endorsers can be found at:
http://ipsi2010.pbworks.com/Endorsement-and-Participant-list

We welcome additional endorsements before the final submission on July 9. To endorse the submission, send an email to Rhonda Sussman, IPSI's Admin Assistant < ipsi -at- utoronto.ca > providing your name, position, institutional affiliation (for identification purposes only).

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Introduction

Industry Canada's 2010 consultation on the Digital Economy strategy invites submissions from the public. At the University of Toronto (U of T), a group of faculty and graduate students affiliated with and supported by the Faculty of Information, the Knowledge Media Design Institute (KMDI) and Identity, Privacy and Security Institute (ISPI) responded to this invitation by convening a collaborative submission drafting process. Through our networks and affiliates, we launched a call for participation on June 4 to recruit scholars and experts in information and communication technology (ICT) policy, broadly conceived, as well as anyone with an active interest in this field. A key requirement from all participants was the willingness to work together on crafting this consensus submission. To achieve this goal we established a wiki environment where approximately 50 people joined in the conversation. Based on the initial contributions, we then held a half-day in-person roundtable with 33 participants at U of T on June 14th, 2010. Individuals participating in our wiki and roundtable event came from a range of backgrounds; while primarily an academic group of professors, students and staff from several universities, some individuals from industry and non-profit organizations also took an active part. Our objective for the wiki and the roundtable event was to collaboratively author this submission as a consensus document, where the opinions and expertise of a broad array of the participants could be brought to bear on developing a digital strategy for Canada.

Recognizing the broad potential scope and importance of our future digital economy, we identified the overall visions and objectives which might effectively guide the development of digital economy policy in Canada. We, the endorsers of this document as individuals, also responded directly to the consultation themes of:

- Innovation using digital technologies
- Digital infrastructure
- Canada's digital content
- Building digital skills.

Following the Roundtable, a draft submission was made available to participants for further comment and revision before being finalized in the form seen here. Participants were free to withdraw their endorsement, or indicate specific clauses they wish to abstain form. Additional endorsements were also welcomed. In this sense the final document reflects a 'rough' consensus of all those involved.

The collaborative authoring process, involving teams focused on specific themes, has meant that the combined contributions are broad and varied, with thematic sections organized differently. For example, some sections respond directly to the consultation questions, where others respond more directly to particular pertinent issues.

We see our submission to this consultation process as an attempt to address the broad public interests across the wide array of both technical and social aspects which face government in setting policy directions for the digital economy.

In the Consultation Paper on a Digital Economy Strategy for Canada, universities are positioned as sites where learners can gain the ICTs skills necessary to participate in a dynamic economy and as places where ICT relevant research can be conducted and made relevant to everyday life. Canadian post-secondary institutions are also sites where a diversity of perspectives: scientific, technical, artistic, and humanistic can be brought together in dialogue to broadly consider the potential policy visions and directions for Canada's digital economy. With our submission, we have attempted to draw on the strengths that university settings offer and to provide concrete policy options wherever possible to help realize our visions for the digital economy.

In crafting this submission, we envision that Canada's digital economy of the future involves both the 'traditional' computers and connections to the Internet, as well as mobile devices and an 'internet of things' where devices ranging from refrigerators to identity cards can connect to databases and networked computers. The digital economy in Canada includes an array of aspects that must be considered such as, access, inclusivity, innovation, creativity, and sustainability. As the endorsers of this document we have responded to Industry Canada's consultation document and express our interest in continuing the dialogue about the digital economy and the implications of digital technologies within Canadian society more broadly.

1 Goals and Objectives

Preamble

Digital technologies are, as the "Improving Canada's Digital Advantage" consultation paper states, ubiquitous (Canada, 2010a). They have transformed, and are continuing to transform, not just the way we work, but also the ways we interact, the ways we play and the ways we conduct the everyday business of our lives as Canadians. Our Government's goal of developing a strong digital economy is clearly the right idea at the right time. But it is important to examine what exactly goes into building a digital economy and what the foundational elements must be. The Consultation Paper defines the digital economy as "the term used to describe the network of suppliers and users of digital content and technologies that enable everyday life" (p. 8). While this definition is clear, it is also narrow, and positioned in the framework of a competitive, conventional market-driven model that does not encompass the changing realities of a digitally-driven world. Users generate content and modify technology, suppliers' capacity to innovate is potentially limited by digital infrastructures they are unlikely to control, and the most valuable

commodity in the online world--and the one most needing protection--is personal information.

A more difficult, but potentially more productive, way to think about the digital economy is to conceive of it in broader terms, as one element of a digital society. Our Government has an unprecedented opportunity, at this critical juncture, to lay the foundations for a digital society that performs not just the vital function of encouraging and facilitating the development of a strong, trusted and innovative marketplace but also, and equally vitally, considers core Canadian values of inclusiveness, sustainability, and accessibility to the digital infrastructures and services that are increasingly essential to civic participation and everyday life. The infrastructures—both physical and policy-based—required to accomplish the report's vision of a productive and profitable Canada are the same as those needed to ensure an engaged citizenry capable of accessing government services and communicating with their elected officials. Those same infrastructures that can support creativity and innovation in the marketplace can support it also in our schools and universities, in our cities and small towns. The digital world is an integrated world; to move Canada forward, we require a cohesive and integrated vision to truly improve Canada's digital advantage.

1.1 Affordable, universal access – Goal 1

As noted in Section 7b of Canada's 1993 Telecommunications Act an objective of Canadian telecommunications policy is to "render reliable and affordable telecommunications services of high quality accessible to Canadians in both urban and rural areas in all regions of Canada." As extended to the provision of broadband services, a digital economy strategy must ensure that all Canadians have access to high quality, affordable broadband services. At an absolute minimum, such services should meet the criteria laid out in 2001 by the National Broadband Task Force, that is that Canadians should have access to broadband networks "capable of supporting an aggregate of 1.5 megabits per second symmetrical to each end user" (p. 72). The reality of a rapidly changing digital world, however, is that this target is already too low to ensure adequate provision of services such as high quality online medical consultations in remote areas or up-to-date online educational materials incorporating video conferencing or video content. 5 megabits per second, with consistent low latency, is a better target. And perhaps the best approach is that taken in the June 2010 report of the Standing Senate Committee on Transport and Communications entitled "Plan for a Digital Canada," in which the committee recommends that rather than focusing on particular technologies or setting static minimum speed levels, "The Minister of Industry in the Digital Strategy should focus on the broadband speeds necessary to bring essential digital services to all citizens" (Canada, 2010a, 17).

In the Telecommunications Policy Review Panel recommended that "a program designed to achieve ubiquitous broadband availability should not be focused on individual "communities" that develop business plans and compete with each other for funds (Canada, 2006). The program should be aimed at broader coverage than

selected communities, [… and] subsidies should be made available based on actual requirements to complete the job, rather than on per capita or other formulas" (p. 8-1). Ignoring this recommendation, in 2009 the Broadband Canada program set up another competition for funds, resulting in more piecemeal solutions to the problem of universal access.

A national approach is now required to ensure that connectivity is available to all Canadians. Such an approach should address two issues: i) provision of high quality service to all Canadians, and ii) provision of affordable access to all Canadians. The two objectives may be met in different ways, and address different audiences. Affordability concerns may be addressed by subsidies, while connectivity issues must be addressed by investment in communications infrastructure. In developing a national approach to universal accessibility, we support the recommendation in the "Plan for a Digital Canada" that "The government in its digital strategy should define universal as 100 per cent of its citizens" (p. 20).

1.2 Legal right to broadband Internet access – Goal 2

Broadband access is widely recognized as central to the development of a strong digital society. For example, a study conducted by the Berkman Center recognized broadband "as a key enabler of economic growth that can benefit services such as telemedicine in rural areas, allow better management of transportation and energy systems and reduce infrastructure costs for businesses" (Berkman Center, 2010). Here in Canada, the "Plan for a Digital Canada" directs four of its 18 recommendations towards ensuring universal access to broadband (Canada, 2010b, 17-20). Clearly, Internet access has become essential to our modern way of life. This needs to be recognized in our statues and regulations.

