The Top Seven Intelligent Communities of 2007

Selected by the Intelligent Community Forum
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Intelligent Community Forum

About the Top Seven

The Intelligent Community Forum's annual list of the world's Top Seven Intelligent Communities sounds like a competitive ranking. But that is not its intent. ICF has developed a list of Intelligent Community Indicators that provide the first global framework for understanding how communities and regions can gain a competitive edge in today's Broadband Economy. The Indicators demonstrate that being an Intelligent Community takes more than "being wired." It takes a combination of —

- Significant deployment **of broadband communications** to businesses, government facilities and residences, with government providing a catalyst when necessary through regulation, incentives and even network construction.
- Effective education, training and workforce development that builds a labor force able to perform "**knowledge work**."
- Government and private-sector programs that promote **digital inclusion** to ensure that all sectors of society benefit from the broadband revolution and by expanding citizen participation in government decision-making.
- **Innovation** in the public and private sectors, ranging from e-government initiatives and efforts to create economic "clusters" to the formation of risk capital to fund the development of new businesses, which are the engine of economic growth.
- Effective economic development **marketing** that leverages the community's broadband, labor and other assets to attract new employers.

The Top Seven have been chosen, not because they excel in all of these areas, but because each demonstrates excellence in at least one. ICF salutes them as role models for the development of vibrant local economies and healthy societies in the global Broadband Economy.

Some of this year's Top Seven also appeared on last year's list. Others from last year have been replaced by new communities. Just as appearing one year does not mean that a community surpasses all others, so being replaced on the list does not signify failure. ICF purposely introduces new examples each year in order to continually expand the scope of the Top Seven list, and the selection process must inevitably exclude some worthy and exciting examples.

About the Broadband Economy

Whether you know it or not, you are living in the "Broadband Economy." It is the new global economy emerging from the deployment of broadband on the "wholesale" and the "retail" levels around the world.

"Wholesale" Broadband

"Wholesale" broadband is the global fiber optic network that links the major cities of the industrialized and developing nations, from Tokyo to New York, Rio de Janeiro to Berlin, London to Mumbai. Vastly expanded during the 1995-2000 telecom boom, the global fiber network was heavily overbuilt by zealous competitors, many of whom went bankrupt in the "bust" that followed. The glut of fiber capacity led to plummeting prices – just at the time when developing nations like India and China opened their economies to global competition and the nations of Eastern Europe moved into the orbit of the European Community.

The near-term result was the explosion of offshoring, as companies in industrialized nations discovered they could find highly qualified suppliers of services in countries where prevailing wages were a fraction of those at home. For developing countries, of course, "offshoring" brought a welcome wave of technology-driven growth.

The long-term impact of wholesale broadband has been far more profound. It has made capital investment in businesses, factories and facilities highly mobile. Trillions of US dollars move around the globe daily in pursuit of a competitive return on investment, and when trouble strikes a nation's economy, that mobile capital can flee at devastating speed. For major companies, it has also unleashed collaboration and cooperation across time zones and cultures that has boosted productivity, created employment, and improved living standards.

"Retail" Broadband

"Retail" is the kind of broadband most of us know best: the DSL, cable, wireless or satellite connection that links homes, schools, small businesses and institutions into the global network. Retail broadband has done for individuals and small organizations what wholesale broadband has done for mid-size to large companies: opened up new opportunities for research, learning, entertainment and collaboration with others around the world.

Local Communities in a Global Economy

In the Broadband Economy, companies naturally look for opportunities to locate their facilities where they can gain the greatest advantage in terms of cost, skills and access to markets. But while global business may be mobile, communities are not. Communities everywhere have the same goal: to be a place where people can raise their children and provide enough economic opportunity to let them stay and raise children of their own.

Retail broadband has also become a new competitive weapon for smaller communities and those located far from the established commercial centers of the globe. It has the potential to move them and their citizens

from the world's periphery closer to its center. Broadband enables small companies to be global exporters. It can ensure that schools in remote regions have access to the latest information tools and reference sources. It can link rural healthcare providers to leading medical centers and local law enforcement to national information grids. By boosting the economic and social well-being of communities, it can reduce the incentives for their young people to move away in search of opportunity and a better quality of life. Paradoxically, it can play a key role in giving communities a sustainable future in our ever-more-connected world.

