

The Network Economy: Moving Information without Moving People

Intelligent Waterloo Conference
“Intelligent Communities and Broadband:
An Alternative to Energy Consumption”
Waterloo, Ontario
October 25, 2007

<http://sitt.ic.gc.ca>

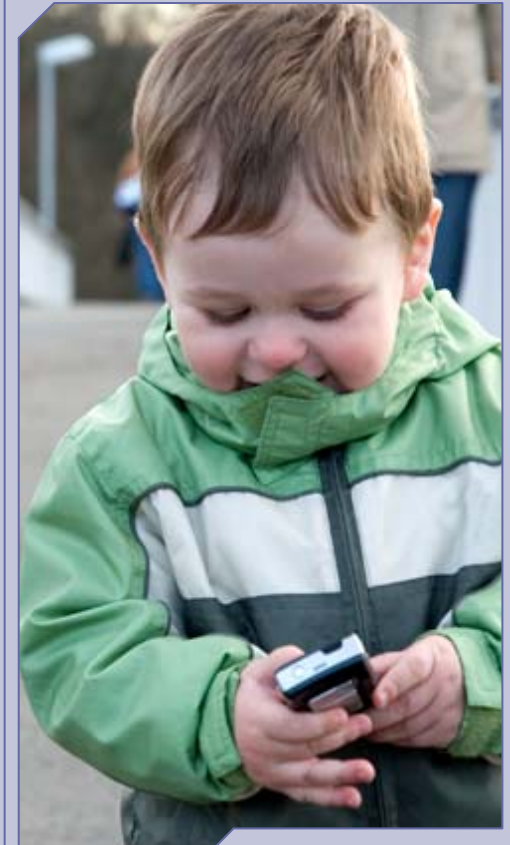
A background image showing a close-up of a microchip on the left and a CD-ROM on the right, both rendered in a light blue, semi-transparent style against a dark blue background. The microchip has some faint markings, and the CD-ROM has its characteristic circular pattern.

Michael Binder
Assistant Deputy Minister
Spectrum, Information Technologies and Telecommunications

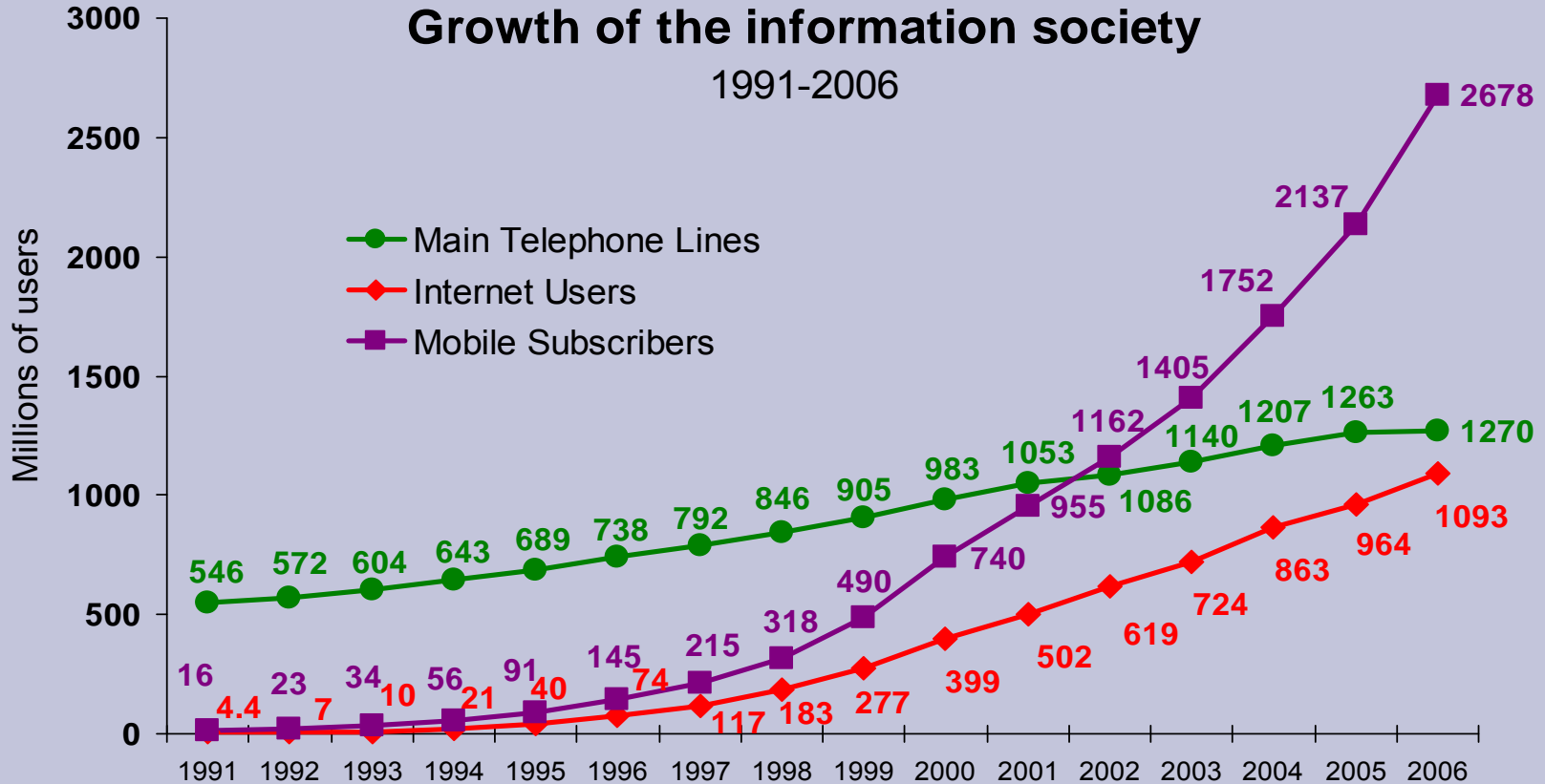
We are in the network economy

*"Over the past number of years, the **ground rules** of the global economy have changed. It has been an important and exciting time, with **advances** in **communications technology**, reduced trade barriers and declining transportation costs, which have changed the world."*

*The Honourable James M. Flaherty, Minister of Finance,
Foreword to Advantage Canada: Building a Strong Economy for Canadians,
November 23, 2006*



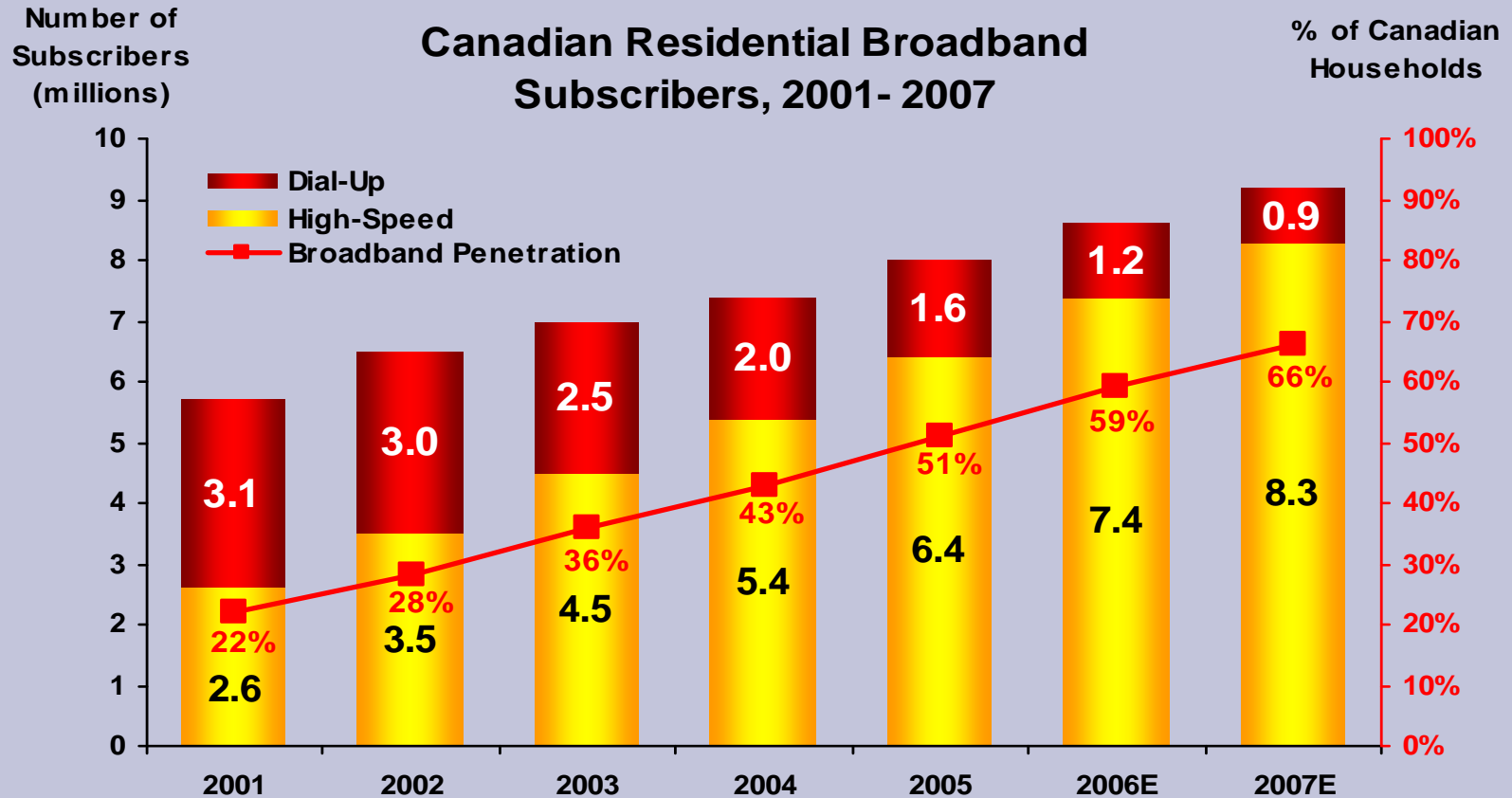
The World is going online



Source: ITU, 2006, Internet World Statistics, January 11, 2007

Notes: Internet Users data 1991-2005 (ITU), 2006 estimate (Internet World Statistics)

