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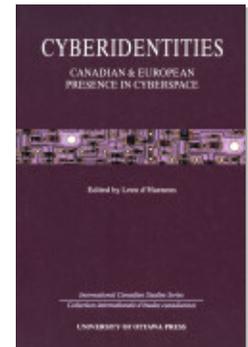
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# **ADVANCING CANADA'S INFORMATION HIGHWAY: STRATEGIES FOR THE NEW MILLENNIUM**

by David JOHNSTON and Natasha H. FARAQUI

In the 1994 Speech from the Throne, the Government of Canada announced it would develop a Canadian strategy to address the challenges of the Information Highway. Later that year Industry Minister, John Manley, established the Information Highway Advisory Council (IHAC), a 29-member body drawn from private industry, the cultural community and consumer groups, to provide advice on major issues related to that strategy. The Council was guided by three key objectives:

- creating jobs through innovation and investment;
- reinforcing Canadian sovereignty and cultural identity;
- ensuring access at reasonable cost.

At the conclusion of its mandate in September 1997, the Council released its final report, *Preparing Canada for a Digital World*, describing the road to the future. This paper outlines the work of the Information Highway Advisory Council and its vision for the knowledge-based society.

## **I THE PROMISE OF A KNOWLEDGE SOCIETY**

The Information Highway has profoundly challenged the dynamics of modern society. At the dawn of the new millennium, Canada and the world are in a state of transition. More and more we are moving away from the industrial society that prevailed over most of the 20th century, towards a society in which the management of *information* and *knowledge* has become the key strategic resource that determines the competitiveness of firms and nations.

For the moment the knowledge society is only a vision flowing from the potential opportunities brought by information and communication technologies. There is no doubt, however, that we are rapidly approaching a world where the creation, manipulation, and sharing of information is to become an overriding human imperative. In the knowledge society, distance will no longer pose an obstacle to economic development, social intercourse, learning, business, or participation in society. Information will become increasingly available to everyone and people will be creators – and not simply consumers – of knowledge and content. The results will depend on people who employ their passion, ingenuity, and imagination to shape the development of this society. The potential is limitless but the challenge is real and it is important that Canada respond wisely to issues and challenges that will:

- create a favourable environment for infrastructure development;
- establish strategies for economic growth;
- address the social and cultural dynamics of this new environment.

In its final report, the Information Highway Advisory Council identified four imperatives they believe must shape information policy in Canada. These imperatives include an economic development strategy, a content strategy, an access policy, and a leadership responsibility. Together these imperatives provide the framework needed to build the knowledge society and support the information economy.

## II THE ECONOMIC IMPERATIVE

### 2.1 Infrastructure development

Just as railroads, highways and airports formed the infrastructure of the industrial society, communication and computer networks form the infrastructure of the knowledge society. The difference between the two is profound. The transportation infrastructure of the industrial society carried people and goods from one place to another. In the knowledge society infrastructure will carry the less-tangible products of the digital age – information, knowledge, and intelligence.

Information technology is the enabling infrastructure of the knowledge society. As such, the future competitiveness of Canadian industry at home and overseas increasingly depends on the availability of high-quality information networks and services in all parts of Canada. The Council believes that the private sector must take the lead in constructing the Information Highway, while government has the responsibility to ensure an attractive policy and regulatory environment for investment. The Council outlined five essential principles of infrastructure development that will strengthen the information infrastructure and allow Canadians to prosper in a global marketplace.

#### *An open, competitive regulatory environment*

Only a competitive environment determined by market conditions will drive companies to make necessary investments in infrastructure. This means creating favourable regulatory conditions that encourage private sector investment in innovation. Furthermore, regulations are needed to ensure an open market and the removal of unnecessary barriers to competition.

#### *Technological neutrality*

In an environment characterized by converging technologies and markets across the communications and information sector, it is critical that market forces determine what technology is appropriate for the provision of a particular service. However, the policy and regulatory regime cannot favour one technology over another and, to this end, must remain “technology neutral.”

*Open standards*

The true potential of the Information Highway is realized when the infrastructure is interconnected and interoperable, where access to one network means access to all. The development of an interconnected and interoperable network of networks requires the universal adoption of an international open standards policy.