Adaptation, Skills and Innovation

The Broadband Economy challenges us all, whether we live in a thriving metropolitan area or a poor rural region. In the Broadband Economy –

- **Adaptability outweighs legacy.** The past achievements of our community may sustain us personally, but they have not retained their value as creators of prosperity. When it comes to economics, adaptability has become the most important success factor. Adaptability means the ability to abandon failing strategies, to develop new expertise, to make decisions and implement them fast.
- **Skills, not resources, are the key to future.** Many communities were founded where resources could be pulled from the earth, from lumbering and mining to oil and natural gas. While physical trade and resource extraction will continue to be economically important, they have been losing their power to create jobs for decades. In the future, a community's competitiveness will be determined by the skills of its people.
- **Innovation, not location, creates a competitive advantage.** Whether in the private or public sectors, innovation means the ability to conceive of improvements in existing services, products, technology or infrastructure; to test them for feasibility, cost and market acceptance; to implement them efficiently and market them effectively. Regardless of location, it is the innovative communities that will adapt fastest to change, find the opportunities that others may miss, and build sustainable prosperity.

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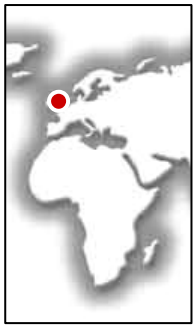


Population
142,000

Labor Force
80,000

Top Industries
Wholesale and retail trade, healthcare, government, manufacturing, education.

Dundee, Scotland, United Kingdom

At the beginning of the last century, Dundee was famous in the Britain as the city of "jute, jam and journalism." Its location in the estuary of Scotland's longest river, the Tay, allowed for the easy importation of jute fiber from India as well as the whale oil used in its processing. The majority of Dundonians, as they are called, worked in the jute mills and related industries. "Jam" stood for marmalade, which was purportedly invented in Dundee in 1797 by Janet Keiller. Her recipe was mass-produced and exported worldwide. "Journalism" referred to the publishing firm D.C. Thomson & Co, founded in 1905, which remains an important employer. Dundee also developed a major maritime and shipbuilding industry; in the ten years from 1871 to 1881, the city built and launched 2,000 ships.

During the twenty years from the mid-70s to the mid-90s, however, global economic changes swept over this industrial powerhouse and left it a hollowed-out shell. Large-scale plant closures threw thousands out of work and caused an out-migration of skills and talent. Resulting union militancy did little to improve conditions but made national headlines that reinforced Dundee's reputation as a city in terminal decline. Population losses hit the retail sector hard, discouraged inward investment, and sharply eroded quality of life.

Identifying Strengths

The government of Dundee (www.dundeecity.gov.uk) did not take these blows lying down. In 1991, the City Council founded the Dundee Partnership to develop the economy, improve the lives of citizens and strengthen its position as one of Scotland's leading cities. The goal was, through education and debate, to forge a shared understanding and common purpose among city agencies, citizen leaders, and organizations in the public, private, academic, voluntary and community sectors. The Partnership set an ambitious set of objectives, including supporting new and existing companies, improving Dundee's physical environment, promoting social and economic inclusion, and developing a vital cultural and tourist economy.

A glimmer of hope appeared in the late 1990s. For the first time in a generation, the city experienced net job growth, despite a continuing fall in manufacturing employment and levels of unemployment that remained well above the national average. Something was clearly happening, but what?

Early investigation revealed that Dundee's university sector - including the University of Dundee, University of Abertay Dundee, the Ninewells teaching hospital and Scottish Crop Research Institute - had emerged as an economic driver. Some of the new jobs being created were in established sectors like publishing and scientific research, but others were in new fields like computer games, software development, animation, film and television.

The city also discovered that it was not alone. Scotland's main cities were experiencing a similar trend and in 2001 joined Dundee in creating the E-City Network, a research program aimed at improving the e-readiness of its member communities. In 2003, the Partnership established a Digital City subgroup to develop a strategy and specific recommendations for making Dundee more competitive in the new knowledge-based economy.