Canadians are no exception: Demanding high-speed

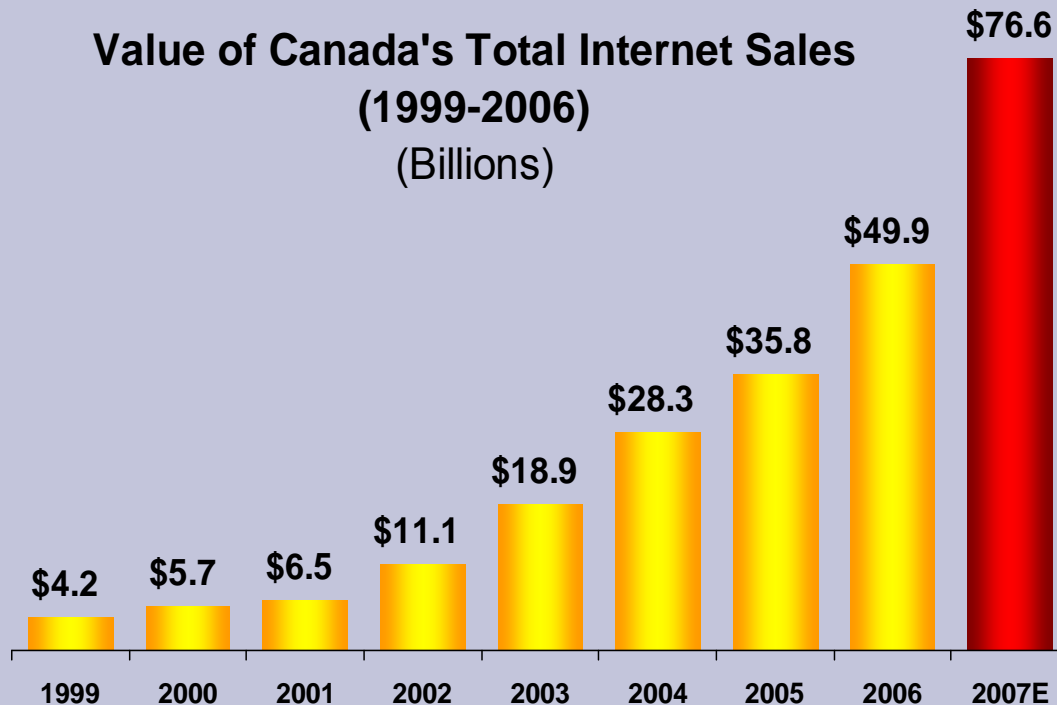


Source: CRTC, Telecommunications Monitoring Report (July 2006)

Note: 2006-07 projections based on IC calculations, assumptions: CAGR Dial-up -22.6%, Total Internet subscribers +7.5%, No. of households 12.55M

So they can shop...

**Value of Canada's Total Internet Sales
(1999-2006)**
(Billions)



Source: Survey of Electronic Commerce and Technology 2006, Daily, April 20, 2007, Statistics Canada

*Projections based on Industry Canada estimates, CAGR=42.4%

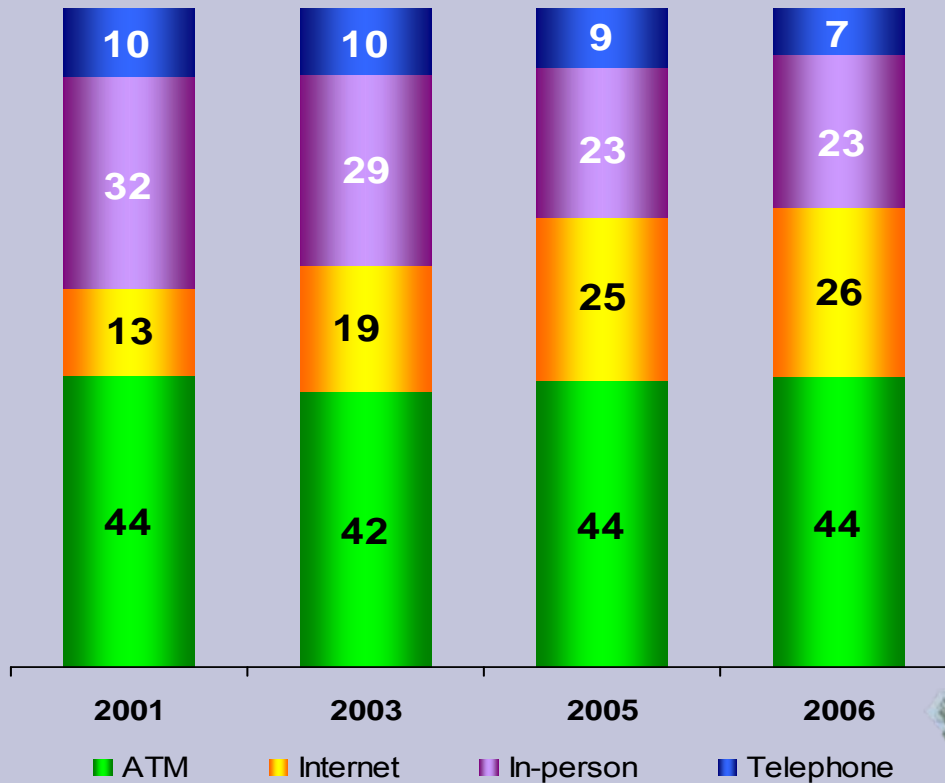
Internet sales in Canada are expected to grow to \$76.6 billion in 2007

In 2006:

- Online sales by private firms increased 42% to \$46.5 billion
- Online sales by the public sector increased 17% to \$3.4 billion
- More than one out of three retail firms with more than 100 employees conducted e-commerce sales

Bank...

Channels of banking
(% of all Canadians)



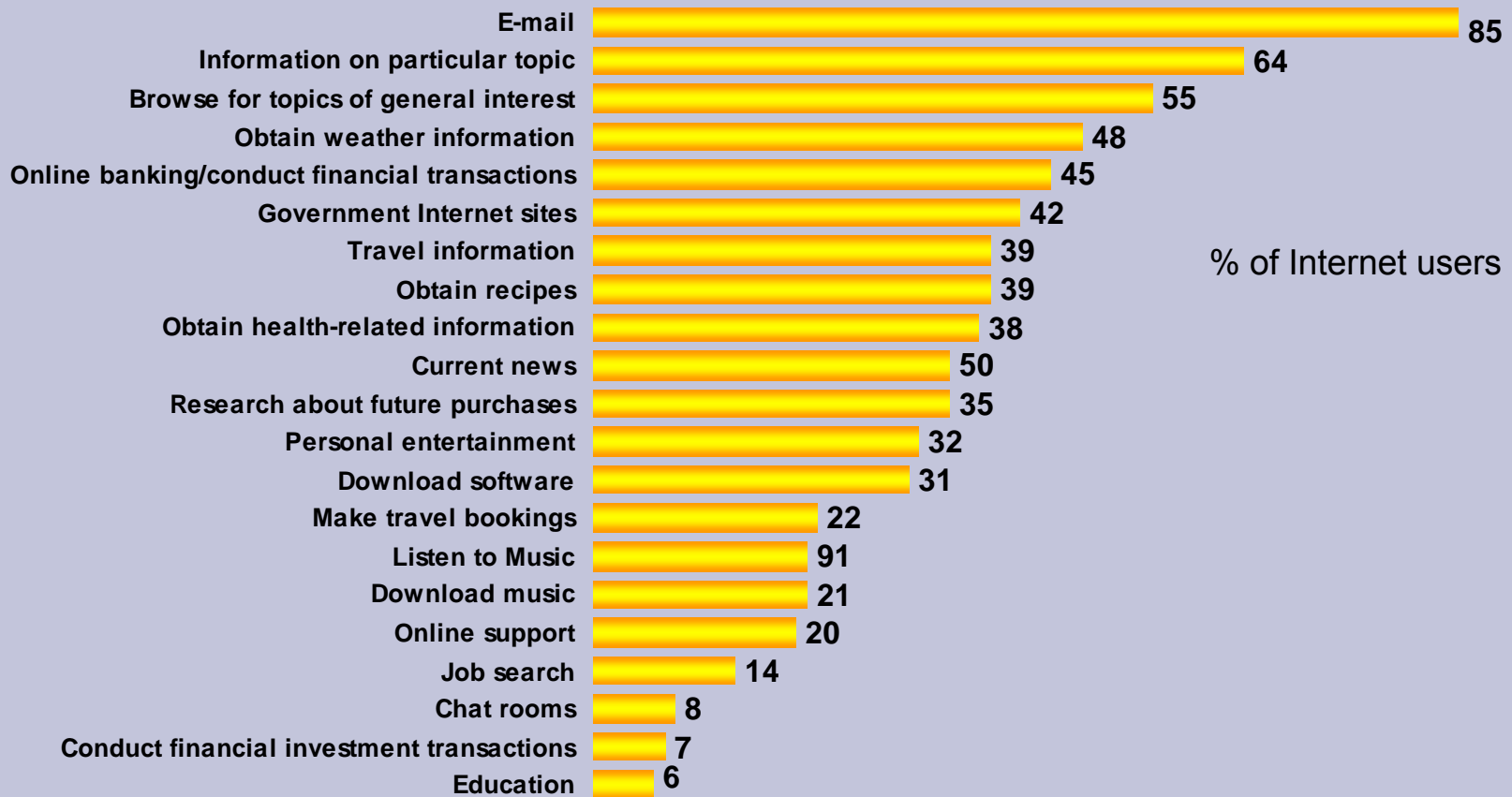
Source: EKOS 2006

In 2006, more Canadians banked online (26%) than bank with a teller (23%)
(Ekos 2006)



Seek news and information...

Top activities for online Canadians

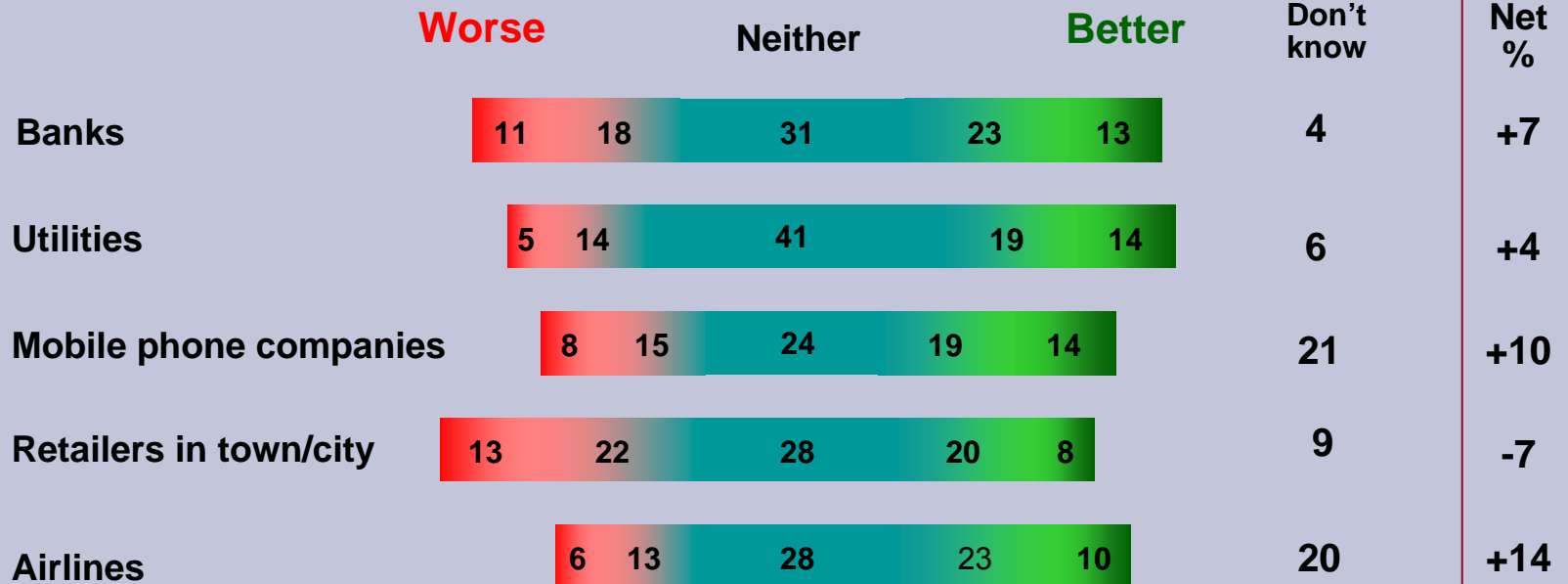


Source: AC Nielsen, Internet Planner Study 2006

And interact with government, all online

Canadians think Government provides better customer service than some key sectors