In 2009, the Finnish government declared broadband Internet access to be a legal right. Also, in 2009, France's Constitutional Council ruled that Internet access was a basic human right (Reisinger, 2009). Various other countries (e.g. Estonia, Greece) have also provided such recognition. Canadians, too, should have a legal right to broadband service. As specified in Goal One, above, this service must be robust enough to support social and economic applications essential to the sustainability of businesses and communities – including applications such as e-health or e-education or e-commerce.

1.3 Participatory citizenship and social inclusion – Goal 3

Building upon the goal of access, the digital economy strategy should actively work to facilitate participatory citizenship and social inclusion. These goals have been expressed in previous Canadian and international discussions about connectivity strategies and the Information society:

> "A connected nation is more than wires, cables and computers. It is a nation in which citizens have access to the skills and knowledge they need to benefit from Canada's rapidly changing knowledge and information infrastructure. It is also a nation whose people are connected to each other. The Government will continue

to work with provinces to ensure greater mobility for people with disabilities and to ensure their integration into the economic and social mainstream of Canadian life. The Government will also bring forward measures to strengthen networks among Canadians and to increase knowledge of Canada and understanding among Canadians…" (Canada, Speech from the Throne, 1997)

- "We support regional and international integration efforts aimed at building a people-centred, inclusive and development-oriented Information Society" (WSIS, Tunis Agenda for the Information Society, 2005)
- "An overriding concern of this committee is that all Canadians - whether in cities or rural and remote areas – are included in this digital society" (Canada, 2010b, 12).

Canadian citizens who are capable of fully participating in a digital society are essential to ensuring our Canadian democratic ideals are upheld. As the Government works towards its stated goals of moving more services online, and develops processes for consultations which increasingly rely, as this one does, on strong online components, we need to ensure citizens are able to fully participate in these important initiatives.

Given the wide range of abilities of Canadians in relation to ICT use, inclusive design principles need to applied to existing practices to make up for existing inadequacies as well as be central to any future development initiatives.

The civil society communiqué for the Canadian Commission for UNESCO (2005) and similar initiatives are indicative of an active, engaged citizenry who care about digital policy and related issues. Furthermore, a digitally connected and digitally literate population is necessary to support the economic goals explicitly stated in this consultation of growing our information and communications technology industry, improving our innovative capacity, and creating Canadian digital content.

1.4 Promotion of privacy and other civil liberties – Goal 4

As Canadians increasingly conduct many facets of personal daily life via digital networks, recognition of the ways that our privacy and other civil liberties may be compromised is growing. We are reminded daily of how the surveillance possibilities of digital infrastructures can be exploited to offer new services and greater convenience, but at the same time pose new potential threats to our autonomy, dignity and civil liberties. In particular, measures taken in the name of greater security often undermine privacy, identity integrity and freedom of expression. At stake is not only the consumer confidence needed for a thriving on-line marketplace, but more fundamentally, trust in communication channels that underpin the full range of interpersonal interactions and social cohesion. A central goal of a Canadian digital economy strategy should be to ensure that our digital infrastructures strengthen rather than weaken widely shared civil liberties values. Only when security measures are in concert with other broad rights can we achieve the full measure of trust in our infrastructures we require and deserve.

More specific goals include:

- Every organization that collects or processes personal information shall be accountable publicly and to their data subjects individually for their personal data handling practice
- Every new system that handles personal information shall embed identity, privacy, and data protection considerations throughout the entire life cycle of technologies, from the early design stage to their deployment, use and ultimate disposal
- Any communication between Canadians inside Canada remain under the full protection of Canadian privacy law. (i.e. intra-Canadian communication should remain within Canada, or if it passes outside Canada should be granted equivalent protection.)

Several of these goals are already incorporated in current privacy legislation, but are not adequately achieved and are made more difficult with current digital infrastructures. We believe that privacy should be considered at the beginning of this process of expanding our country's reliance on digital technologies economically, and at every subsequent stage of the process in every initiative. Investment in privacy enhancement as part of the design process of new technologies, in addition to investing in, and allowing access to, stand-alone privacy applications with broad potential uses, is needed to ensure the necessary level of citizen and consumer trust in digital infrastructures that can support the expansion of our digital economy and integrity of digital society.

1.5 Community planning and design – Goal 5

A digital economy proposal should be designed and implemented with a strong community-based component in mind. This means not only better funding for community-based ICT initiatives, but involving communities and community organizations in connectivity policy-making, defining access needs, defining programs, and other aspects of capacity development. (Clement *et al*, 2010;CRACIN, 2005a).

1.6 More effective coordination within the Government of Canada on Internet and digital technology policy – Goal 6

Numerous agencies, ministries and departments within the Government of Canada make policy decisions that relate to the Internet. There is no overarching policy and no single agency or individual appointed to orient this framework toward clearly defined policy goals and ensure effective coordination.

A recent evaluation of the state of communication law and policy in Canada found numerous issues linked to a lack of effective policy coordination including:

- Areas where policy exists but needs to be radically reconstituted because it is inadequate to current environment;

- Gaps between principles and practices;
- Lack of concrete provisions for realization (often through the use of conditional language or the absence of explicit financial mechanisms);
- The existence of countervailing measures in certain policy areas;
- Policies containing built-in capacities for circumscription/non-compliance. (see Raboy and Shtern 2010)

These general trends were particularly salient where Internet policy is concerned.

Recognizing the challenges associated with this lack of coordination, two government agencies with clear interests and responsibilities in this area, the CRTC and the NFB, have called for the drafting of a "National Digital Strategy". The National Film Board (NFB) called for a Canadian national digital strategy in its submission to the CRTC proceeding on the scope of new media broadcasting (NFB 2008), and again in its submission to the Canadian Broadcasting in New Media proceeding itself (NFB 2009). Echoing the call of the NFB, the CRTC (2009, section 74) points to initiatives such as the Digital Britain Review, Digital France 2012, New Zealand's Digital Strategy 2.0, Germany's iD2010, and Australia's Digital Economy Future Directions to suggest that "several countries have already recognized the value and the importance of a national digital strategy and, as a result, have developed plans for their citizens' and economies' futures that ... send a clear message of the importance of a holistic approach to this environment." The more recent Standing Senate Committee on Transport and Communications, "Plan for a Digital Canada" also notes that over 20 countries in the world have comprehensive digital strategies, and suggests that Canada too needs both a comprehensive and coherent digital strategy, but also goes a step further and calls for a Minister for Digital Policy to fill this strategic gap.

Though the current process is arguably discursively and substantively distinct from what the CRTC and NFB had in mind, it is important to recognize as the CRTC did that "issues raised in relation to matters of taxation, copyright, privacy, spectrum management, and convergence of broadcasting and telecommunications industries, among others, are all interrelated and warrant a coordinated approach" (CRTC 2009 section 76) and to pursue this goal of greater inter-governmental coordination on internet and digital strategy as part of our discussions on the Digital Economy Strategy (see also Raboy and Shtern 2010, at Chapter 9).

1.7 Broad Desiderata – Goal 7

While universality, affordability and privacy protection are among the most frequently mentioned desirable characteristics for broadband infrastructures, there are many other considerations. The Community Wireless Infrastructure Research Project (CWIRP), funded by Infrastructure Canada, in 2007 developed a set of 14 desiderata for community wireless initiatives that can apply to digital infrastructure more generally (Potter & Clement, 2007). Since then other criteria have come into

the mix, such as community participation and environmental sustainability. Here is a (nearly) comprehensive list:

1. Ubiquitous & Universal
2. Widely Useful
3. Usable
4. Accessible
5. Affordable
6. Reliable
7. High Quality
8. Healthy
9. Cost-Effective
10. Accountable & Responsive
11. Secure
12. Civil liberties promoting
13. Open
14. Neutral & Non-Discriminatory
15. Community enabling
16. Environmentally Sustainable

Many of these criteria have been dealt with in this submission. Time limitations have prevented the adequate treatment of every item.

2 Innovation using digital technologies

2.1 Should Canada focus on increasing innovation in some key sectors or focus on providing the foundation for innovation across the economy?