*Research and development*

The quality of Canada's Information Highway depends on Canada's collective capacity for innovation. The phenomenal growth in computer networking and the Internet has resulted in a need to concentrate research resources on advanced networking and broadband technologies such as Asymmetrical Digital Subscriber Loops (ADSL), cable modems, and Integrated Service Digital Networks (ISDN). Creating a favourable environment for private sector research is essential; however, it is also equally necessary to ensure that public and private research efforts complement and reinforce each other.

*Strategic investments*

Though the private sector will take the primary role in building the information infrastructure development, government can play a catalytic role through strategic investments that enable public institutions to take advantage of the Information Highway. Future government infrastructure programs need to target investments where the private sector is unlikely to generate sufficient funds. Specific areas include: education, health, research, and community development.

**2.2 Economic development**

While much emphasis has been focused on infrastructure development, infrastructure alone is not enough to build the knowledge society. The Council firmly believes that *content, applications and services* are the lifeblood of the information economy and a major source of jobs and economic growth. Thus, building infrastructure includes strategies to encourage new information highway-based products and services for a global economy. A key element of such a strategy includes the creation of a policy environment that promotes electronic commerce and economic activity on the Internet.

*The Internet and electronic commerce*

The Internet has emerged as the central component in the evolution of the Information Highway. Its broad scope, adaptability, and versatility are creating dramatic opportunities for individuals, the economy, and society as a whole. Through the Internet, people have access to many new forms of information and entertainment. The technology also holds the promise of enabling major extensions and improvements in education, health and other public services. As a result, the Internet can significantly contribute to economic growth and job creation.

The Internet is also a powerful and useful tool from which to expand world-wide trade and has the potential to become the driving force behind electronic commerce. Its large market base and the relatively inexpensive cost to transfer huge amounts of data make

the Internet an attractive alternative. One cannot tell how the Internet will evolve to generate new markets, goods and services, however.

A number of difficulties prevent firms and consumers from capitalizing on opportunities vested in the Internet as a platform for electronic commerce; this includes security and privacy; consumer protection; authentication and secure modes of payment; and telecommunication tariffs and regulations. These have been major impediments to the rapid development of an electronic marketplace. The Council believes that addressing and overcoming these issues will help ensure the expansion of electronic commerce and realize the potential of the Internet as a venue for broad-based economic activity.

### **2.3 Sectoral strategies**

The Council believes that sectoral areas such as health, education and small business represent significant opportunities for the development of content, applications and services. In each of these sectors the potential benefits of the Information Highway are considerable, and the Council emphasized creating the right environment for these sectors to realize their potential.

#### *Small business enterprises*

Small- and medium-sized business enterprises (SMEs) have a dynamic and growing presence in the Canadian economy. The increasing use of information technology is changing the way small business adapts to new markets and commercial opportunities.

The Internet as a means of conducting electronic commerce promises a range of economic benefits to SMEs. Internet technology allows small business as to do new things and organize themselves in different ways. Personal networking can now span a much larger geographic area, making new forms of collaboration possible. Better communication and more timely, precise information represent significant cost-savings to SMEs. Business-to-business on-line commerce is also growing, and will likely allow SMEs to eliminate 90 percent of their transactional operations.

Small businesses are moving rapidly to gain access to the Internet. According to the Canadian Federation of Independent Business (CIFB), 50 percent of SMEs with 50 or more employees used the Internet as of April 1997. These figures are expected to double by next year.

Helping business to use the Internet fully will foster a sophisticated electronic commerce sector in Canada and will help firms expand their capacity to participate on the global stage. This, in turn, will also contribute to domestic economic growth and job creation.

#### *Health*

Information technology can transform the health system by providing higher quality care in a cost-effective manner while creating new jobs, markets, products, and services. A

commercial tele-health industry is already emerging in Canada. Meanwhile, global demand is growing for products and services that companies can provide.