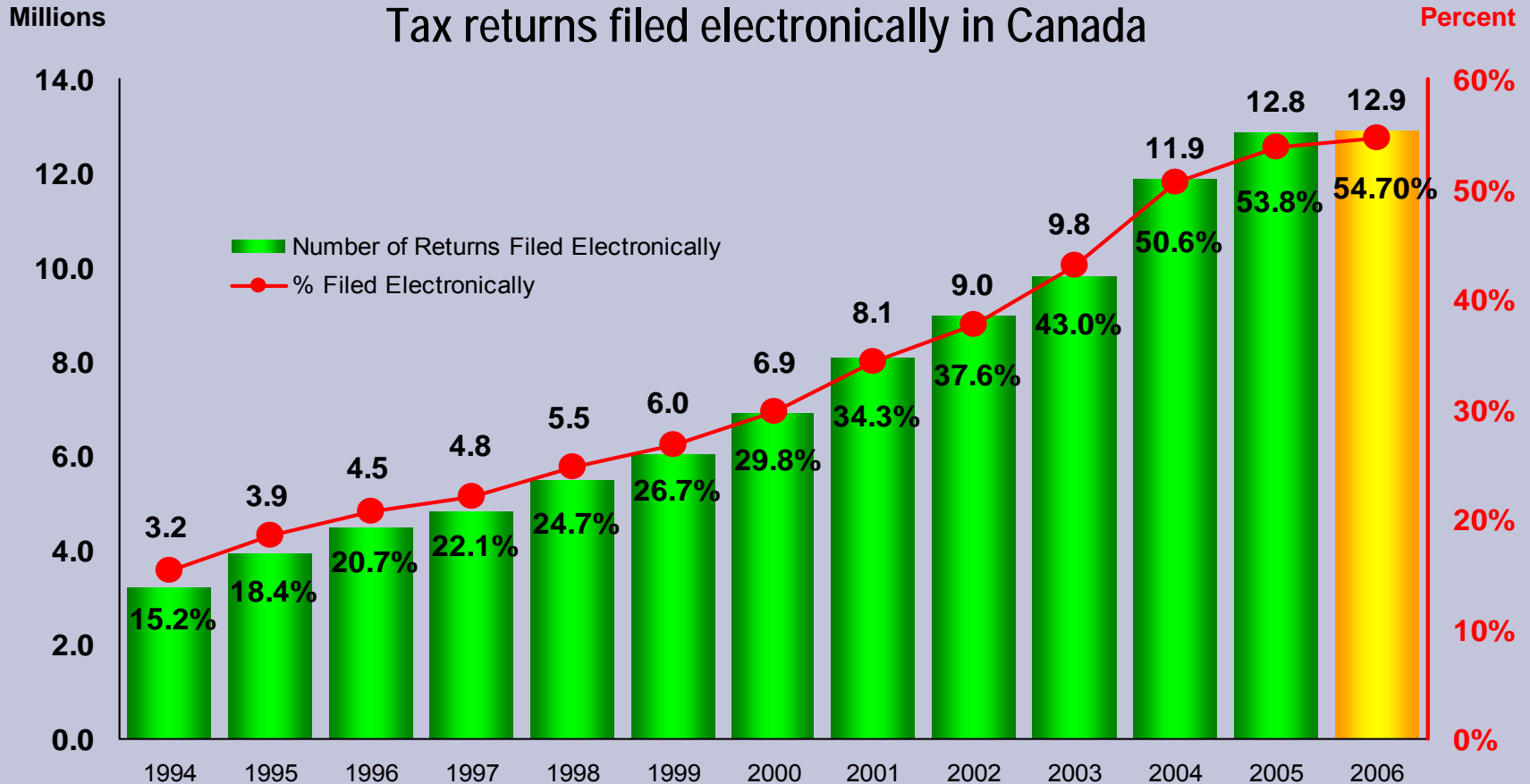
% of Canadians surveyed



(Base: All Aged 18+)

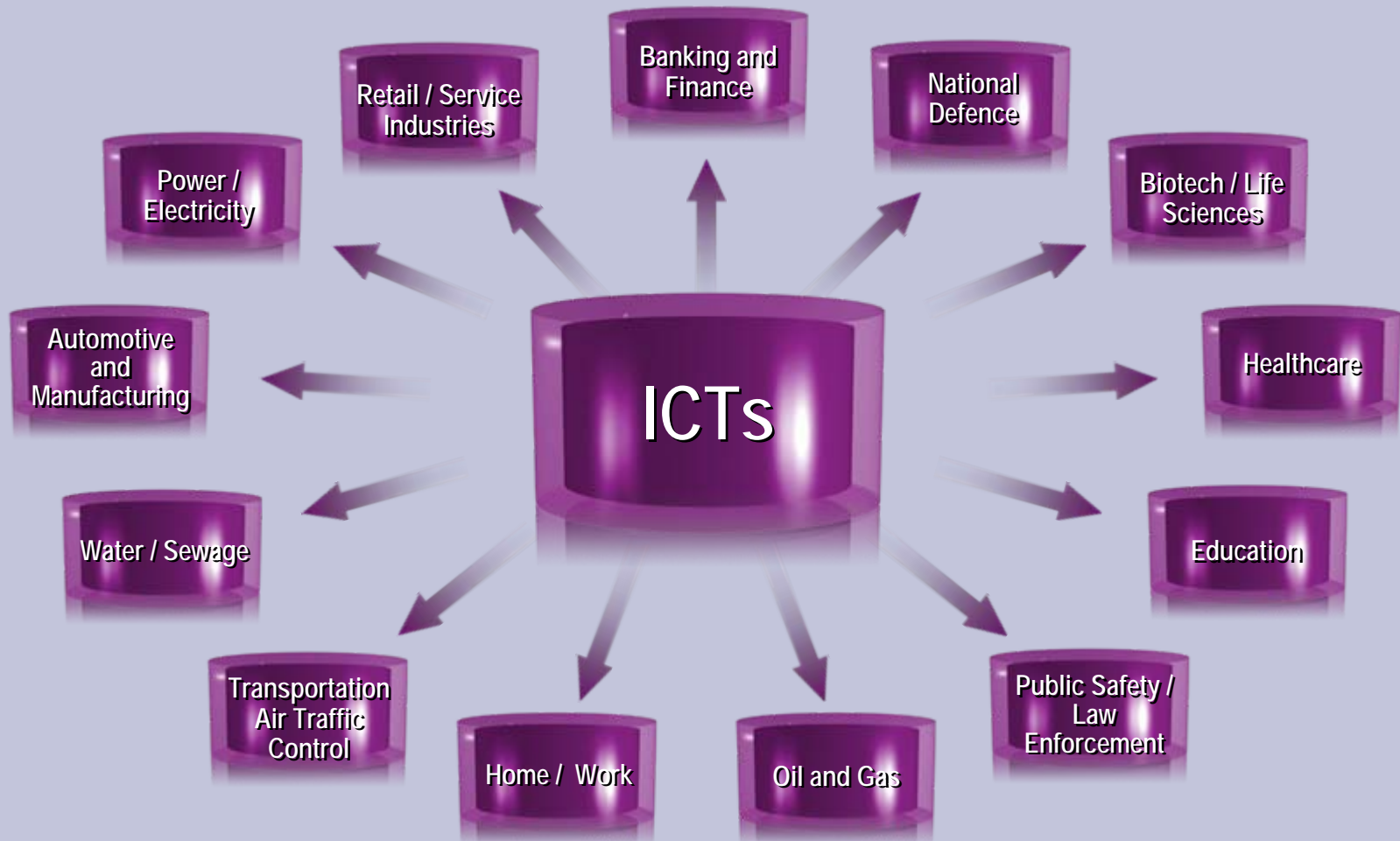
Source: Presentation "Leadership in Customer Service: Delivering on the Promise" - Canada Report: "Key Findings Overview and Citizen Survey Data", Accenture, June 2007

They even like to pay taxes online



Source: Canada Revenue Agency, Tax Year 2006 – Preliminary as of June, 2007

Our economy, society and public safety are dependent on ICTs



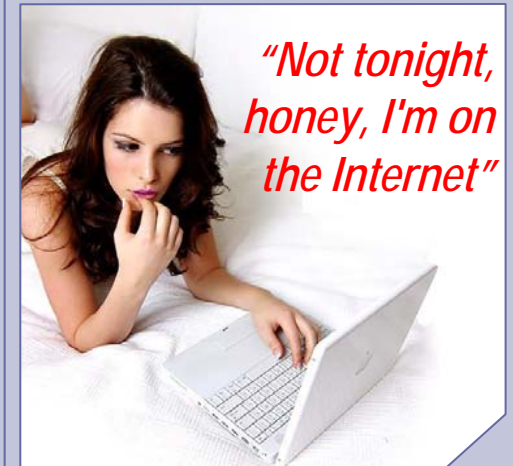
Some might say ... The technology is taking over our lives

- 28% of respondents spend less time communicating with friends, family and co-workers because of the time they typically spend on the Internet
- Almost 75% agree they now shop differently
- US users can't go without the internet, cell phones, and television – *in that order*
- Younger generation increasingly expects to be able to connect anywhere at any time – Mobility represents the next big shift
- 20% admitted they have less sex because they use that time for being online

Source: Based on results of JWT Sept 2007 survey (1,100 US respondents aged 18 years and older), as quoted at businessshrink.com, marketingcharts.com, and blogs.knowxnews.com

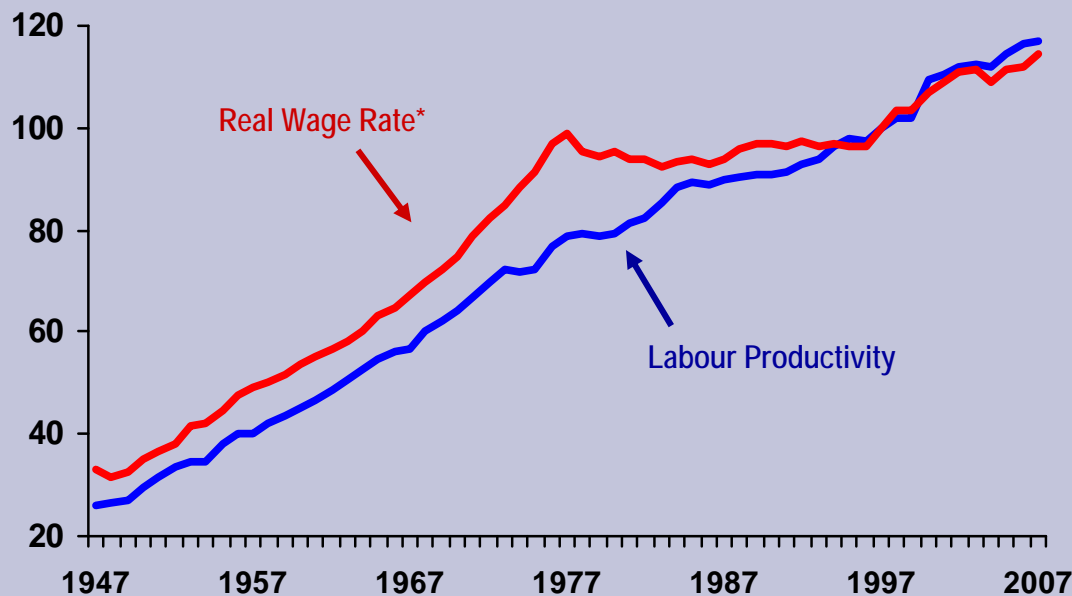
"People told us how anxious, isolated and bored they felt when they are forced offline."