2.1.1 A foundation for innovation

We define "Digital Economy" broadly as an ecology of interaction, energy, resources and distribution (involving ideas and actions). Canada should focus on providing the foundation for innovation across the entire economy and not just in a few priority areas. The Canadian government should provide the infrastructure and incentives that will promote wide access and innovation across all sectors of the economy and society. The digital economy involves a broad array of individuals and organizations including: industry, non-profits, academia and government. Scientific, humanistic, artistic, and technical perspectives each contribute and need to be considered within the digital economy and society.

We recommend, focusing on a wide foundation for innovation to allow all sectors to participate in the digital economy and society.

2.1.2 Net neutrality

For all sectors to participate and innovate within the digital economy and society, network neutrality is required as a foundational element. Net neutrality refers to the idea that data and information can be transmitted and received on the internet from every source in non-discriminatory ways. Practices such as filtering and traffic shaping, or throttling, run counter to the principles of network neutrality. In Canada, some steps have been taken through the CRTC to protect network neutrality. Civil society organizations such as SaveOurNet.ca (2009) note that:

> "the onus is on the consumer to file a complaint and to prove that the ISP is throttling traffic. We think that's wrong. When it comes to surfing the web, the internet user, not big telecom, should be in the driver's seat."

As a possible tactic to address this situation, SaveOurNet suggests that the CRTC could conduct compliance audits. Therefore, it can be said that the realization of network neutrality requires ongoing reviews of legislation, regulation and practice.

Legislating or regulating to protect network neutrality in Canada is essential for innovation. In the American context, we note that President Barack Obama has been a vocal supporter of net neutrality and the Internet Freedom Preservation Act of 2008 is under consideration. (See also: Lessig, 2008)

We recommend, regulation must continue to be reviewed and adapted to protect the interests of Canadian citizens and innovators.

2.1.3 Balance security and generativity

The locking down of digital technologies into appliances may be seen as a way to promote security, but risks impairing the generativity that is vital to innovation and social development. It is important to find a balance between neutrality, openness and security (Patten, 2010; Zittrain, 2006).

2.2 Which conditions best incent and promote adoption of ICT by Canadian businesses and public sectors?

A question concerns where we place the onus for innovation, on citizens, or do we simply assume that the emphasis on incentives and promotion should be directed at corporations? Again, the consensus was on approaches directed toward citizens rather than funding big businesses.

Current decision-making models and funding schemes perpetuate existing uses of technology and ideas.

2.2.1 Infrastructure

We recommend, establishing and funding infrastructures is a necessary foundation for innovation. Making the infrastructure more readily available to everyone is the single best way to promote adoption of ICT by Canadian businesses, public sectors, and private citizens

2.2.2 Gallery of Innovation

We recommend, the government support the creation of a Gallery of Innovation – that can become a mode of promoting (not funding) ideas. This may be like a business incubator.

2.3 What would a successful digital strategy look like for your firm or sector? What are the barriers to implementation?

2.3.1 A Canadian digital archive

We recommend, to establish a Canadian Digital Archive, so that all Canadian content would be deposited in an institution after a given number of years in order to ensure equitable access to Canadian content to all citizens. There could be a repurposing of libraries to make them central nodes of access to the contents of the archive.

2.3.2 Streamline funding programs and tax incentives

We recommend, a task force should be created to streamline, rationalize, and synthesize all existing funding programs and tax incentives across jurisdictions as a prerequisite to creating and instituting a comprehensive new vision.

In this new vision, there should be a better balance than present systems vis a vis the efforts required to go through the process to secure funding. Innovation would be supported if effort required to apply for funding is more in proportion to the potential benefits.

A barrier for producers is the lack of funding up front. There should be a way of looking ahead to potential areas of innovation.

2.4 Other

The DES Consultation Paper identifies private sector actors and market forces as the primary drivers of innovation. However other economic sectors, notably the public media institutions such as the CBC and NFB as well as the community-based non-profit sector, also play important roles in socially beneficial innovation and should be considered for public support in the digital economy strategy.

2.4.1 Content innovation and Canada's public media institutions

The questions posed under the theme of innovation seem to frame innovation as something that happens technologically and strategically but not creatively. This is too narrow a focus, in particular given that the DES focuses elsewhere on Canada's digital content advantage. The two are inexorably linked. Creative innovation is a key to establishing a digital content advantage; regardless of whether success in digital content is defined in artistic, economic or cultural policy terms.

In order to facilitate creative innovation, the following policy principle must be enshrined in Canadian copyright law, internet policy and digital media production funding programs: *Let Canadians Use Their Media.*

Media Divides: Communication Rights and the Right to Communicate in Canada (Raboy and Shtern, 2010), expands on this principle in the following terms:

Through public broadcasting, public subsidies for film and television production (through the Canadian Television Fund and other mechanisms), and a host of arts, media, and Canadian culture programs, Canadian citizens' tax dollars pay for a significant amount of media content. The principle behind cultural policy frameworks such as Canadian content rules is that this content has an ethical and cultural value to democracy, social cohesion, and education in Canada that transcends its market value. Yet, our ability to access cultural creation that we subsidize through the NFB and the CBC is limited by copyright law and contingent on the willingness and initiative of these public agencies themselves.

It stands to reason that there would be similar non-market value to Canadian democracy, social cohesion, and education by allowing Canadians to use publicly funded cultural products as the basis of further creative activity. It stands to reason that the ability to use and share deconstructions, commentaries, and expressions related to the iconic imagery of "Canadianness" only adds value to these cultural policy objectives. But restrictive copyright laws that apply to government information and publicly funded cultural products prevent this sort of creative activity and, in particular, make it impossible to communicate such sentiments legally. If the cultural value of producing Canadian content justifies a framework of public subsidies that are purposely removed from the marketplace for cultural products in the first place, why are market-based copyright laws then applied to the access, use, and sharing of publicly funded Canadian content? While this logic seems to fail the rather abstract cultural benefits tests, it also fails at a much more concrete level: generally, people who pay for something should expect to have access to it and to be permitted to use it.

Remedying this situation requires bold moves by public institutions in Canada, including, but not limited to, the CBC, the NFB, museums, and educational institutions. These organizations should embody a strong public interest view of copyright. For example, the CBC should make its audiovisual archives available to Canadians for free, and libraries ought to at least make their public domain collections available for free. The principle is simple: publicly funded cultural products in Canada should be freely available for use by the Canadian public.

2.4.2 Community-based innovation

Community-based non-profit ICT organizations in Canada's social economy also have a history of technological innovation and value creation in providing public goods, thereby warranting significant public support. (see also Section 4.4)

We recommend, that the community-based, non-profit sector receive public support equal to or greater than the subsidies and tax breaks offered to the private sector. (CRACIN, 2005b)

3 Digital infrastructure

Basket of basic services

Certain principles must underlie policies related to digital infrastructure in Canada but are, at present, under-emphasized in policy and/or not being realized on the ground. There needs to be a basket of basic services available to everyone that include a variety of ingredients.

3.1 Broadband access

While Canada was a world leader in broadband penetration in the 1990s, it has subsequently fallen far down in international rankings. The Standing Senate Committee on Transport and Communications' *Plan for a Digital Canada* recommends that Canada should define universal as nothing less than 100% of citizens (Recommendation 5) and that "The government should change the requirement for current spectrum licence holders to spend 2% of revenue on research and development and have the money redirected for the deployment of broadband to areas currently unserved" (Recommendation 15). Elsewhere in this document we point out that universal access to broadband is a necessity in a modern information society such as Canada (sections 1.1; 1.3); in particular to the realization of policy goals such as digital skill development (sec. 5.2.1) and digital content production (sec. 4.7) that are indentified as priorities by the Digital Economy Strategy Consultation Paper. Unfortunately, the Next Generation Connectivity (2010) study by Harvard's Berkman Center places Canada as 22nd among 30 OECD countries, taking account of penetration, speed and price (p. 68). As we discuss elsewhere in this document Canada's response to the digital divide is inadequate, in particular when compared against other comparable national cases such as Australia. (see sections 5.6, 6.1). The Berkman report attributes this relatively poor performance to the decision to regulate carriers using facilities based competition, in which telephone and cable incumbents would compete with each other to drive down prices and expand service offerings (p. 83). The result has been an oligopoly industry structure, and most urban areas served mainly by a single cable and single telephone incumbent. Countries that instead embraced functional separation between backbone and local services, enabling new market entrants and more vigorous retail service competition, have performed much better (e.g. UK). Australia has gone beyond functional separation, in structurally separating the high capacity backbone network from Telstra, the incumbent telco, to promote competition in the wholesale market (New National Broadband Network (2009), Prime Minister of Australia, 2010). Functional or structural separation in the local loop becomes especially important as fibre to the home becomes more prevalent and the norm for internet access.