Building the Digital City

The long effort to forge a common understanding and shared goals began to pay off in measurable ways in the next few years. A government-funded Business Gateway project began providing e-business training and support to small and mid-size companies, while Dundee's universities established graduate business incubators and policies promoting the spin-out of new companies. The University of Abertay Dundee established a research center devoted to computer games and digital entertainment. A £20 million (US$39 million) Digital Media Park entered into development, promising 100,000 sq. feet (9,290 m^2) of space for e-businesses in its first phase. Dundee colleges began developing online training materials on animation, film and television, while universities put advanced IT curricula online for the use of Dundee businesses.

Dundee's City Council also took digital technology to heart. A comprehensive Web site provided faster, more convenient access to information and in 2006 was processing 65,000 payments of taxes and fees worth £8 million. The Council also worked to consolidate data systems across multiple agencies. This led to the introduction of a Dundee Discovery Card and Citizen Account, which combined smart-card functionality for ten services including the city bus system, national entitlement system, parking and student services at the universities. The Citizen Account is a single secure database record that can be used to pre-fill forms for both local and national government services. An investment program also placed free public-use PCs in libraries and neighbourhood centers located within 2 miles of every household in Dundee.

Seeing the Journey Through to the End

By 2006, Dundee had achieved 100% broadband coverage through the private sector, supplemented by wireless pilot projects, with 33% penetration as of 2005, and local schools enjoying data rates up to 15 Mbps. One in every four adults is involved in continuing education, while the population of full-time students is one of Scotland's highest. The number of knowledge workers, at 6,300, is nearly triple the 2003 count, while the number of knowledge-based businesses has nearly doubled. Life sciences alone employ over 3,900 people, and a recent survey of US-based scientists ranked Dun-

dee as the third most desirable place to work outside North America. Wyeth Laboratories, one of the world's largest pharma companies, recently announced that it would base the world's first translational medical research center in Dundee. The Tayside region is also home to over 350 digital media and creative businesses, most of them in Dundee, employing over 2,300 people. Major employers include NCR, Real Time Worlds, Dynamo Games and ScotlandOnline.

Today, the once-dominant manufacturing sector provides only 10% of Dundee's jobs, while healthcare, wholesale and retail trade and education make up 40% of employment. The city still has far to go on a long road, but the collaborative leadership it worked so hard to create seems fully capable of seeing the journey through to the end.

Population
547,000

Labor Force
496,490

Top Industries
Wholesale & retail, hotel and food & beverage services, manufacturing

Gangnam District, Seoul, South Korea

In 1970, South Korea's gross domestic product per person was on a par with the poorer nations of Africa. In 2004, it joined the "trillion dollar club" of world economies and in 2005, surpassed Taiwan in total GDP to become the 10th largest economy in the world.

This dizzying rate of change can be seen in close-up in the Gangnam District of South Korea's capital city, Seoul (www.gangnam.go.kr), which appears among the Top Seven for the second time. In 1970, Gangnam was an agricultural district. Today, 80% of its residential areas consist of high-rise apartments. Gangnam-gu (as it is called in Korean) represents 25% of Seoul's economy, and is home to many corporate headquarters, including such Korean firms as POSCO, KEPCO and Korea Telecom, as well as the IT venture companies located on Teheran Road, known as South Korea's Silicon Valley.

#1 in Broadband

South Korea's explosive growth has been the result of strong government-business cooperation, with government setting objectives, determining policy and directing credit and investment. Government leadership explains the country's #1 ranking in broadband penetration, with more than 12 million broadband subscribers in a total population of 48 million and speeds of 10 Mbps a standard offering in urban areas. This, from a starting point in 1995, when fewer than 1% of South Koreans used the Internet. The national government articulated a clear vision for modernizing the country's infrastructure, then set a national technology policy that created true broadband competition, which helped prices fall and speeds rise.

In such a goal-driven, high-tech nation, Gangnam-gu stands out for leadership by local government in using broadband technology to meet the needs of its citizens and involve them more closely in

decision-making. Under former mayor Kwon Moon Yong and his successor, Mayor Maeng Jung Ju, the local government of the district has invested about US$55 million since 1995 in IT systems, e-government, citizen education and digital democracy.