Critical to the achievement of these benefits will be the development of a national, integrated, health information network. In *Towards a Canadian Health I-way: Vision, Opportunities and Future Steps*, released in late 1996, Health Canada explored this opportunity and called for specific measures to develop a strategy. Parallel with this effort, Industry Canada is completing a Sector Competitiveness Framework for the tele-health industry. Preliminary work suggests the industry faces significant challenges because of the small Canadian market, strong foreign competition, and a lack of skilled individuals. Yet opportunities also exist. New professional disciplines are emerging in the areas of tele-nursing and health information. Meanwhile, international markets for Canadian expertise are opening up.

To seize these opportunities Canada needs a framework that encourages growth in the health industries, with particular reference to software, information systems, and "intelligent" equipment. Moreover, the growth of these industries depends on wiring health institutions such as hospitals, medical laboratories, research labs, and community clinics.

#### *Technology-assisted learning*

From the outset, the Council stressed the importance of lifelong learning as a precondition for developing the human resources needed in the knowledge society, and as a way of ensuring that Canadians qualify for the jobs available in that society. The deployment of technology-assisted learning therefore represents a real commercial opportunity for Canada. The challenge for this new learning industry resides in effectively combining content, hardware, and human talent to create business opportunities and jobs. By defining pedagogical outcomes to include Information Highway technologies, and by converting learning materials into a digital format, Canada can develop new products capable of exploiting the full potential of the technology.

Multimedia technologies are becoming the primary platform for technology-assisted learning. It is expected that the global market for multimedia products will grow 25 percent a year. Both in Canada and abroad, changing skills and knowledge requirements in the private sector are producing a growing corporate market for technology-assisted learning materials and content resources.

There is a real opportunity to develop a multimedia learning industry by taking advantage of the emerging domestic and global training markets. Given the enormous commercial potential of multimedia, the Council encouraged expertise in this area.

## **2.4 The workplace and human resource development**

The way we think of work has changed significantly in the past decade. Canadians now anticipate three or four different careers in their working lives; each position requires increasingly diverse skills; and part-time work, tele-work, contract work, and self-employment are becoming more prevalent. These changes to the workplace require constant learning and adapting. In the knowledge society, learning is no longer limited to formal education, but is a lifelong process. As such, the Council recommended that Canada modernize its labour standards legislation in a way that adequately reflects the changing workplace and new forms of employment. Changes to the labour market and to the nature of work are also creating a pressing need to adequately identify required skills with the anticipated sources of work. The Council strongly urged the government to research the impact of information technology on employment trends, emphasizing that Canada must match skills – especially skills in computer literacy and numeracy – with the labour market realities of the knowledge society.

Helping Canadians secure employment in the new economy also requires the availability of new learning and training opportunities. With advances in technology and computer networking, the effective use of information and communication technologies are essential to support lifelong learning. The Council advised the government to establish a consultation mechanism to resolve policy issues relating to technology and learning.

### **III THE CONTENT IMPERATIVE**

#### **3.1 Shifting environment for content**

Reinforcing Canadian sovereignty and protecting Canada's cultural identity has been a major public policy mandate. Historically, this mandate has included efforts to foster an environment where Canadian cultural expression can be appreciated and preserved. This includes:

- building and sharing common values and experiences among Canadians through cultural expression (television, film, music, books, arts);
- facilitating improved access and support to creators, cultural organizations, industries, and institutions (tax incentives, subsidies, and regulation);
- creating a presence for cultural and linguistic diversity of content by providing Canadian voices and Canadian choices.

Information technology has transformed the meaning of content. There are now new ways to create, produce, market and distribute content; content is being integrated with various types of media formats such as the Internet and multimedia; and the cultural sector is converging with non-cultural industries. New Media is a synthesis of this change. It includes things like the digitization of paintings and books, video on demand, Internet radio, on-line interactive services, and multimedia CD ROMs. The Internet has a special relationship with New Media content. It works well as an extension of

traditional media while allowing millions of people worldwide to share information and communicate.

This shifting environment for content is currently challenging traditional approaches to domestic cultural policy and is forcing Canadian cultural industries into a state of transition. The conventional definitions of "culture" (i.e., film, publishing, recording, performing and visual arts) are being radically redefined by the surge of new cultural activities in New Media. These new activities are blurring the distinctions between "broadcasting" and "telecommunications" and creating a dilemma for Canadian cultural policy initiatives.