We recommend: Functional or structural separation rather than just facilities-based competition.

3.2 Open access

The importance of open access practices across digital economy policy is underlined throughout this document (see sections 4.1; 6.1). Recommendation 14 of the Standing Senate Committee on Transport and Communications' *Plan for a Digital Canada* states that "The government should pursue open access policies with respect to telecommunications infrastructure as a means of sustaining or improving competition in the telecommunications sector" In conjunction with functional separation, users and service providers should be free to develop applications and operate any services that do not interfere unduly with network operations, without the prior approval of carriers. See the Berkman report (p. 83) and I-NEC Declaration on Open Networks.

We recommend: adoption and promotion of open access practices and standards.

3.3 Essential services, including a minimum performance level and 9-1-1

The Canadian government should establish a basic level of Internet access regarded as essential to full participation in contemporary life that all Canadians and households can be assured of at affordable rates. This point is referenced throughout this document (see sections 5.6 and 6.1). The Standing Senate Committee on Transport and Communications' Plan for a Digital Canada recommends that "Canada should present a strategy for an inclusive digital society." (recommendation 1) and that Canada "should focus on the broadband speeds necessary to bring essential digital services to all citizens" (Recommendation 3). The standard should be based on the functional requirements for full participation in the digital economy/society, as indicated by popularly used services. Based on current functional needs and the Broadband Taskforce Report (2001), the minimum level of guaranteed service for all by 2015 should be at least 1.5Mbps bi-directional, low latency (<15ms to internet backbone) for <=$20/mo. Based on comparison with leading OECD countries, the aim in this same time frame should be for a near universal (e.g. 90%) of at least 5Mbps. A widely affordable price level is an important ingredient since there are significant numbers of Canadians, predominantly in urban area, who cannot afford broadband access even though it is already locally available. These standards should be re-visited periodically to account for changing use patterns.

The importance of existing telecommunications public interest obligations must be emphasized through the transition to new IP-based services, emergency communication and 9-1-1 service in particular.

We recommend: Universal affordable access to high quality broadband be defined as a basic essential service.

3.4 Community anchor institutions

Digital infrastructure is not just constituted through hardware and software, but involves socio-organizational components that provide various forms of service and guidance. (See Clement and Shade, 2000) While an important digital infrastructure target is to enable household and personal access to a broad array of network

services, there will be a continuing need for intermediary organizations at the community level to assist people in making effective use of digital services. These intermediary organizations, such as libraries, community centres, community networking organizations, are especially valuable where income and educational other socio-economic factors are impediments to full and effective use (See: Dharma et al. (2010) SSRC report; National Research Council (2007)). They are also, as we point out in section 5.6 of this document, crucial to ensuring the development of digital skills. The Standing Senate Committee on Transport and Communications' Plan for a Digital Canada recommends that "The government should change the requirement for current spectrum licence holders to spend 2% of revenue on research and development and have the money redirected for the deployment of broadband to areas currently unserved" (Recommendation 15). Such a funding program should target the social as well as technical infrastructure needed to ensure universal connectivity in Canada.

We recommend: Funding and regulatory support for community anchor organizations and their meaningful integration into policy discussions about connecting Canadians.

3.5 Public interest and competition

In 2006, the federal government issued a Directive to the CRTC to "rely on market forces to the maximum extent feasible" in implementing the objectives in the Section 7 of the Telecommunications Act. (Canada, 2006, December 27). While market forces can be an important driver of lower costs and improved services in some areas of the digital infrastructure, in combination with the shift from regulation to facilities based competition, the effect has been perverse. A fundamental lack of meaningful competition has meant that this Directive has contributed to an oligopolistic hold over telecommunications services in Canada, in which dominant providers effectively carve up the market between themselves and only reluctantly allow competitors to use their facilities. This market force reliance is often at odds with what Canadians need from the market for Internet services. It is, for example, incompatible with The Standing Senate Committee on Transport and Communications' Plan for a Digital Canada's recommendation that Industry Canada take a public-interest focused approach to establishing prices and allocating resources in order to "promote wireless service in currently unserved or underserved areas" (recommendation 16). Realization of the open access principle would mean that services on top of this level can be highly competitive, providing knock on positive effects for Canada's digital economy (for example in regard to training of a digital labour force as discussed in section 5.3).

We recommend: The "Market Forces" Directive should be repealed, to allow the CRTC a freer hand to pursue public interests in meeting the Section 7 objectives.

3.6 Universal email access

Email service is essential component of digital communications and relatively inexpensive per capita to provide on a mass basis. While current free services such

as those offered by Google, Hotmail, and Yahoo are popular, all rely on an advertising business model that monetizes the fine grained collecting of personal data and tracking of individual behaviour. This poses an unnecessary privacy risk. An alternative would be for a publicly accountable body to offer a permanent email address and service to every Canadian with high reliability guarantees and strong privacy protections. Such a universal email service would be an ingredient in the larger basket of basic digital infrastructure services available to all Canadians.

We recommend: Universal availability of reliable, privacy-protective, non-commercial email address for all Canadians.

3.7 Privacy

Privacy is a concern that cuts across all of these policy areas and types of service. More meaningful options for protecting privacy must be embedded into the design of communications infrastructures. See section 1.4.

We recommend: Making privacy an infrastructure design issue in Canada as well as a communication regulation issue.

Emerging challenges with digital infrastructure

The digital economy strategy should take account of a series of emerging challenges and trends that will require policy development in the future. As above, this is not intended as a comprehensive accounting of the infrastructure of the future, but rather a more in-depth attempt to draw a road map for how public authorities should proactively take steps to navigate a specific series of policy challenges that will likely find their way onto the agenda of the government of Canada in the near future. In designing the Architecture of the Future the digital economy strategy should:

3.8 Support IPv6

The existing finite IP address resources are rapidly being allocated. A global movement is underway to transition to the more plentiful IPv6 standard (see http://www.ipv6actnow.org/) and Canada could and should consider what role its domestic infrastructure policies and engagements in global internet governance discussions can play in leading and supporting such efforts.

We recommend: Canada should actively support the adoption of IPV6 (Internet Protocol version 6).

3.9 Plan for “internet of things”

The Internet is evolving from an Internet of Machines to an Internet of Things: a concept referring to the extension of the Internet into the real world of physical objects, from books to cars, from electrical appliances to food. According to this vision, the ability of objects to communicate data will lead to the development of better quality goods and more informed decision-making by consumers.

The ability of objects to communicate such data, and the ability of Internet infrastructure to support such transactions, will lead to development of new industries and the commercialization of value-added applications that will dramatically impact both industry productivity and the consumer experience. It will also create new opportunities and challenges for citizens and policy makers that must be planned for, in particular around associated privacy, security and surveillance challenges. There are questions as to what sort of consumer information is appropriate to share, with whom, under what circumstances, and how such data is stored and organized. The challenges must be considered and any resolutions must incorporate business and communication standards that are open, transparent and universal.

A core infrastructure that will underpin the Internet of Things is Data Discovery Services, a suite of services that enables query-issuers to identify the location of data about products and services and to request access to that data. The lynchpin of the data discovery process is the Object Naming Service (ONS). The ONS is the framework for retrieving information about objects through the Internet, based on the current Domain Name Service (DNS) that provides IP addresses for domain names.