$3 Billion Collected Online

Work began in that year on deploying a local area network (LAN) linking government agencies and making it possible to automate traditional paper-based systems. In 1997, the government introduced kiosks at government offices and transportation hubs to give citizens access via the LAN to online registration and tax forms. The system was built out over the next three years until, by 2000, there were 61 e-government applications - from vehicle registration to building permits - available through an expanding network of kiosks. The following year saw the kiosk system converted to a Web portal that could be accessed via Internet as well as the LAN-based kiosks. By 2005, about 29% of transactions between government and citizens or businesses were taking place via the portal, and tax payments worth US$3 billion were collected online. The system also accepted complaints on topics ranging from fraudulent advertising to restaurant cleanliness through the Web or mobile SMS.

TV GOV

The next phase in Gangnam-gu's development appeared to take a step backward, technologically speaking. At the end of 2006, Gangnam-gu launched TV GOV, an interactive digital broadcast system provided via the world's most widely accepted display platform: the television. TV GOV has two goals: to encourage older residents to use the district's e-government systems through the familiar interface of the television, and to deliver educational services to students. Through TV GOV, users can gain access to the full range of online e-government services through their television. The system also provides government news channels, cultural and arts channels, and specialized information for senior citizens, women and children. To further support the use of technology, adults of all ages have access to technology training at 35 sites throughout Gangnam, which serve over 400,000 citizens per year.

Gaining admission to university is highly competitive in South Korea, and parents who can afford it spend a great deal on private tutoring for their children. Low-income families are at a substantial disadvantage in this educational race. Through TV GOV, students can gain access to over 100 distance education courses, as well as an online library of school books,

designed to prepare them for college entrance exams. Over 330,000 students have used already used the program.

These online and TV-based services have allowed Gangnam to implement a high level of transparency in local government. The Web portal has more than 350,000 registered users, of whom 47% are actively involved in surveys or have registered to receive email alerts on specific issues. The survey system has been used nearly 1,500 times since its introduction to gain comment on budget issues, business regulations and other matters. A search system provides fast access to all non-confidential documents in process by the government.

The next step for Gangnam-gu is development of "ubiquitous" services that integrate IT, mobile and wireless technologies, and global positioning via satellite (GPS). Systems under discussion include a direction-finding system to enable blind citizens to get around more easily, and location tracking for children, using GPS and radio frequency identification (RFID) technology. In a nation that has experienced stunning change and expects more of the same, Gangnam-gu aims to maintain its leadership in integrating technology into the community.

Population
61,800

Labor Force
70,000

Top Industries
Information technology, communications, broadcasting, financial services, pharmaceuticals, publishing.

Issy les Moulineaux, France

Nathan Bedford Forest, a winning general on the losing side of America's Civil War, once wrote that armies win battles by getting there "firstest with the mostest." No community has applied this winning formula more successfully than Issy-les-Moulineaux, a suburb of Paris that appears on the Top Seven list for the second time.

Issy-les-Moulineaux has a history of economic success. Beginning in the 19th Century, the community became an industrial zone of the Paris region. In the early 20th Century, an airfield constructed on an old army parade ground became France's "cradle of aviation" where Henry Farman completed the world's first one-kilometer flight. After rebuilding its industries following the World War II, Issy-les-Moulineaux underwent the same de-industrialization as other communities in the 1970s and 1980s, but was sustained by the presence of the French military and its aviation heritage. The community also had a small cluster of IT, telecommunications and R&D organizations attracted by proximity to government agencies.

Local Information Plan

In 1980, Andre Santini was elected Mayor of Issy-les-Moulineaux. He immediately launched a campaign to lure more technology companies into the area and make high-tech the backbone of the economy. Under his administration, Issy-les-Moulineaux was the first French city to introduce outdoor electronic information displays and the first to deploy a cable network. In 1993, schools introduced a smart card allowing pupils to pay for lunch electronically, while the City Council rebuilt its meeting room in 1994 as a multimedia center. That year, Mayor Santini also asked city departments to study the development of the Internet in the US and created a steering committee to develop Issy's "Local Information Plan."

To understand how forward-looking this was, remember that 1994 was the year when Netscape, the company that would introduce the first widely-used Web browser, was founded. There were only 10,000 Web sites worldwide then, compared with 80.6 million in 2006, and the first e-commerce sites were just coming online.