Ann Mack, Director of Trend Spotting, JWT, Sept 24, 2007, Business Shrink Article



ICTs impact our productivity growth...

Labour Productivity and Real Wage in the Canadian Business Sector, 1947 - 2007 (1997=100)



*Real labour compensation per hour worked.
Source: Statistics Canada

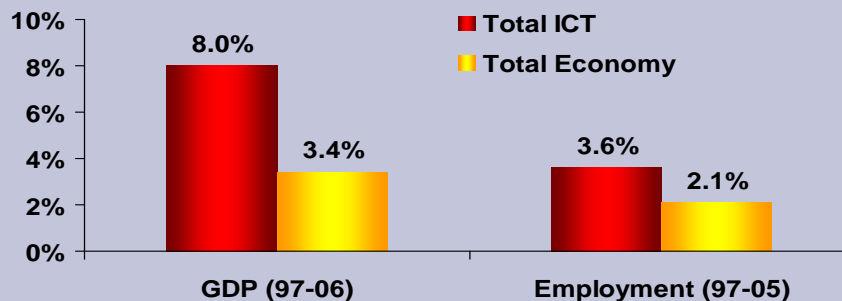
...productivity growth is key to
standard of living

- Productivity is the most important determinant of a country's standard of living – a highly productive economy creates more jobs and can pay high wages
- Canada among *top 6* nations in quality of life - UN Human Development Index (2006)
- Approximately a quarter of Canada's productivity was due to ICT capital investment in 1995-2005 (based on numbers found at the OECD productivity database)

Canada's ICT sector performance is strong...

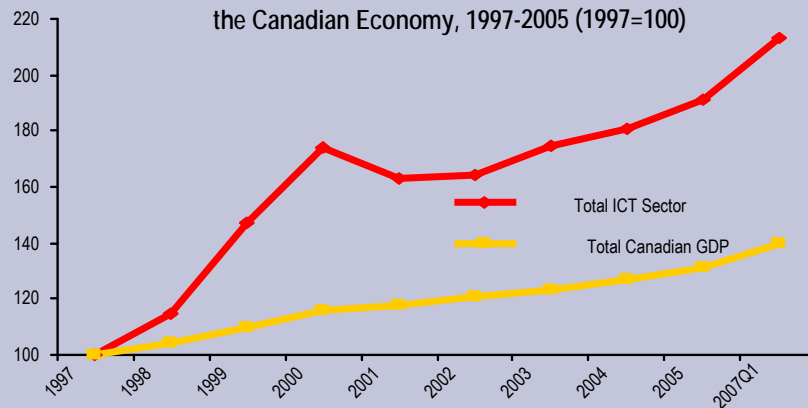
ICT sector outpaces growth of Canadian Economy

Annual growth in GDP and employment



Source: ICT Branch, Industry Canada, October 2006

Indexed Growth in GDP at Basic Prices for the ICT Sector and the Canadian Economy, 1997-2005 (1997=100)



Source: Canadian ICT Sector Profile, ICT Branch, Mar. 2007

Strong contributor to the Canadian economy:

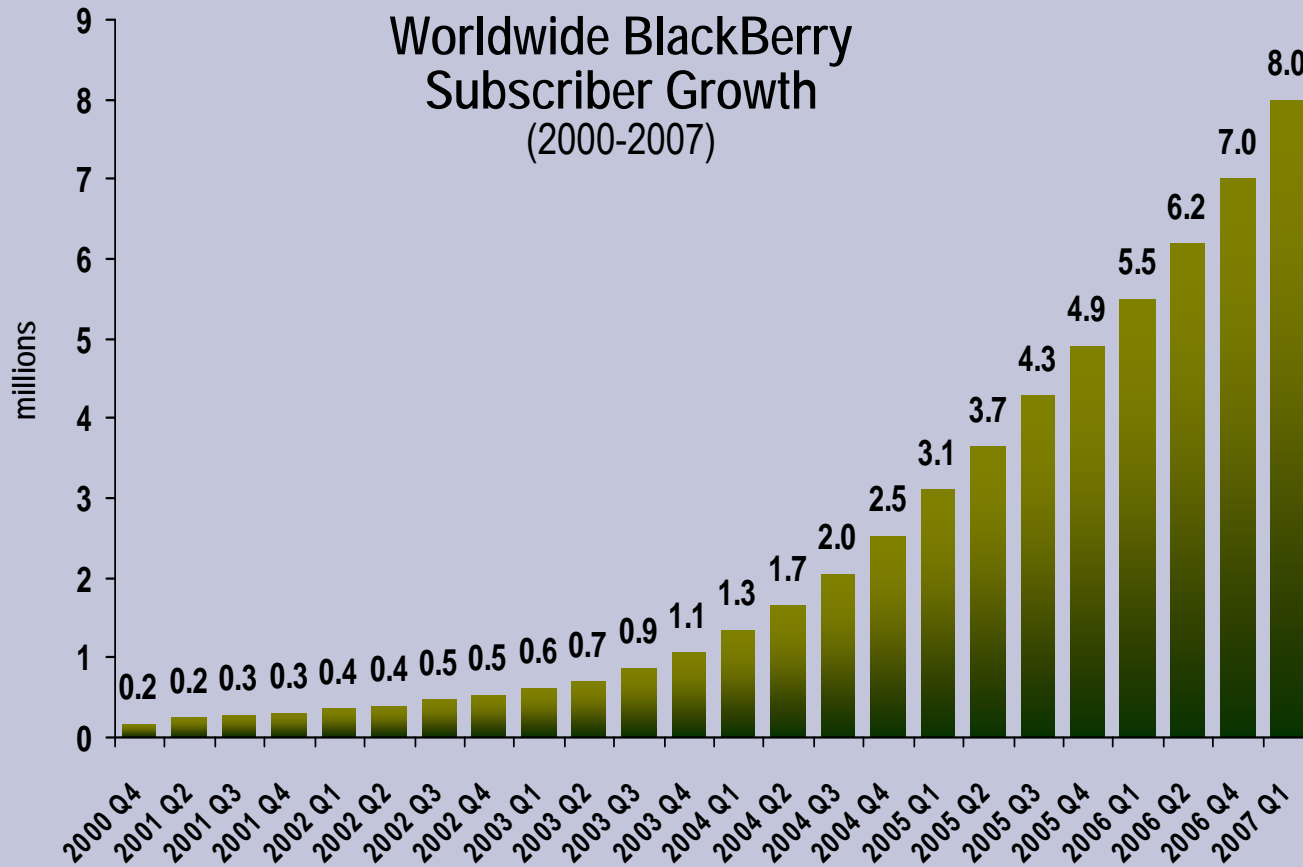
- 5.9% of GDP (2006)
- 8% growth per year since 1997:
 - Compared to 3.4% for the economy
- Sector has grown by 113% since 1997, three times as much as the Canadian economy (39%)
- 39% of private sector R&D, outperforming all other sectors (2006)

And Canadian firms are at the front of the pack

- *Global powerhouses:*
 - Nortel, Celestica, Entrust, RIM, ATI....
- *World renowned in multimedia:*
 - Softimage, Discreet Logic, XYZ-RGB...
- *In wireless equipment:*
 - RIM, Sierra Wireless, SR Telecom...
- *In Wifi and WiMAX:*
 - BelAir Networks, DragonWave, Redline Communications, Wavesat, WiLAN...
- *In mobile applications:*
 - 7-24 Solutions, Certicom, OZ, Push Consilent, Redknee...

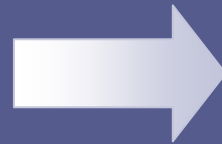


RIM Country



Source : Research in Motion Press Releases, 2000-2007

We are moving to an EoIP world



Top-down: What the network thinks you want, when they think you want it and in the format they want

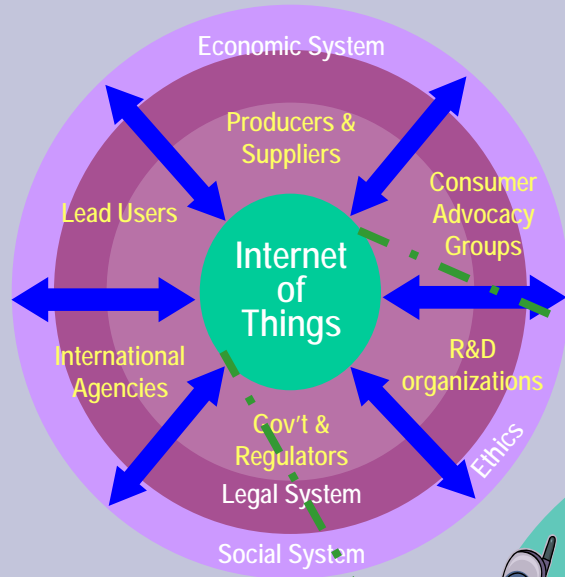
- TV content on cable, or over the air
- Radio show on radio
- Books in the bookstore or library
- Snail mail rain or shine
- Voice by monopoly phone provider

Choice: What you want, when you want it, from anywhere

- All content and services available online: Music, Movies, TV Shows, Books, podcasts, Voice, TV, Radio...
- Choice of receptors: Personal Computers, cell-phones, Blackberry, iPods...

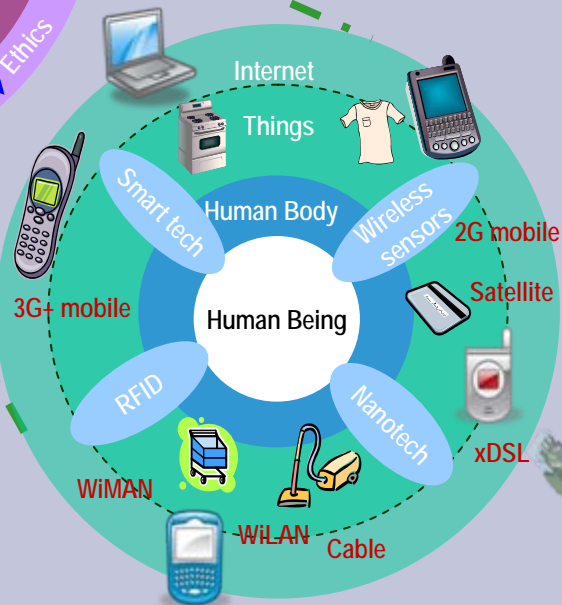
The Consumer's Revenge!