Canadian policy makers must take into account the complexity of the policy questions raised by such developments, including the need to deal with the "data path" that queries for information through the Internet of Things will produce, as well as privacy and information sovereignty issues that are sure to be raised resulting from traceability of consumer products and their connection to communication networks. Canada must consider how to address issues relating to information sovereignty, which arise when data pertaining to certain products – such as information transactions regarding pharmaceutical products- result in commercially valuable information being stored outside of Canada. (See: Commission of the European Parliament et al. (2009) on an Action Plan for Europe re: The Internet of Things).

We recommend: In order to position Canada as a leader in creating this next generation of the Internet, to drive economic value through the commercialization of related emerging industries, and to manage related privacy and information sovereignty requirements, Canada must focus on the development and implementation of foundational Internet architectures that will enable domestic control of personal data as well as commercially valuable data and its discovery path. Widespread implementation across Canadian industry of global supply chain and business process and communication standards, as well as automatic identification and data capture technologies, and the creation of the means to network this information through the ONS, represent the critical first steps for realizing the sustainable vision of the Internet of Things and the creation of the digital applications of the future.

3.10 Retrofit declining telecoms infrastructure

Canada's rapidly declining telecommunications infrastructure has now become a major concern for small and large business, the R&D sector, the education sector and the social sector alike. "Broadband speed is an important driver for "useful connectivity" since it facilitates the flow of information, stimulates innovation, encourages education [and] increases productivity and economic prosperity" says a recent report from the Canadian Chamber of Commerce. (Canadian Chamber of Commerce, 2009). According to telecom analyst Sheridan Scott "A 2009 study by the World Bank suggests that an increase of 10 per cent in broadband penetration in high-income countries correlates with GDP growth increases of 1.2 per cent." (Scott, 2009). The Canadian economy needs strategic investment in more than roads and bridges to exploit the potential of the new communications tools. In April 2009, the Government of Australia announced it would build a national high-speed broadband network that would deliver up to 100Mbps to 90% of its citizens. The eight year, AU$43 billion project will be one of the largest state-sponsored Internet infrastructure upgrades in the world. The Australian Prime Minister has suggested that project will support up to 37,000 jobs at the peak of construction and recently announced a structural separation agreement with Telstra to achieve this. (Prime Minister of Australia, 2010; Foley, 2009). This is the kind of program that will be necessary if Canada is to bring its communications infrastructure back up to world class standards. Industry Canada defines broadband connectivity as "access to Internet service that supports data transmission at a minimum speed of 1.5 Mbps to a household." (Industry Canada, 2009). At this speed, rural and, in some areas, urban Canadians will remain effectively disconnected and disabled for a long time to come. In the process, policy development and coordination is required in order to make best use of emerging network infrastructure capacities including geo-location technologies and - "flexible radio" or "opportunistic delegation", spectrum management practices whose more effective deployment in Canada could contribute to improving the efficiency and robustness of communication infrastructure. Such Advanced Radio Spectrum (ARS) (including such advances as Cognitive Radio and Software Defined radio systems) is the technical framework supporting the long-term maturity of Canada's digital economy. As an ARS-based economy evolves, we must create the conditions for security that ensure perpetual open access to Open System Interconnection's Network Layer (or in TCP/IP, Internet Layer and Link Layer - ISO 7498) by fat, hybrid, and thin clients of all kinds, at all times, whether clients be remote, embedded, or mobile.

We recommend: Acknowledge that evolving infrastructure demands and technologies mean that keeping Canadians connected is becoming as important a policy challenge as getting Canadians connected.

3.11 Enhance our capacity for monitoring and mapping Canada's digital infrastructure

Such information and data is required for consumer decision making, make the market work better. Also for effective public oversight of critical societal infrastructure, would in that it allows for reporting on facilities, availability and

capacity, service performance levels, traffic, subscriber, traffic management practices pricing, (See Dharma et al. 2010, SSRC report). Maps of Canada's digital infrastructure should be done and updated. Open standards and public accessibility for the this process are required in order assure that firms and publicly funded research organizations (including universities) are able to benefit from the data collected and contribute to the mapping effort. The increased and continual mapping of Canada's physical information relay infrastructures and related processes will reveal the edges of an emerging national advanced radio spectrum (ARS-discussed above). Therefore, the development of open infrastructural cartographic standards will permit civil and private sector participation in the furthering of national strategic transmission objectives and is crucial to the goal of retrofitting the digital infrastructure.

We recommend: Monitor and map Canada's digital infrastructure and, where feasible, adopt open standards for doing so.

3.12 Focus on human development and environmental sustainability

An overarching challenge of planning a digital economy is anticipating and confronting the impact that the attendant build-outs and reorganizations will have for our health and our environment. This is particularly important within the discussion of digital infrastructure. For example, there is growing awareness that the digital infrastructure, the "cloud", especially carrier hotels and server farms are highly energy consumptive. This comes from both need to power the digital circuits and equipment but also the cooling systems to dissipate the heat generated. Canada is well placed with its relatively abundant renewal energy sources and a cold climate to serve as a host for computing intensive installations. Since it is more energy efficient to ship bits than power, hydroelectric generating stations in northern areas could be attractive sites for locating server farms (See: http://green-broadband.blogspot.com/) but there are numerous other health and environment issues linked to the digital economy that should considered.

We recommend: Particular attention be paid within the digital economy strategy to the human development issues associated with the digital infrastructure such as the issues of: e-waste, sustainable digital infrastructure development, the viability of "green broadband" programs and health impacts of wireless technologies.

4 Canada's digital content

Preamble

The background paper placed a great deal of emphasis and focus on conventional forms of content in the 'creative' industries, while failing to recognize other important forms of content such as scholarly research and government generated data. There is also a great deal of emphasis placed on the creation side of content, while issues of access and reuse of information remain in the shadows. Of particular

importance, the principle of openness needs further recognition at the federal level through policy targeted at opening up publicly funded scholarly information.

4.1 Open access to scholarly research

While billions of dollars are invested on research by the government on a yearly basis, only a small percentage of the publications and data generated by such funding is accessible to the public within a reasonable time period. We are currently seeing a very large portion of content being bypassed by open access policies which could effectively harness Canada's digital advantage by promoting greater access and dissemination of research, and therefore greater research uptake and innovation.

Since 2008, the Canadian Institute of Health Research has an open access policy which requires that research publication funded by CIHR be deposited in an online open access repository. The other major granting councils (SSHRC, NSERC, and NRC) should follow the example of CIHR. If government policy required open access to publicly funded research, authors could better retain the rights to their research, while publishers could move away from licensing content towards focusing on the provision of high quality and value-added publishing services which are built on top of openly available content.

We recommend: Canadian granting councils require open access to publicly funded research.

4.2 Openness and innovative business models

As mentioned earlier, we recognize the potential for the development of new business models, which will invariably differ in different content contexts. Nevertheless, the government has a role to play to ensure that there is maximum access to publicly funded research and content. The government also has a role to play to ensure that producers of creative content are able to maintain rights associated to their content. What is required are new business models for disseminating scholarly content/musical content in a more open ecosystem.

Currently, we continue to see academic content signed over to publishers and used in subscription based models, while authors continue to be disadvantaged by the loss of intellectual property rights to publishers. While we need to have a policy in place that insists that publicly funded material is made publicly available, we also need to see the emergence of new business models building on the openness of data.

What is required is the emergence of new business opportunities/modalities of rights management which are both open and profitable. Ideally, emerging business models can find new ways to take advantage of the openness of content. What is required, however, before this can become a reality is government support in the experimentation phase with respect to research funding and building new partnerships with both academia and the private sector. In order for universities and other public institutions to be more competitive at the international level, more large-scale projects focusing on digital innovation and business models will be

required. New developments such as the Digital Media Fund are a positive step towards this goal.

4.3 Balanced copyright

We recognize that digital content is a broad reference point. There are many other socially produced and collaborative types of creative content which are not created by professionals. In addition to academic content mentioned above, there is also government produced data. It is important that the diversity of content is accurately reflected and recognized through copyright legislation and given fair and thoughtful considerations to balance the many copy-right related concerns such as innovation, freedom of speech, and creative rights over content.

Therefore, it is important to recognize that different forms of content require different considerations. A fine balance needs to be struck between the rights of creators/consumers in a wide variety of digital contexts. It is also of utmost importance to maintain the technological neutrality of related policies and legislation.