### 3.2 Content development strategy

The Council strongly advised the government to develop a stronger, broader, and more integrated Canadian content strategy that not only expands the scope of Canadian cultural policy to encompass new forms of content, but also addresses the plight of traditional media in Canada. As a framework for developing an effective and useful strategy, the Council outlined the following components.

#### *Strong creative base*

As production of digital content develops technical sophistication, success depends increasingly on a marriage of creative talent and technical skills. This relationship depends on encouraging content disciplines such as computer graphics, animation, multimedia, and Internet software design. In addition, artists and creators need to work with content providers to develop new production techniques and new forms of content. Artists and technical experts involved with new media content have the potential to transform cultural communication. The Council regards new media as a true opportunity for collaboration between the technical and artistic/cultural communities.

#### *Access to capital*

Industry studies reveal that inadequate access to capital substantially restricts a sector's growth potential. If cultural dialogue is to be strengthened, strategies are needed to continue committing public resources through tax incentives, public agencies, as well as direct assistance to private industry. The multimedia industry represents an important growth opportunity. The Council recommended that a Cdn\$50 million Canadian multimedia fund be established to support the development, distribution and marketing of Canadian cultural and educational products.

#### *Access to content*

Reaching Canadians means ensuring they have access to meaningful content. Traditionally, funding has been focused on the creation and production of content. The Council believes that, despite a range of existing initiatives, marketing and distribution of content has not received adequate emphasis. The Council recommended that funding support not only the production of content but also its effective distribution and marketing.

*Export development strategy*

All types of Canadian content production will benefit from efforts to expand into foreign markets. The multimedia industry has the potential to become an important source of export revenue. The Council feels it would be beneficial to undertake specific export development initiatives. Under such an initiative, producers of Canadian content in existing and new media would receive increased assistance through existing federal export marketing programs. This would include improved access to market information, inclusion in Team Canada missions, and assistance through Canada's trade development offices and programs.

*French-language content*

The Information Highway is overwhelmingly an English-language phenomenon, dominated by American content. Though French is the second most important language on the Internet, French-language content represents an estimated three percent of all Internet content. Francophones share with all Canadians the problems of creating indigenous content for a relatively small domestic population. That challenge is greater for a language group that is comparatively small in global terms. In light of these circumstances, the Council urged special measures to strengthen the French language presence, including allocating resources to French language content and helping francophone communities gain access to the Internet.

**IV THE ACCESS IMPERATIVE**

Access to the Information Highway is critical to Canada's future as a knowledge society and to our success in the information economy. As the economy becomes more dependent on information, Canadians will increasingly rely on the enabling effects of the Information Highway to succeed economically and remain competitive.

As the Information Highway becomes more pervasive and significant in the economic, social and cultural life of Canadians, so will the scope and complexity of access issues. The Council called for the development of a national access strategy that would address three requirements of public policy:

- ensure affordable access to basic telecommunications and broadcasting services;
- promote access to Information Highway services and networks such as the Internet;
- establish a formal mechanism for defining access and universality.

*Access to basic networks*

Canada has led the world in providing access to broadcasting services and basic telecommunication services such as telephone. These basic services are also important to Canadians as platforms for access to the Internet. Canada has already achieved universal access to core telecommunication services and has safeguards in place to ensure that Canadians maintain access to these services in a competitive environment. New technologies such as direct-to-home satellites and Local Multipoint Communications (LMCs) are also emerging to provide additional avenues for the distribution of

programming and network services. These steps will benefit consumers with increased choice, affordable rates, and better quality service.

#### *Access to the Internet*

The Internet is likely to provide many of the electronic information services that people will want to access. The Internet has the potential to provide significant social, economic and cultural benefits, and is an important avenue for citizen participation. Accordingly, the Council recommended that Canada promote access to the Internet through community networks and electronic public spaces. The Council also supports initiatives for sustainable access to the Internet in all schools and libraries. For rural and remote areas, the Internet is increasingly recognized as a key instrument for economic and social development; however, there is considerable evidence that problems with affordable Internet access will emerge with growing frequency, particularly in areas such as the far North. The Council believes it is imperative that Canada focus its access policies on the Internet and take the steps necessary to accelerate access in all regions of the country.