Where everyone and everything is connected



Ecosystem of the Internet

- Radio-Frequency Identification (RFID) tags + Smart Computing
- Wireless sensors
- Personal Area Networks (PANs)



Source: ITU, 2005



But increasing pervasiveness of technology can also increase challenges ...

Using ICT and Networks to Address Digital Divides ...

Individuals *by income, education, and age*

Businesses *large and small*

Regions *urban and rural / remote*

Countries *developed and developing*

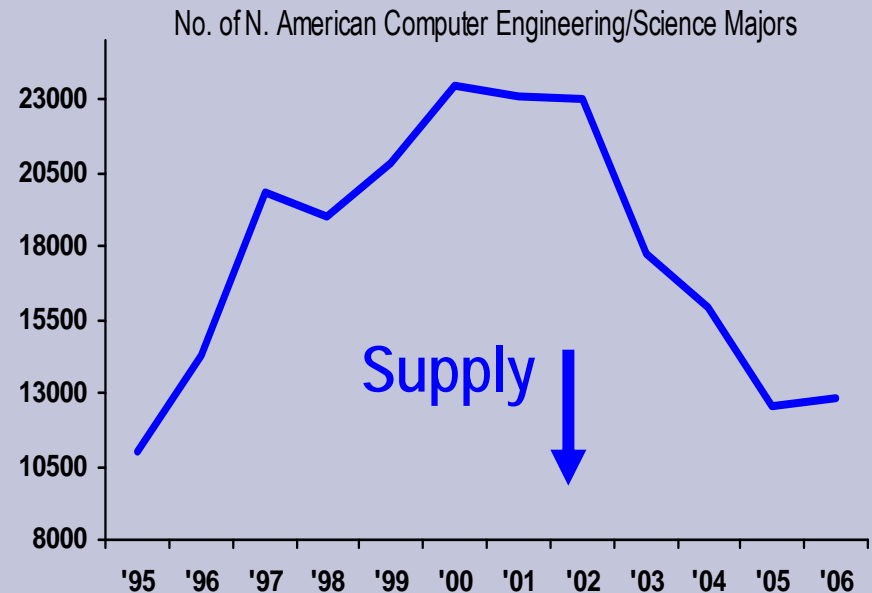
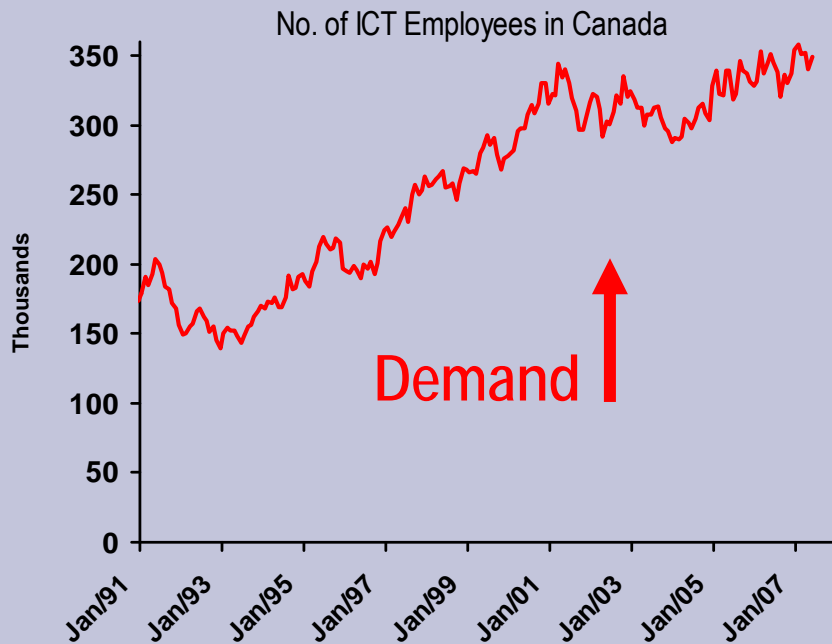
Universal Access is a Bridge to Economic and Social Inclusion



Need for ICT skills...

Increased demand and upward pressure on salaries indicate *tight labour market* with insufficient supply of skilled labour

- Between Fall 2004 and 2005 a 21% drop in undergraduate enrolment



Sources: Statistics Canada (June 2007); Computing Research Association (May 2007)

Need More Spectrum

Spectrum challenges are now global

- Global and regional harmonization
 - Technology neutrality
 - Licence-exempt spectrum and standards
 - Public safety and security
- Implications
 - Greater effort required to build consensus (i.e. preparations for WRC)
 - Nations can no longer operate in isolation
 - Regional (minimum) – Global (desired)

New Spectrum

- AWS
- 700MHz
- 2.5GHz
- Satellites
- DAB/New Media
- UHF White spaces
- UWB



Trust and Confidence ...

Privacy and online security concerns

- *Privacy and security fears* discouraging e-commerce in Canada
- Users changing their online behaviour due to security concerns
- Consumers *losing trust* in online banking

Online threats continue to evolve

- Spam is clogging the networks and increasing costs
- Spyware, adware and zombies

Identity theft and cybercrime

- E-mail fraud, e-commerce attacks and extortion

Malicious attacks on networks

- Virus, worms, denial of service attacks, malware...



Challenges are not new: we started early

Getting Canadians on-line:

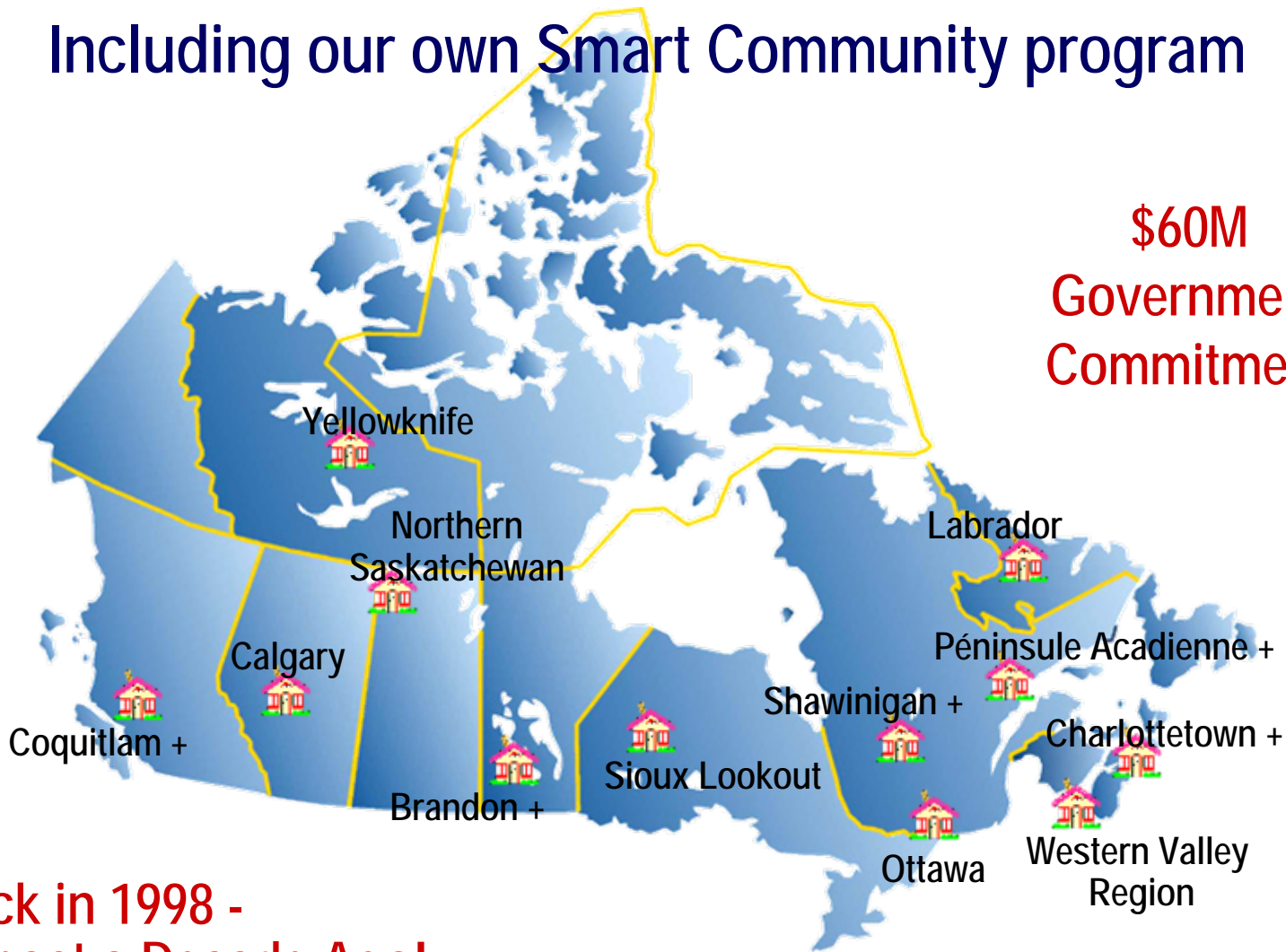
- Based on recommendations of the Information Highway Advisory Council (1994)
- Connecting Canadians (1998-2002)
 - Announced in Budget 1998
 - 6 Priority “Pillars”:
 - Canada Online
 - Smart Communities
 - Canadian Content Online
 - Electronic commerce
 - Canadian Governments Online
 - Connect Canada to the World
- Government On-Line (1999)

Set out to make “Canada the most connected nation in the world”



Including our own Smart Community program

\$60M
Government
Commitment



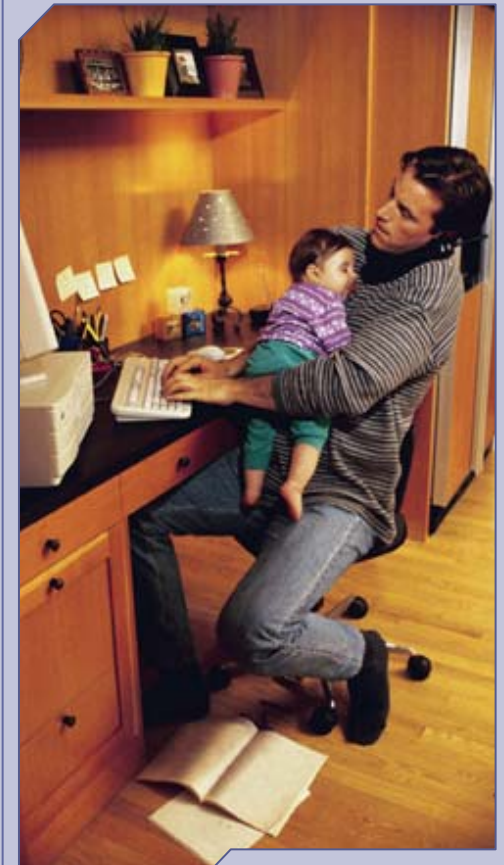
Back in 1998 -
Almost a Decade Ago!