4.4 Community networks and digital content

Community networks play an important role in providing locally relevant on-line content, including information on local events, community issues, heritage material, and links to local social services and businesses. These and other content services helped to stimulate local civic participation and the development of social capital. Community networks have also been active in cultivating electronic public spaces for community members to gather and discuss local problems. K-Net, for example, hosts over 14,000 web pages created by First Nations individuals and community groups across northwestern Ontario. Together these community web pages receive up to 30,000 unique visits per day. Vancouver Community Network hosts over 400 email listservs used by local community organizations and informal groups to share news and information and to plan and coordinate activities. VCN listservs had over 25,000 subscribers and generated over 96,000 postings between 2002 and 2005. (CRACIN, 2005a). The role these organizations play in developing content relevant to Canadians needs to be better recognized and supported.

4.5 Financial and other support for the creation of Canadian content

On page 26 of the consultation document, the following funds are briefly introduced:

- The Canada Media Fund
- The Canada Interactive Fund
- The Canada Book Fund
- The Canada Music Fund
- The Canada Periodical Fund

Alongside issues of infrastructure and information management practices, the ways in which such funds support (or hinder) the creation of content for the "digital economy" is also a topic worthy of further discussion. In particular, the recently-created Canada Media and Canada Interactive Funds hold promise for independent producers that do not wish to be tethered to a "traditional" (i.e. offline) broadcast licence, since a greater range of productions are eligible to apply (as compared to the constituent Canadian Television and Canada New Media Funds that were merged to create the CMF).

4.6 Digital opportunity structures and the capacity of Canada's independent production sectors

Since the 1980's, Canada has invested significantly, with decidedly mixed results, in the incubation of an independent film and television production sector. Steps must be taken to identify and understand the linkages between "traditional" media content producers and the Canadian and global markets and audiences for digital media content and to consider what, if any small additional policy steps can be taken to ensure that Canadian independent production firms have the capacity to be creatively and economically viable across all of these various media platforms. Rather than re-inventing the wheel and seed funding an entirely new independent digital media production sector, the policy emphasis should be on establishing screen-based media production (digital, film, TV etc.) as a single marketplace and as part of a uniform cultural policy.

This would involve defining clear, technology-neutral economic and cultural policy goals for Canada's independent production sector, leveraging the investments that the Gov. of Canada has already made into independent media production and ensuring that Canadian media creators are capable of taking advantage of the opportunities that are presented by the emergence of these additional creative and market opportunities.

4.7 Accessibility

The government of Canada needs to place a greater focus on mainstreaming accessibility to ICTs for persons with disabilities and the aging population through policies which promote the mandate of web accessibility. It seems that support for accessibility of digital media for disabled users would come here. In our increasingly digitally-mediated economy, it is crucial that we reduce barriers to equal economic participation for Canadians. In general, supporting the work of the World Wide Web Consortium (W3C) (such as WCAG, ATAG, their mobile web best practices) seems advisable. More locally, the Toronto-based Inclusive Design Institute (IDI) has much to offer in this regard. Tax incentives or funding programs to encourage voluntarily adoption of accessibility standards would be helpful. This might then serve to raise the profile of the issue and improve the required skills amongst developers and designers. Greater technical support (both improved quantity and quality and widely and freely available) would need to be put in place to aid implementation of accessibility.

4.8 Long term preservation

The Library and Archives Canada (2007) document "Canadian Digital Information Strategy" clearly lays out the fact that Canada is headed towards a dangerous course with its current attitude towards its digital information.

> "As a nation, we do not yet have the capacity to assure long-term access to our digital resources. Indeed, all digital information is at risk. Yet digital preservation is not a high profile issue, despite some recognition that the early decades of the digital era may prove to be the "digital dark age" – the least permanently documented period of recent history."

It is important to consider when drafting a new digital economy strategy then, to emphasize the importance of the full life-cycle of digital data of all kinds and to have concrete goals for their long-term preservation. Some governments are starting to realize the importance of long-term preservation of data (Ontario's Land Information Strategy for instance just announced a long-term preservation strategy for its digital geospatial data), but not enough importance is put on this need at the outset of consultations such as these. Preparing for the archiving of data must to start before the data are even conceived.

The government should play a larger, overarching role in ensuring the preservation of Canadian content for the future. Could a new focus be placed institutionally on digital preservation? More human resources are required to meet the demands of digitization.

4.9 Open data

We recommend, to create a data.gc.ca portal for Canada's public sector information (PSI) and data in parallel with the excellent NRCan GeoConnections model (e.g. GeoGratis, GeoBase, Discovery Portal).

These PSI & data should be shared at no cost with citizens, be in accessible and open formats, searchable with standard metadata, wrapped in public domain or unrestricted user licenses, delivered within an open architecture infrastructure based on open standards, specifications and be interoperable. It should be governed with open government principles whereby data & PSI are shared first and arguments to restrict are made only for legitimate privacy and security reasons, which should also be disclosed. It should have a permanent home and include both the right combination of multi-departmental (e.g. CIC, INAC, HRSDC, NRC, NRCan, etc.) inputs, trans-disciplinary human resources (e.g. Librarians, archivists, scientists) along with IT specialists & engineers. It should be built in consultation with Canadians to ensure it is designed with user needs and usability in mind. (This is how the GeoConnections program built the Canadian Geospatial Data Infrastructure).

The Government of Canada produces administrative data for the purpose of program delivery (e.g. Canada Student Loan, location where new Canadians land, the number and location of homeless shelters, etc.), and it produces data for the

purpose of governing, for example: the data collected by Statistics Canada (e.g. Census & Surveys, National Accounts); Environment Canada (e.g. air & water quality, location of brown sites); Canada Centre for Remote Sensing (e.g. satellite and radar imagery); Industry Canada (e.g. corporate registry); Canada Revenue Agency (e.g. Charities dbase); National Research Council (e.g. Scientific data); SSHRC (e.g., social science research data) and more. These data have already been paid for by Canadians via taxation, and the cost of selling these data back to citizens on a cost recovery basis is marginal or more expensive (e.g. Cost of government to government procurement, management of licences, royalties, government accounting and etc.) relative to the benefits & reduced overhead of delivering these data at no cost. Furthermore, Canadians often pay multiple times for the same data, since each level of government also purchases the same data, federal departments purchase these data from each other and there are examples where municipalities purchase the same data multiple times from Statistics Canada. This is not only a waste of taxpayer money it goes against the principle of create once and use many times and of avoiding the duplication of effort.

Data & PSI are non-rivalrous goods where sharing and open access to these does not impede other from doing so. Open access stimulates research and IT sectors who will have the resources they need for the creation of new data R&D products (e.g. Applications) and services (e.g., web mapping), evidence based decision making (e.g. Population health), and informing public policy on a number of key Canadian issues (e.g. Homelessness, housing, education). In addition, evidence from Canadian City Open Data Initiatives (e.g., Vancouver, Edmonton, Toronto, and Ottawa) have demonstrated that the cost and time to find and access data & PSI within government have been greatly reduced since finding these are easier and negotiating access becomes a non-issue, which in turn brings savings to citizens and greater efficiencies within these institutions. Next, participatory and deliberative democracies include the active engagement and inputs from citizens, civil society organizations, the private sector, and NGOs along with their government. Making these data available increases the collective knowledge base of Canadians and stimulates public engagement, improves efficiencies, and fuels innovation. Finally, ensuring the openness of government data enables both citizens and other governmental departments to remain aware of what data exists, and can prevent the duplication of data sets inter-governmentally.

These are already our (citizen's) data & PSI, why not share them with us and enable citizens and the government to work together to stimulate Canada's economy, create innovative industries and formulate evidence based public policy.

4.10 ICT literacy

While great emphasis is placed on the ability to access information, it is also important that Canadians will have the skills not only access to information, but being able to navigate and interpret this information, too! It is of foremost importance that the principle of digital inclusivity is build around burgeoning content? While we see a shift in norms around web accessibility, Canada needs to

remain on the forefront of these developments—namely finding new ways to encourage web accessibility mandates for the private sector. We also need to ensure that students are acquiring the required skills to utilize digital content in the knowledge-based economy. A more positive step would be a movement towards more digital classrooms and new pedagogies which make use of digital content and encourage digital innovation. Canada must also ensure that digital content is available more widely in both in French, as well as in English.