The Local Information Plan was completed at the beginning of 1996 - and just one year later, Issy decided to outsource its entire IT infrastructure to Euriware, a 10-year-old Paris company that was one of France's first outsourcing firms. The goal was to speed up the pace of technology innovation in the community, and Mayor Santini promoted it as the first step in transforming Issy into a "digital city."

Ready for Competition

In January 1998, the French government ended the monopoly of France Telecom - and Issy once again seized the opportunity. Foreseeing the change, the city had already negotiated deals with competitive carriers that led to the construction of new fiber networks. When the monopoly officially ended, the new carriers switched on service and local companies were able to take immediate advantage of price competition.

By 2006, local government's IT and communications infrastructure had undergone vast changes. Government, school, library, and health care buildings are fully wired with broadband, and there is one PC for every 11 students in the primary schools. The multimedia City Council room began broadcasting deliberations via cable TV and the Web and accepting citizen input in real time. A robust e-government portal provides online public procurement, online training, access to a "citizen relationship management" system called IRIS, and even online voting. And the outsourcing contract has allowed Issy to substantially reduce costs. In a 2005 survey, the city ranked 96 over 110 French cities of more than 50,000 inhabitants for operating costs. The population has grown 35% since 1990, swelling tax revenues, without any increase in the government payroll.

89% of Citizens Online Daily

Even more impressive has been the impact on that growing population. There are six alternative broadband providers serving Issy today, and Wi-Fi covers all public buildings and the entire business district. According to an April 2006 survey, 89% of the population uses the Internet daily, compared with a French average of 56%. Three-quarters of Internet users access the Web via broadband, and 67% have downloaded software, music or films.

Nor is the broadband economy of Issy solely for the digital elite. The city has invested in creating a cyber-kindergarten, public-access terminals, "cyber tearooms" that provide access and training to the elderly in a familiar and comforting environment, and video conferencing to connect parents with children away at holiday camps. The government consults online with a representative Citizen Panel to gather opinions on local issues, and Participative Budget-Making Platform enables citizens to help the city in setting local investment priorities.

The impact on economic development has been profound. Today, 60% of the companies based in Issy-les-Moulineaux are in information and communications technology, including Cisco Systems Europe, France Telecom, Hewlet Packard, Orange Internet, Sybase, Canal+, Canal Satellite, Eurosport, France 5 and France 24. A partnership between the city and France Telecom's R&D facility has made Issy a test bed for new applications like fiber-to-the-home, which is currently deployed to a test group of 4,000 households. Business attraction and growth have been so robust that Issy-les-Moulineaux currently has more jobs than residents - a claim that few cities in the world can make.

Population
1,148,785

Labor Force
686,000

Top Industries
Government, information technology, telecommunications, life sciences, tourism.

Ottawa-Gatineau, Ontario-Quebec, Canada

Ottawa and Gatineau are cities on the opposite banks of the Ottawa River, with English-speaking Ottawa on the Ontario side and Gatineau in French-speaking Quebec Province on the other. Together, they form a metropolitan area of over 1 million people. In addition to language, one more thing distinguishes Ottawa from its sister city: since 1867, it has been the capital city of Canada.

As with other national capitals, the main business of Ottawa has long been government. Total Federal government expenditures have risen from C$16 billion (US$14bn) in 1970 to C$158 billion (US$134bn) in 2001, though a growing economy has actually reduced Federal spending as a percentage of GDP. While most of that spending is distributed across Canada's vast land mass, the nation's capital naturally benefits. Today, 13% of the current labor force of Ottawa-Gatineau consists of Federal government employees.

But, like the capital region of other nations, a strong government cluster has also attracted businesses that depend on government policies and spending decisions. Canada's telecommunications industry, once state-owned, is headquartered in the region, and defense, security, software and life sciences companies have found good reason to locate offices and research facilities there. Current employment in the region's more than 1,800 high-tech companies is equal to 11% of the total labor force, even after the technology bust at the turn of the last century.

Besides being prosperous and dynamic, Ottawa-Gatineau is a nice place to live. It enjoys a beautiful natural setting at the junction of three rivers and boasts the lowest cost of living of any major North American city. It was ranked sixth in the world for quality of life by the Swiss firm Corporate Resources Group, and a cross-Canada survey recognized the region as the best place to live and work in the nation.