To help Canadian communities become “Intelligent” ...

What is a Smart Community?

A geographical area ranging in size from a neighbourhood to a multi-county region whose residents, organizations, and governing institutions are using information technology to transform their region in significant ways. Cooperation among government, industry, educators, and the citizenry, instead of individual groups acting in isolation, is preferred. The technological enhancements undertaken as part of this effort should result in fundamental, rather than incremental, change.

From The Smart Communities Guidebook (January 1997), prepared by the International Center for Communications at San Diego State University with direction from the California State Department of Transportation

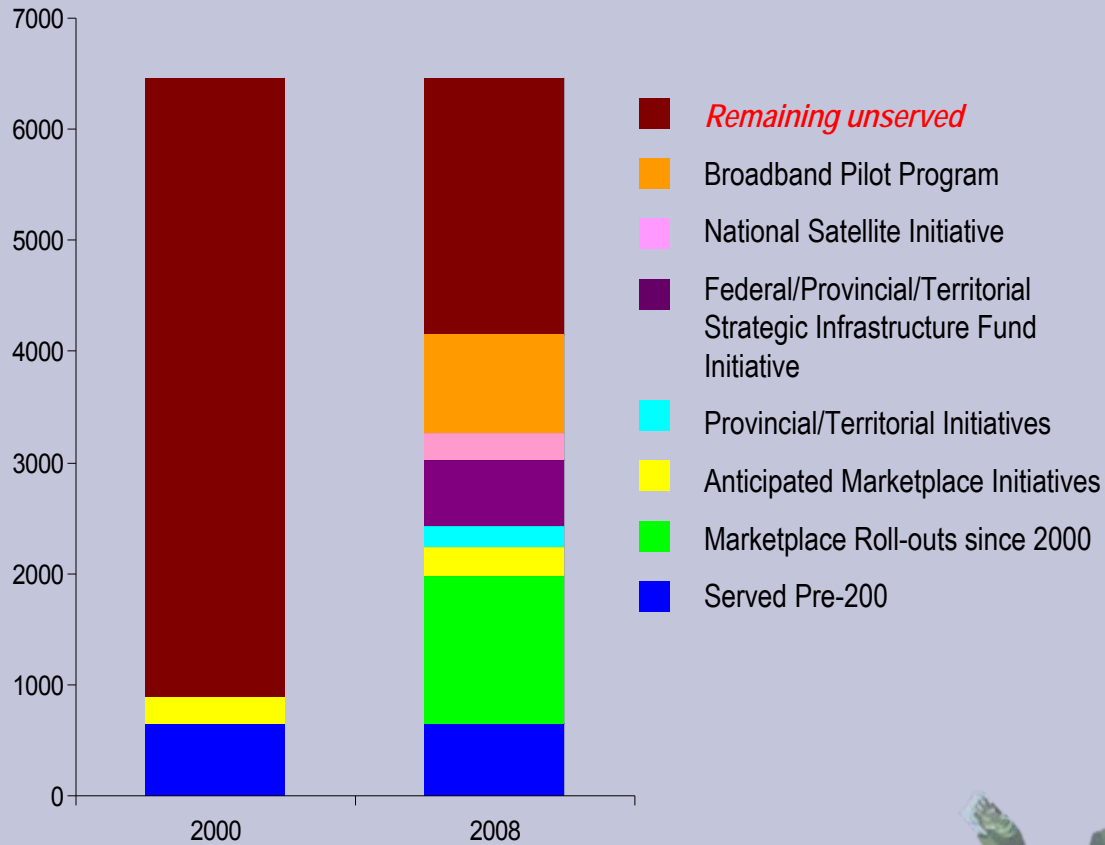


Our efforts produced success

- Majority of schools and libraries connected by 1999
- Over 800,000 refurbished computers given to schools (as of June 2007)
- Student-to-computer ratio (median) is 5 to 1 (Statistics Canada, 2004)
- Established approximately 4,000 Internet access sites
- CA*net 4: the world's first national optical research and education network
- 81% of households (IPSOS-Reid 2005) and 82% firms use the Internet (SECT 2005)
- Among the top rates of broadband penetration (OECD 2006)
- #1 in Government Online (GOL) (Accenture 2001, 2002, 2003, 2004, 2005)

Canada has become an e-Society

We're making a difference, but important work remains...

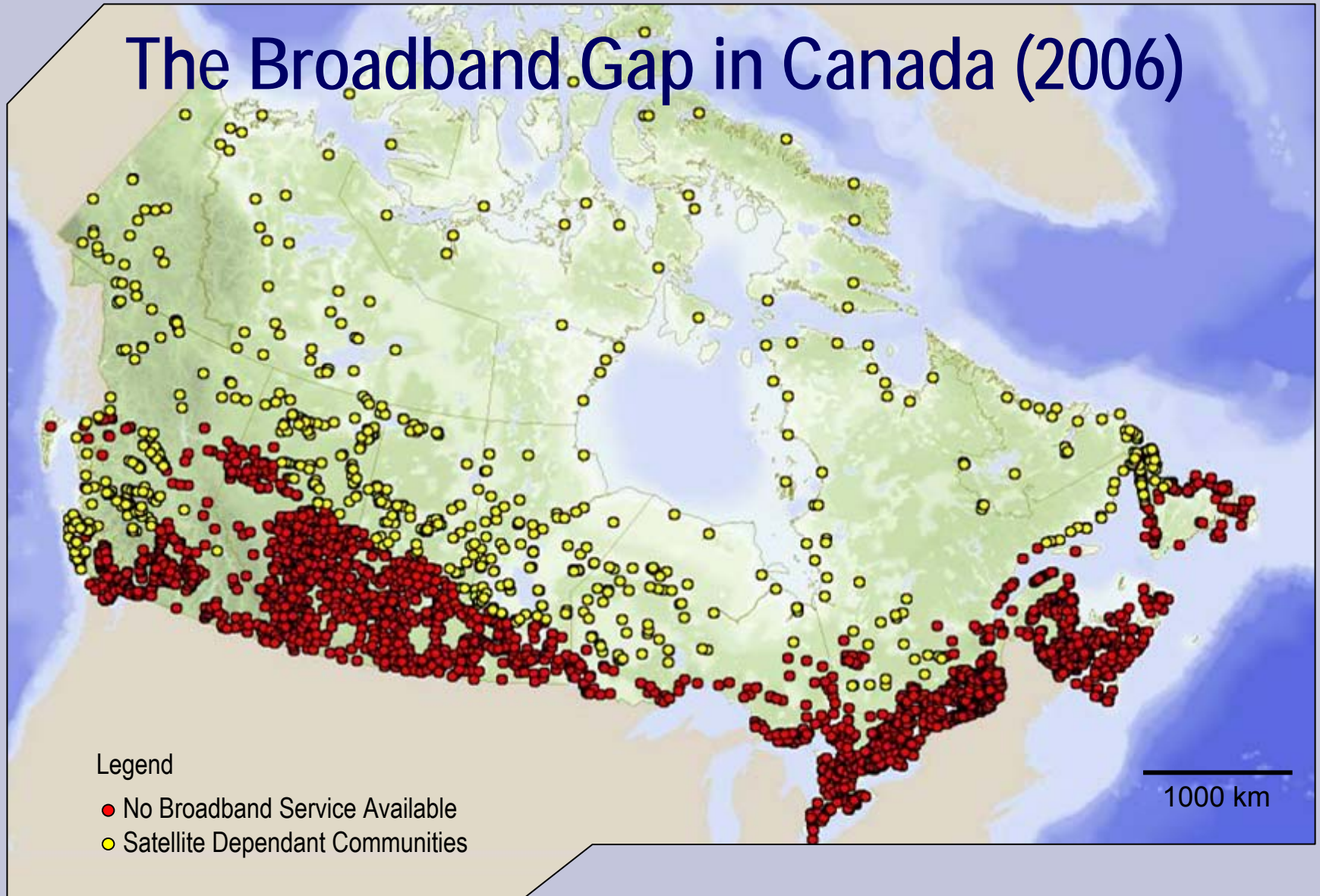


Source: Industry Canada, Broadband Office, May 2006

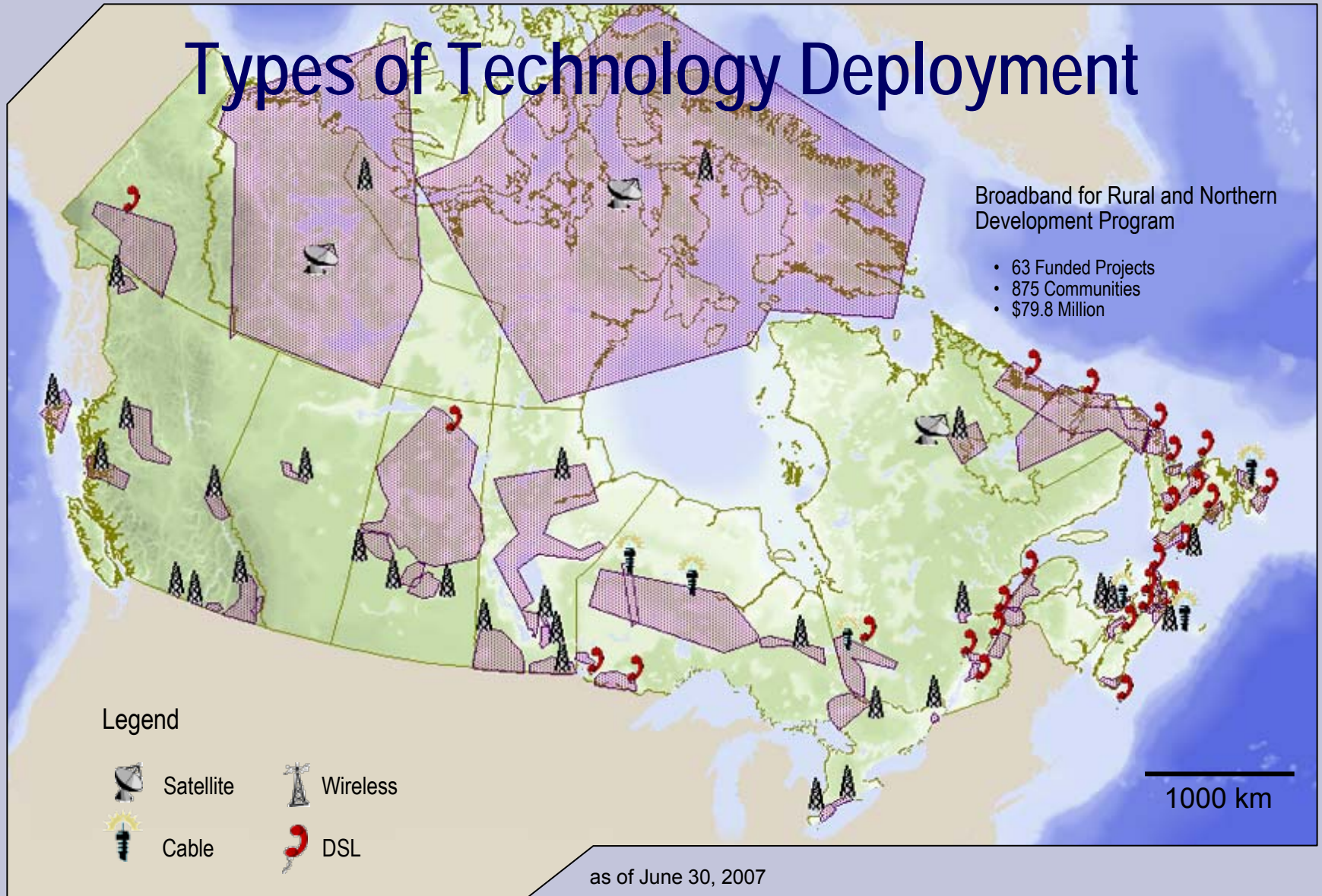
It is estimated that approximately 2000 communities remain without broadband