5 Building digital skills

5.1 What do you see as the most critical challenges in skills development for a digital economy?

In a digital economy, technology is ubiquitous and in a constant state of change. The most critical challenge is ensuring continuous and flexible access to skills development and training, not just for the labour market but for citizens as a whole who need these skills to participate in the social, political and economic life of the 21st century.

5.2 What is the best way to address these challenges?

These challenges can best be addressed with a three-point approach:

5.2.1 Accessibility

As other parts of this submission have already pointed out, access to new communications tools should be considered a public good. Access to "effective" bandwidth that supports a wide range of communications applications should be a legal right for all Canadians.

5.2.2 Continuity

Learning and training in the digital world will be a lifelong challenge for citizens and governments need to be proactive by establishing an enabling policy environment. There is a persistant shortage, for example, both in the formal and informal learning environments, of instructional assistants in the area of digital skills. Programs such as Industry Canada's Community Access Program Youth Initiative (CAP-YI), which receives funding from Human Resources and Social Development Canada (HRSDC), meet this challenge and should be supported and expanded. This program annually hires youth between the ages of 15 to 30 to help meet the skills needs of users of public community access sites. Both the summer work experience stream and the career focus stream provide valuable work experience to interns and valuable learning experiences to clients of these sites.

Such programs, offered in conjunction with various levels of government, could also serve the more formal learning environment (elementary, secondary, post-secondary) in meeting its needs for assistance in this area.

5.2.3 Flexibility

Although the formal education system is expected to produce graduates who have the skills to fill the jobs available, we cannot know precisely what skills will be required in future jobs. In part this is because opinions are mixed as to the nature of the future workplace, with potentially more virtual and shorter-lived organizations, as Grantham (2000), in *The Future of Work*, suggests. By contrast, Arnott (2000), in *Corporate Cults* sees organizations as becoming increasingly integrated into people's lives, making them more dependent. Regardless of the specifics, technology will change rapidly and there is a general agreement that internet access will be increasingly pervasive and the means of accessing it will become ever more integrated and mobile. Education needs to become more flexible at all levels to prepare students for such an uncertain future. The current variability in the way schools integrate technology into k-12 education, and to a slightly lesser extent, post-secondary education needs to be addressed, with clearer standards and ongoing professional development for teachers to allow them to keep up with changes in technology and research on how these changes may be effectively reflected in curricula.

5.3 What can we do to ensure that labour market entrants have digital skills?

Discussions at the recent Canada 3.0 conference pointed out that an affordable and accessible infrastructure is the base for further development of digital skills. Just as important is the recognition that these skills will need to be addressed at many different levels to serve many different clients -- including citizens, consumers, producers, and learners. Organizations and institutions providing access, learning and training in use of new technologies need to be supported by all levels of government. Some of the most effective work in this area is done at the local level where needs can be assessed and programs to meet them can be delivered in a timely and cost effective fashion.

As always, ensuring that a correct balance is maintained with respect to gender and cultural participation in these programs must continue to be a goal.

5.4 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?

Constant upgrading, both in the workforce and the general population, will be an ongoing challenge of a digital skills agenda. There should be incentives to business for investing in human capital and to individuals for skills development. Such incentives could include tax breaks to employers who provide skills upgrading sabbaticals and tuition rebates to workers for continuing education courses. Practices in other countries provide models.

5.5 How will the digital economy impact the learning system in Canada? How we teach? How we learn?

As we move forward in an on-line society, making correct and responsible use of the technology needs to be prioritized over simply using technology. There will be an on-going responsibility in formal educational institutions to provide a basic level of existing digital skills. Collaboration, problem solving, learning how to learn in new contexts will be as important as specific technological competencies and probably more portable. Skills related to effective use and management of information will be key. Constant reassessment and adjustment to accommodate emerging technologies will also be necessary.

- The government should continue to work with international bodies such as the OECD on international standards for technological competencies – not just computer skills, but also information use and management skills
- As new social and educational practices using technology as intermediary evolve, there is a need for research on using these tools in the educational and social context. Social networking is one of the newest additions to the digital toolkit, but it is too early to predict where it will eventually fit in the teaching/learning spectrum
- The federal government, as part of its innovation agenda, should support research programs studying the effective use of new technologies in formal and informal educational contexts
- Explicit focus on internet safety is required as part of the emerging area of media literacy for young people. Issues such as cyberbullying; protecting children from online predators and privacy on social networks need to be addressed as part of primary and secondary public education curricula. The next generation of Canadians should not only be skilled in the use of ICTs and digital media, but should be empowered to fully evaluate the opportunities and risks related to their use and make smart, long-term personal decisions about how they share themselves with the world in perpetuity
- Digital media literacy should be a cross-curricular program.

5.6 What strategies could be employed to address the digital divide?

In March 2006, the Final Report of the federally appointed Telecommunications Policy Review Panel (2006) acknowledged that "physical access to ICTs at the community level, together with improved broadband network connectivity, is a prime means for spreading the social and economic benefits of information technology." It also quoted a submission from researchers from the Canadian Research Alliance for Community Innovation and Networking (CRACIN) "that community networks and other community-based organizations provide both technological and social infrastructures for ICT access, adoption and use. Community networks also act as important sources of local economic development and innovation. Through training programs, for example, they help ensure that all

Canadians, particularly those most at risk of being left behind, have the necessary skills to participate in the networked economy." (Chapter 7, p.7-43).

This is a powerful acknowledgment that programs such as the current Community Access Program (CAP), which daily helps thousands of Canadians acquire the skills needed to participate fully in an on-line society, have a current and future role in ensuring that no citizen is left behind. It should be recognized and supported as an essential component of a digital skills agenda.

Canada currently has a national network of 3,500 community technology centers that help more than 100,000 people per day (Telecom Policy Review Panel, 2006. c. 8) to incorporate new technologies into their lives. These sites and their young facilitators, along with a legion of volunteers, provide job search and software training, technology literacy programs, access to community services, and cultural integration opportunities. They partner with the local private and public sector to provide services and experienced personnel in many different areas – from film editing to website building. Along the way, thousands of youth gain valuable job experience and thousands of Canadians, including First Nations people in remote villages, immigrants in inner cities, youth, seniors, economically disadvantaged, and physically challenged citizens learn to use the new technologies to their advantage. Both internal and external evaluators have agreed that this very cost-effective program has been a success story for years (Ekos, 2004). This network must not be allowed to collapse in the current policy vacuum. Support for existing centres needs to be expanded and a program to restart funding for new centres needs to be established.

This investment will boost the local economy by encouraging the uses of technology for community development and by offering collaborative tools that promote the effectiveness of the community sector. With so many communities in distress due to major job losses, these programs provide essential support in this economic downturn.

5.7 Other: Government as a model use

The government itself must become a model user of new technologies, converting to on-line systems and integrating them where privacy policies allow such integration.

Government departments must also co-ordinate activities more closely and communicate more effectively where their responsibilities overlap. Industry Canada and Human Resources and Social Development Canada (HRSDC), for example, share responsibility for digital skills programs. Any policies to address these issues on a national scale will require deep integration of their operations.