Ottawa 20/20

Given this situation, the region's political leaders could be forgiven for resting smugly on their laurels. But they have done nothing of the kind. In 1999, the City of Ottawa formed The Ottawa Partnership (TOP), a group of public and private-sector leaders who advised government on growing and sustaining the local economy. In 2001, the area completed a political reorganization that united a regional government body and 11 urban and rural municipalities, including both Ottawa and Gatineau, into one local government structure. As part of that process, the new government published a plan called Ottawa 20/20. Its goal was to establish a unified planning, zoning and development scheme that would see the community through the next 20 years as its population increased by as much as 50%. Following a performance review of the first five years, the government recently published a detailed plan for 2006-2009 focusing on economic development, equality and privacy issues. With an overall goal of making Ottawa-Gatineau an "Innovation Capital," priorities include workforce skills development, improving knowledge sharing among businesses and citizens, linking innovation more effectively with the marketplace, strengthening entrepreneurship and upgrading marketing.

Behind these priorities are two primary challenges to the region's continued success. Research by The Impact Group in Toronto, in collaboration with H. Douglas Barber, co-founder and retired CEO of Genum Corporation, one of Canada's most successful high-tech firms, shows that Canada suffers from a "commercialization gap" compared with its neighbor nation to the south. Canada is strong in research and development and has some world-class technology companies like Nortel and Mitel, but Canadian business generally lags American business in bringing technology innovation to market. According to Dr. Barber, the key to the problem is the relative inability of government, compared with the private

sector, to understand customer needs and innovate competitively to meet them. Statistics from Industry Canada reveal that, in 2000, 68% of funding for R&D came from government and related sources while industry contributed 32%. This is nearly the reverse of the US, where industry spent 67% of each R&D dollar and government spent only 33%. This relative lack of customer centricity and commercial competence tends to produce technology-based enterprises that cannot afford the marketing or R&D needed to succeed.

The other challenge has to do with the region's unique mix of urban and rural areas. In urban areas, 94% of households and 100% of business and government facilities had access to broadband in 2003, whereas availability in rural areas was about 2%. Lack of broadband infrastructure posed a severe constraint on further development outside the existing urban zones.

Changing the Culture

It may be ironic to ask government to tackle a commercialization gap caused by an excess of government over private investment. But Ottawa-Gatineau is pursuing several creative approaches to changing the culture of innovation in business. Leading by example, the city has put dozens of services, from pet registration to utility bill payment, online. A SmartCapital program completed in 2003 introduced a collaborative online catalog of the resources of major universities, institutes and libraries in the region. An Entrepreneurship Center offers assistance in starting and growing companies, and connects them with local venture capitalists. More than 2,400 clients started businesses in 2004 alone, and they created more than 7,800 new jobs and C$205 million (US$174m) in new investment. Annual venture capital investment in the region has grown at an average of 50% per year since 1995, peaking at C$1.35 billion (US$1.15bn) during the technology boom and settling to a more sustainable C$250 million (US$212m) since then. Government, business and academia now collaborate on workforce development programs ranging from math tutoring for talented low-income children to analyzing skills gaps and working to fill them.

Meanwhile, government spurred the formation of a volunteer group, the Ottawa Rural Communities network (ORCnet) to build awareness about broadband and aggregate demand in rural areas. Through workshops, communities meetings and work with the telecom sector, ORCnet helped service providers build a business case for extending broadband into low-density markets. To sweeten the pot, local government put C$1 million (US$850k) into a public-private partnership that is investing C$3 million (US$2.5m) in a network build-out scheduled for completion in autumn 2007, which is expected to largely close the urban-rural broadband gap.

Ottawa-Gattineau has targeted life sciences, which already employs 11,000 people, as well as wireless, VoIP and green technologies as its best hope of future growth as the Innovation Capital. With over 78,000 people employed in high-tech already, the region looks forward to having a technology labor force larger than its Federal labor force, and to seeing privately-funded innovation become the primary driver of its economy.

Population
283,700

Labor Force
126,100

Top Industries
Call centers, business services, automotive manufacturing, healthcare, adult education.