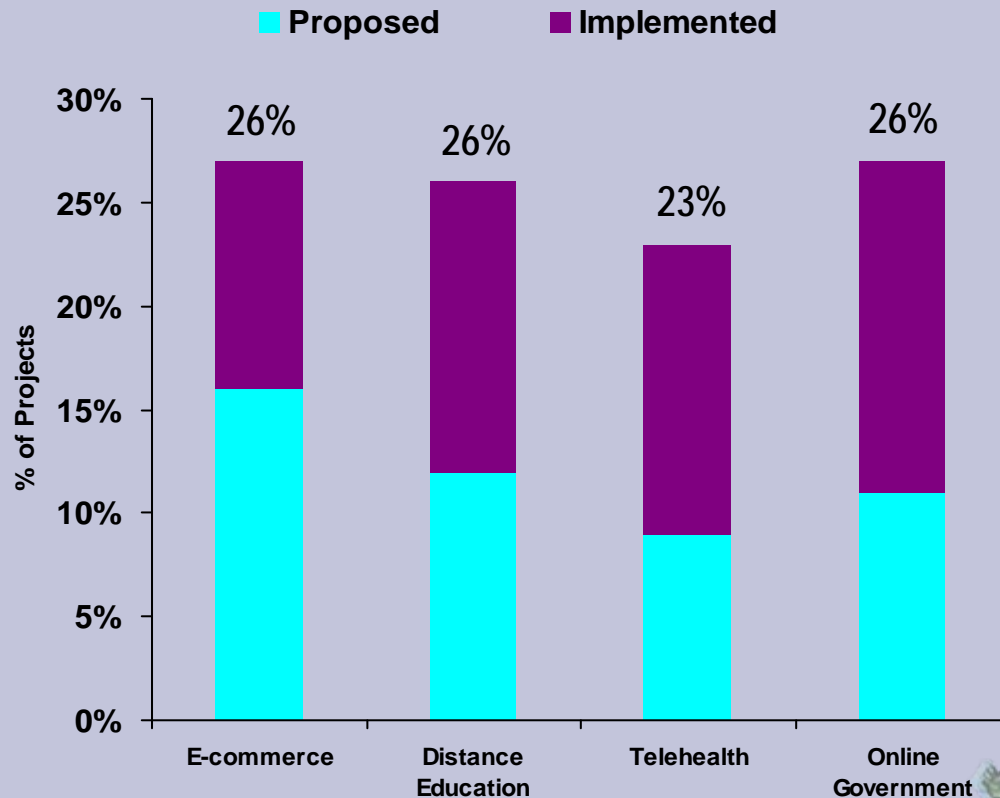
The Broadband Gap in Canada (2006)



Types of Technology Deployment



BRAND Program: catalyst for rural adoption of broadband applications



After only a few months of operation, BRAND communities were adopting :

- E-commerce
- Distance Education
- Telehealth
- Online Government

Other uses:

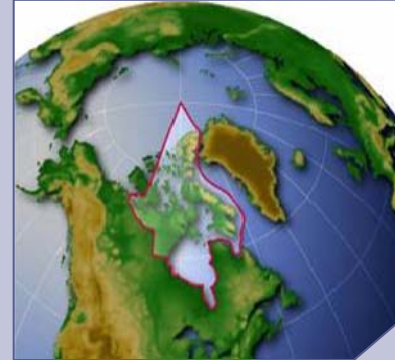
- GIS, e.g. regional 911 - address database for emergency services
- Cultural resources online
- Telecommuting
- Teleworking

Source: Industry Canada, Broadband Office



Nunavut a BRAND Success Story

- Nunavut spans **2 million square kilometres** of Canada extending north and west of Hudson's Bay, above the tree line to the North Pole and accounts for **1/5 of Canada's land mass**.
- With a median age of 22.1 years, Nunavut's population is the youngest in Canada. It is also one of the fastest growing; the 2001 **population of just under 29,000** represents an increase of eight per cent in only five years.
- Inuit represent about 85 percent of the population.
- The communities range in size from tiny Bathurst Inlet (population 25) to Iqaluit, the capital (population almost 6,000). None of the communities are accessible by road or rail; the ground is permanently frozen and everything, from people to fuel to food, arrives by plane or sealift.
- **22 of the 25 communities have no bank.**
- SSI Micro designed, built and maintains the network, and local Community Service Providers in each Nunavut community deliver the service to local residents.
- "QINIQ" (name of network) is the Inuktitut root word for "to search." The introduction of broadband means people can connect to each other, and communicate orally and visually – more in keeping with Nunavut culture than text-only English Internet formerly available through slow dial-up services.

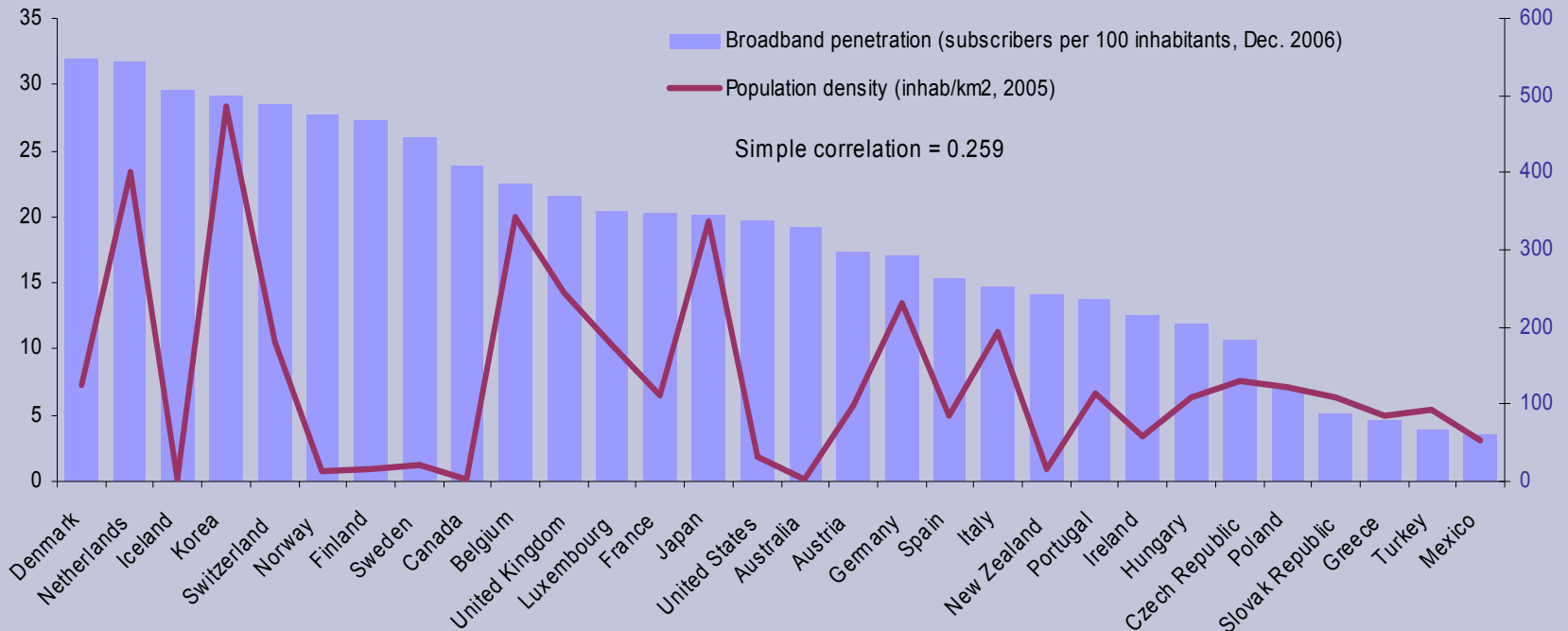


Rush to Broadband is a Competitive Strategy

OECD broadband penetration and population densities

Broadband penetration, Dec. 2006

Population density, 2004



Canada: BB penetration (per 100 inhabitants, Dec 2006) 23.8 ; population density (2005) 3 inhabitants/sqkm

Japan: BB penetration (per 100 inhabitants, Dec 2006) 20.2 ; population density (2005) 338 inhabitants/sqkm

Source : OECD

Industry Canada programs and policies are evolving

- Connectedness Initiatives
 - CANARIE
 - Smart Communities, Community Access Program
 - SchoolNet, Computers for Schools
- National Broadband Task Force (2001)
- Broadband (BRAND) Program (2003)
- National Satellite Initiative
- SPAM Task Force (2004-2005)
- Telecom Policy Review (2005)
- Continued Deregulation via Policy Direction, VoIP Decision, Forebearance (2006)



New technologies are advancing

Here Now

- Voice over IP
- P2P
- Integrated GPS
- WiFi
- RFID
- 3G Mobile
- Satellite Radio / DAB
- Mobile TV / IP-TV / Web TV
- DTV / HDTV
- PVR
- Video on Demand
- WiMAX
- Mesh Networks
- Broadband Power Line (BPL)

*Access to anything,
anywhere, anytime*

Coming Soon

- 3G+ Mobile
- Ultra Wide Band (UWB)
- Software-Defined Radio (SDR)
- Grid Computing
- Sensor Networks
- Nanotechnology
- Internet Protocol Version 6 (IPv6)
- Quantum Cryptography