#### *Definition of essential services*

As the Internet begins to provide many of the basic services to which Canadians should be assured access, it is important to consider a process for determining what those basic services might be. Telecommunications policy and regulations have typically addressed the issues of access and universality in terms of network access: broadcast policy and regulations have usually viewed access in relation to broadcast signals and programming services. Neither model is adequate in the new environment. Markets and technologies are evolving rapidly and new approaches are needed to meet critical social, economic and cultural needs.

The Council firmly believes in the need to focus on access issues for the successful transformation, both socially and economically from an industrial to a knowledge society. Access to Information Highway services will become crucial to full participation and, indeed, the exercise of democratic citizenship in a knowledge society. Decisions on what Information Highway services should be considered essential will have far-reaching social, economic and cultural ramifications, and need to be informed by the viewpoints of industry and the community at large.

## **V THE LEADERSHIP IMPERATIVE**

### **5.1 Government as a model user**

The Council believes that government has a responsibility to take the lead role in developing the knowledge society by positioning itself as a model user of communications and information technology. In doing so, the government would serve as a catalyst in the development and innovative use of the Information Highway, while helping itself to perform more effectively. The ensuing gains in accessibility, responsiveness and affordability are substantial; nevertheless, the key advantage lies in the continued relevance and legitimacy of government in this new environment.

Two important areas where government might use information technology to improve services to the public are committing to electronic commerce as the preferred mode of business, and promoting electronic access to government services. Some ongoing initiatives to accelerate this process include:

- TBS decision to use electronic commerce as the preferred means for government to conduct its business by 1998;
- the Electronic Commerce Secretariat at Justice Canada to determine impediments to electronic filing as a basis for developing legislative options by the year 2000;
- the federal government's electronic authorization and authentication policy. This includes the Public Key Infrastructure (PKI) initiative to support privacy, integrity, and authentication issues by late 1998;
- Industry Canada's *Strategis* Internet site, which allows Canadian business to access and explore 20,000 electronic documents containing strategic business information;
- Industry Canada's SchoolNet and the Community Access Program (CAP), both working to improve Internet availability through public access sites.

The Council feels that it is not enough for the federal government to pursue these initiatives on its own. All governments of Canada (federal, provincial/territorial, and municipal) need to coordinate their activities to provide Canadians with seamless access to single electronic windows on government in Canada. Though most federal Internet sites have direct links to provincial sites, Canadians are still far from having a single window from which to access all levels of government. The closest approximation is the InterGov site, which provides a catalogue of on-line services provided by the federal government and participating provincial/territorial and municipal governments. The Council stressed that government leadership is a necessary and vital objective for promoting and encouraging the benefits of the knowledge society.

## VI MEETING THE CHALLENGE

### 6.1 The road ahead

Canada has made enormous progress in building the Information Highway in the last decade. While much has been accomplished, more work remains before the full promise of the knowledge society is realized. For the last four years, the Council served as a catalyst for Information Highway initiatives. At the close of its mandate the Council outlined specific areas it felt would require further attention including initiatives in:

- **advanced networks** – infrastructure and applications development encouraging private and public sector partnerships to further the roll-out of advanced networking and related applications development;
- **standards** – promoting the development, diffusion, and adoption of standards for open networks and connectivity and continuously charting the “Standards Roadmap for the Information Highway”;

- **performance indicators** – defining and measuring the key economic and social indicators of Canada's progress as an information society, and providing for appropriate benchmarking against international developments;
- **electronic commerce** – realizing the economic benefit of a digital marketplace and establishing a policy framework where electronic commerce can flourish on public networks such as the Internet;
- **lifelong learning** – providing a forum for governments, educators, and the technology community to consider issues where resolutions are necessary to making lifelong learning “a key design element in the Information Highway.”

Governments, industry, community groups, and individual Canadians all have a role in making the knowledge society a place that reflects Canadian goals, aspirations, and values. The future is full of opportunities. The innate potential of technology, prudent government action and the unique skills and resources of Canadians, will ensure our successful transition to a knowledge society. The Council's work aims at moving Canada with greater speed and focus in this direction.

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