Sunderland, Tyne & Wear, United Kingdom

ICF welcomes the city of Sunderland to the Top Seven for an unprecedented fifth time this year. The largest city in the Northeast of England, Sunderland has quite literally risen from the ashes of the Industrial Age to create a globally competitive city prospering in the Broadband Economy. This transformation was due to neither luck nor location, but to visionary leadership, good planning and unrelenting commitment.

In the 1980s, this former shipbuilding and mining center on the North Sea, which at one time launched more ships than any other port in Europe, had a peak unemployment rate of 22%. As the last shipyard closed in 1988 and the last coal mine followed in 1994, Sunderland fell into the bottom 10% of Britain's "depressed districts." The legacy of heavy industry was a large unemployed group of low-skilled workers, many with chronic health problems. With so little local opportunity, young people fled the city, leaving behind a shrinking and aging population.

Partnership Strategy

Sunderland's government responded in a way that would become a much-copied strategy for success. In 1991, it organized a volunteer group called the Sunderland Partnership, comprised of members from government, local universities, the chamber of commerce and citizen leaders representing important constituencies. The Partnership developed a vision for a new economy based on what Europeans called "telematics" - the union of telecommunications and computers. While City Council staff labored to translate this vision into measurable goals and meaningful programs, the Partnership focused on politics. Members educated their organizations and constituents about the crisis into which Sunderland had fallen, the challenges to recovery, and their vision for the future. This was to prove essential to Sunderland's success, because it created the political will and integration needed to embrace change.

The Telematics Strategy was published in 1996 to cover a 5-year period through 2001. It included training programs in call center and other Digital Age skills for the unemployed, public-access Internet kiosks and "electronic village halls" with Internet access, business incubation programs and an initial, government-funded high-speed network for a metropolitan area possessing no more than basic telephone infrastructure.

Doxford International

Meanwhile, the economic development staff succeeded in persuading a real estate developer to build the first speculative building of what is now Doxford International, an award-winning office park. During the 1990s, it filled and

expanded, filled again and expanded again as the European headquarters of Nike and Verisign, and home to such companies as Barclays, CitiFinancial, EDF Energy and T-Mobile. These companies were attracted by the high-quality facilities in a city with attractive wage costs, a strong incentive program, and the availability of freshly-trained labor. The same team won public-sector funding from the national government and European Commission and invested it in rebuilding the derelict waterfront into a new home for the University of Sunderland, a former technical institute that had gained university status in 1992.

By 2000, Sunderland had created 9,000 new jobs. A second Telematics strategy, covering the 1999-2003 period, focused on using ICT to promote social inclusion and ensure that everyone benefited from the city's transformation into an Intelligent Community. It set new goals, including development of a publicly-owned ISP and e-government hub called the Sunderland Host, expansion of the high-speed network to businesses and community centers, and creation of a one-stop Sunderland Portal for citizens, business and government users. There was no let-up, however, in economic development efforts. In 2002, EDS opened its first data center in the North of England in Sunderland. During the three years from 2002 to 2004, Sunderland secured 72% of the new jobs entering the region, despite having just 11% of the North's population.

The latest plan, called The Sunderland Strategy (2004-07) has focused on exploiting the city's global connectivity and growing knowledge workforce to attract even more inward investment and encourage the formation and growth of small and midsize companies. For the past five years, the number of net new jobs has increased 4.87% compared with the UK average of 3.17%. Sunderland has also seen a measurable improvement in the quality of those jobs, with growth primarily in financial and customer services that offer good pay and prospects for advancement. From 2004 to 2005, gross weekly pay in Sunderland rose at three times the national average, and the average salary for full-time employees is almost double the national minimum wage.

Working Together

Sunderland's transformation from industrial has-been to Intelligent Community illustrates the power of making many separate elements work in concert. For example, the city's activism about deploying broadband, and willingness to create joint ventures where necessary to reduce risks to the private sector, convinced carriers including NTL-Telewest, BT and Tiscali to provide broadband at competitive costs for speeds up to 10 Mbps. Broadband penetration has leaped from 25% two years ago to 75% today. The City Council has taken advantage of this connectivity to create an e-government portal that delivers a wide range of services to about 30,000 visitors per month. Broadband is also the medium for a Virtual Learning Environment created by the City of Sunderland College that is used by more than 20,000 students for training in information technology.