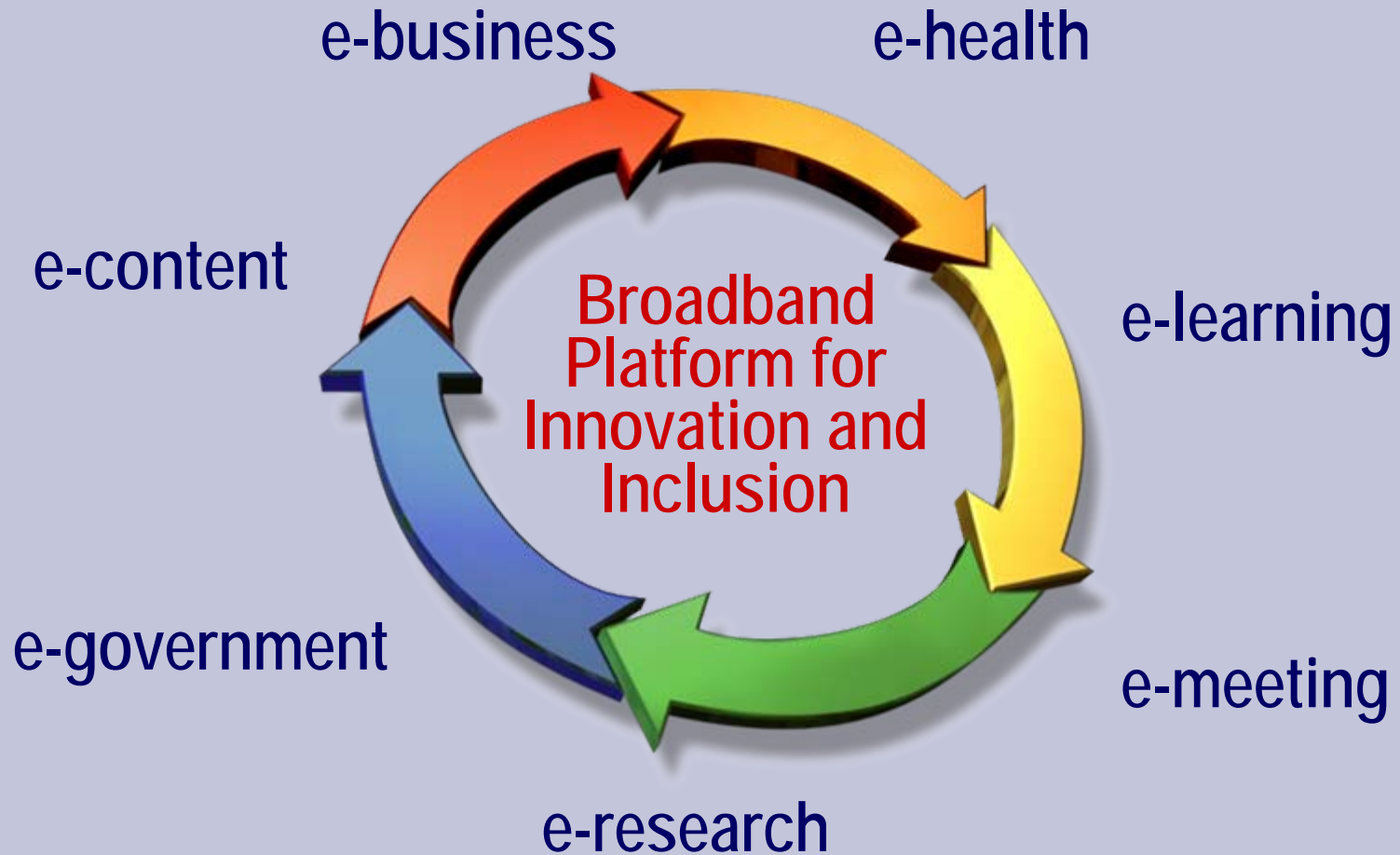


On the Horizon

- Gigabit WiMax
- User Controlled Light Paths (UCLP)
- Semantic Web
- Bio Computing
- Quantum Computing



Bringing new opportunities



Broadband and ICTs increase our options...

E-Health

- Telehealth applications in remote areas save \$30 M per year in transportation costs (Infoway 2005) – and a corresponding reduction in fuel emissions

E-Learning

- Delivering education across the country (KNet Internet High School) or across the city (Distance Education) increases accessibility and saves students time and travel costs

E- Transport

- Reduced fuel consumption and pollutant emissions (<http://www.itscanada.ca/english/benefits.htm>)

E-Work

- Bell Canada and Telus report a savings of 11 000 tonnes and 114 tonnes of CO², respectively, from their telework programs (The Vancouver Sun)
- Video conference reduces need for air travel

E-Home

- Programmable thermostats and appliances can reduce home fuel and utilities consumption



So we can make “smart” decisions

Reduce, Refurbish and Re-Use, Recover, Recycle

- Environmental benefits of ICTs are broad but E-waste is also an issue
 - Lifecycle of ICTs
 - Production: hazardous materials released, resource-intensive manufacturing processes
 - Use: Increased used of ICTs → increased use of energy and materials
 - End of Life: Disposal of ICTs can impact land and water sources, or be shipped to developing countries
 - Government needs to set the example
 - Industry Canada, Computers for Schools (CFS) initiative
 - Directing used equipment to the re-use market after diligent repair, testing, refurbishment
 - CFS reported the re-use of over 40,000 computers, representing a diversion of approximately 1,659 tons of ICT equipment from landfill from October 2006 to March 2007

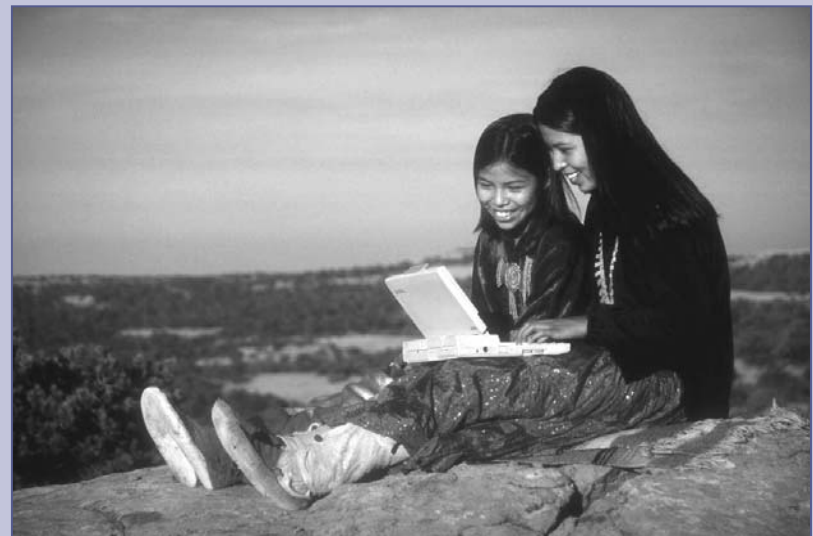
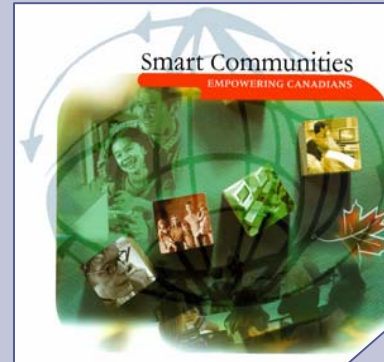


Technology alone does not solve environmental problems, but enables greater options to improve on existing practices

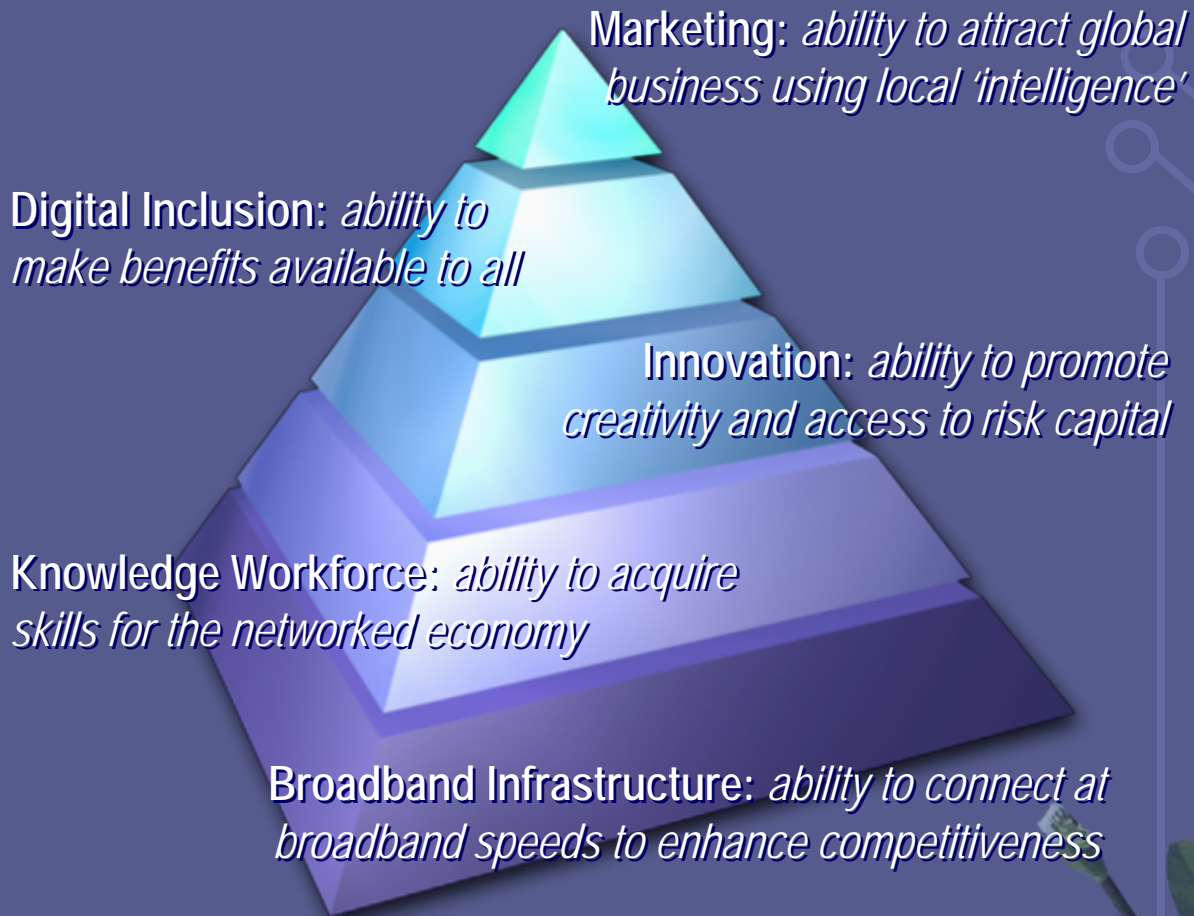
Resulting in Smart Communities that benefit the economy and the environment

Characteristics of Canada's Smart Communities

- A Smart Community has a vision of the future that involves the use of Information Communication Technology in new and innovative ways
- Information Communication Technology used to empower residents, institutions and regions
- The community's members, organizations, and governing institutions work in partnership



Intelligent Community Indicators: Critical Success Factors



In the broadband economy, adaptability outweighs legacy - skills rather than resources are the keys to the future. Innovation, not location, creates competitive advantage.

Intelligent Community Forum

We must strive to bring the benefits of the network economy to all Canadians

Congratulations *i*-Waterloo

From Intelligent Communities to Intelligent Canada...

- There are many challenges on the road to the true network economy
- Canada took an early lead, but we must continue to keep the vision alive
- Need too ensure we engage all stakeholders: citizens, government, business, and academia

...We can do it...



<http://sitt.ic.gc.ca>

Government of Canada
www.gc.ca

Industry Canada
www.ic.gc.ca

Canada 