6 Other

Immediately following our Roundtable on June 14, the Standing Senate Committee on Transport and Communications (2010) announced its *Plan for a Digital Canada*

Of the 18 recommendations in the Standing Senate Committee's Report, the following are supportive of or relevant to the points raised in the Roundtable gathering that generated this Consultation document:

RECOMMENDATION 1	Canada should present a strategy for an inclusive digital society.
RECOMMENDATION 2	Canada should, in conjunction with the presentation of a strategy for an inclusive digital society, appoint a Minister for Digital Policy, who would take over the oversight of the strategy from the Minister of Industry.
RECOMMENDATION 3	The Minister of Industry in the Digital Strategy should not focus on any particular technology or speed for increased broadband coverage in Canada.
RECOMMENDATION 4	The Minister of Industry in the Digital Strategy should focus on the broadband speeds necessary to bring essential digital services to all citizens.
RECOMMENDATION 5	The government in its digital strategy should define universal as 100 per cent of its citizens.
RECOMMENDATION 6	The government should use all the proceeds from spectrum auctions to provide high-speed Internet (broadband) access for rural and remote areas.
RECOMMENDATION 12	The Minister for Digital Policy and other federal ministers should work with their provincial counterparts to develop a comprehensive digital literacy programs that can become an integral part of the education system.
RECOMMENDATION 14	The government should pursue open access policies with respect to telecommunications infrastructure as a means of sustaining or improving competition in the telecommunications sector.
RECOMMENDATION 15	The government should change the requirement for current spectrum licence holders to spend 2% of revenue on research and development and have the money redirected for the deployment of broadband to areas currently unserved.
RECOMMENDATION 16	Industry Canada, in establishing policies to allocate and price spectrum, promote wireless service in currently unserved or underserved areas.

The Standing Senate Committee on Transport and Communications worked for approximately a year, held twenty-two meetings to consult with a wide variety of stakeholders, and went on two international fact-finding missions. In contrast, the Roundtable participants responsible for this response to the Digital Economy Consultation met once, in addition to soliciting online submissions via an, interactive wiki, and brought together academics, lawyers, and experts from industry. The fact that the same kinds of issues and answers came independently from these two very different processes suggests, we believe, that the general concerns expressed in these documents about the digital future of Canada, are both widespread and significant.

The Standing Senate Committee on Transportation and Communications' recommendations can be sorted into two groups of direct relevance to the Digital Economy Consultation's key questions and categories.

6.1 Building a World-Class Digital Infrastructure

Infrastructure-building issues are discussed through our submission to the digital economy strategy consultation (sections 1.4; section 3- in particular 3.1; 3.3; 3.4; 3.10). Senate Standing Committee Recommendations three, four and five deal with the universality and ubiquity elements of the proposed Digital Strategy, and the pros and cons of having broadband speed targets. In their "Plan for a Digital Canada," the committee recommends that rather than focusing on particular technologies or setting static minimum speed levels, "The Minister of Industry in the Digital Strategy should focus on the broadband speeds necessary to bring essential digital services to all citizens" (Standing Senate Committee, 17).

Many other National Broadband Plans, such as the Australian National Broadband Network initiative and the FCC National Broadband Plan for the U.S., have chosen to define two kinds of speed targets, a high one for a majority of users and a significantly lower one for a universal (or ubiquitous) floor (e.g. 100 Mbps for 90% of the Australian population by 2018, 12 Mbps for the rest). Some have criticized this approach as continuing the existing Digital Divide between urban and rural areas.

The recommendations we make in this consultation response paper for our Canadian strategy do not echo the Senate report directly, but are in much the same spirit. Our recommendations include quantitative minimum standards of 1.5 Mbps immediately, and 5 Mbps by 2015 for (nearly) all Canadians at affordable rates (e.g. $20/mo) (See section 3.3). Similar to the Standing Senate Committee, we believe the adequacy of these potential standards must be measured against the speeds necessary to bring essential services to Canadians in every region as well as prevailing socio-economic conditions. We suggest that by instituting mandatory reviews of these standards at regular intervals, during which participation is solicited from a wide range of broadband providers and users across Canada, these targets can undergo ongoing revision in order to keep them current and relevant in the rapidly changing technological environment. This approach provides both a concrete, measurable target and an assurance that changing contexts and needs can

be accommodated within the policy structure. Further, like the Standing Senate Committee in its' fifth recommendation, we take universal access to mean providing this minimum standard of broadband service to 100% of Canadians.

A different facet of Digital Infrastructure is reflected in Recommendations 6 and 14 - 16, which deal with Spectrum Management practices, including open access (Rec. 14), the disposition of revenues from spectrum auctions (Rec. 6) and the mandated 2% research and development (R & D) expenditure (Rec. 15) for wireless carriers who hold spectrum licences. The AWS/PCS spectrum auction in 2008 brought in over 4 billion dollars; the Standing Senate Committee suggests in their recommendations that these revenues from the sale of spectrum should be redirected to supporting the deployment of broadband in unserved and under-served rural and remote areas. Any redirection of spectrum revenues which currently flow into the general revenues of the government of Canada will require a major change of policy by the Department of Finance since we do not have dedicated taxes in Canada, like the gasoline tax in the U.S. which is used to support the Highway Trust Fund. However, this remains an obvious source of funding for any future broadband initiatives that the federal government might choose to undertake, both to extend service to rural and remote areas as well as make it affordable for those who already have service locally available but who lack the financial means to subscribe. While the Roundtable group did not make a similar recommendation in regards to specific funding mechanisms for improvements to the broadband infrastructure, it is clear that the necessary upgrading and improvements necessary to ensure the affordable, universal and ubiquitous access that we recommend must be funded in a sustainable and substantial manner.

Through this submission was have returned to the importance of open access policies (sections 3.2; 3.9; 3.11; 4.1; 4.9). The Standing Senate Committee recommendation 14, regarding pursuing open access policies is well-aligned with the Roundtable group's recommendation for the adoption and promotion of open access practices and standards. The recommendation which seems slightly more contentious is Recommendation 15, which asks the government to change the requirement for spectrum licence holders to invest 2% of revenue on R & D. Spectrum licence holders dislike this requirement, and the impetus for this recommendation, according to the Senate Committee report, credits a Rogers representative with the suggestion that perhaps the money would be better spent on rural deployment. Given the emerging challenges we itemize in the second part of section three of this Consultation paper, and the clear need for significant research investment to ensure a secure, competitive and responsive infrastructure capable of accommodating the "internet of things" while maintaining attention to key privacy values and human development issues, we would suggest that a balance needs to be struck between rural deployment and ongoing carrier-financed research to fuel industry innovation. Furthermore, given that increasing levels of R & D and technology innovation are seen as central challenges in the "Improving Canada's Digital Advantage" document, this recommendation seems unlikely to find wide support.

6.2 Building Digital Skills for Tomorrow

Recommendation 12, which addresses digital literacy education, is relevant to the "Building Digital Skills for Tomorrow" stream of the Digital Economy Strategy consultation. This recommendation is in keeping with our Roundtable group recommendations regarding the need for accessible, continuous, and flexible learning in a digital society. We would like to suggest, however, that although coordination between federal and provincial governments to ensure formal educational progress on digital literacy is essential, it is merely a start. As we note in Section 5 of this consultation response, true digital literacy must be promoted both within formal educational systems and in community anchor institutions such as technology centres, libraries, and community centres, and must be predicated on affordable and universal access to the necessary technological infrastructures.

6.3 Conclusion: Strategies for Sustainable Prosperity

Perhaps the key contribution of the Standing Senate Committee "Plan for a Digital Canada" to this Consultation on the Digital Economy is not in its recommendations, but in its recognition of the true scope of the need for policy, planning and citizen participation in the digital society. Its first and second recommendations, which call for a comprehensive strategy for a digital society, and a dedicated Minister of Digital Policy to oversee the coordination necessary across multiple Ministries and areas of government, speak directly to this larger vision. As the Senate report warns, although there are a number of important policy initiatives currently underway, Canada has a long way to go to develop a truly inclusive and extensive digital society. Canadians, they argue, are "still digital tourists as opposed to fully functioning citizens in a digital society" (Standing Senate Committee, p. 15). As we too argue at the beginning of this Consultation response, Canada, and Canadians, need to take a broad perspective of the Digital Economy as a key element in a well integrated and inclusive Digital Society. Canadians can't be tourists, just passing through—we have to find a way to live in and shape the Digital Society of today and tomorrow, productively, sustainably, and safely. We sincerely hope this consultation on a Digital Economy Strategy for Canadians ultimately helps to work towards that goal.

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"Weaving the Web", 2009 - Travis Meinolf, Ele Carpenter, after Paul Grimmer; selection from the Open Source Embroidery exhibit and sourced under Creative Commons from: http://www.flickr.com/photos/jeremybrooks/4267648329/

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