The "electronic village halls" created by the first Telematics Strategy are being expanded into multi-agency centers, which provide healthcare, housing, welfare rights, police, job-finder and other services as well youth and sports facilities. Video-conferencing links people using the centers to support staff. These are supplemented by kiosks distributed throughout the city. Sunderland has also identified and trained Community e-Champions to broaden digital inclusion at the neighborhood level, as part of a "peoplefirst" strategy that also equips social service workers with wireless PDAs from which they can instantly check databases and record service requests.

Following on the success of Doxford International, Sunderland has attracted major investment in technology office parks and incubators. The Business & Innovation Center at the Sunderland Science Park offers 200,00 sq. ft. (18,580 m^2)of high-tech workspace housing 165 companies employing 1,100 people. The Rainton Bridge Business Park currently houses 150,000 sq. ft. (13,935 m^2) of incubators and technology facilities and will become the site of a 400,000 sq. ft. development by Northern Rock that will put the site on course to exceed the original target of 4,000 new jobs.

The University of Sunderland, with 250 full time R&D staff, has become an innovation hub that makes business formation a priority. A Digital Media Center created with support from Sony is the most advanced facility of its kind in the UK, with 50,000 sq. ft. (4,645 m^2) of film, TV and radio studios, and includes an incubation space for students setting up their own businesses. A New Ventures project facilitates the spin-out of new businesses from University research, while the University continues to expand incubator facilities and develop venture financing in collaboration with government and the private sector. A recent survey revealed that 10% of Sunderland's labor force is now self-employed - inspired perhaps by the success of local entrepreneurs like Paul Callaghan, who founded Leighton Group at the Business & Innovation Center in 1997. It is now a global business serving customers including British Airways, Lloyds TSB and Microsoft.

So successful have been its efforts to develop a knowledge-based economy that Sunderland has begun branding itself as the "Software City." It is remarkable to think that, in a single generation, the people of Sunderland have moved from slag heaps, slums and stagnation into a future built on turning knowledge into prosperity.

Population
401,000

Labor Force
222,700

Top Industries
Manufacturing, trade, transport & communications, business services.

Tallinn, Estonia

Located on the shores of the Baltic Sea, Tallinn is the capital of a nation that spent 51 years as part of the Soviet empire. It gained independence in 1991 and saw the last Russian troops depart in 1994. Yet by 2006, Estonia was a member of the European Union, had an economy growing at double-digit rates and was ranked in 25th position for international competitiveness by the World Economic Forum. In addition to being Estonia's capital, Tallinn represents 70% of its economy (though only 30% of its population of 1.4 million). ICF recognizes Tallin as the economic and political center of a nation whose population is that of a large city, salutes its unprecedented gamble on ICT as a pathway to the broadband economy.

"Tiger Leap"

With the final departure of foreign troops, Estonia discovered that freedom alone does not bring investment or prosperity. The national government led by then prime minister Mart Laar took radical measures to tame hyperinflation, abolish taxes on business and require a balanced state budget. Yet even such heroic measures were clearly inadequate to meet the challenge. In 1995, Estonia's ambassador to the US and Canada (now president), Toomas Hendrik Ilves, publicized the idea of connecting all schools to the Internet. Estonia's then President Lennart Meri supported the idea and the government created a program called "Tiger Leap" to provide all schools with PCs and Internet connections by 1999. This was at a time when school buildings were in disrepair and teacher pay was only US$100 per month.

Even before Tiger Leap could prove its educational value, the concept began to spread. A "Tiger Tours" program funded by an NGO put computers into vehicles to introduce ICT to the rural population. Banks in Tallinn talked about their own Tiger Leaps while introduce e-banking, and newspapers being published for the first time put out online editions. Lack of purchasing power, however, posed a clear obstacle to ICT adoption. In response, the National Library in Tallinn introduced the first public access Internet services with funding from UNDP. The Soros Foundation began a program that invited enthusiasts to create public access points all over the country, and in 2000, a private foundation called Look@World, funded by telecom, banking and computer companies, spread public access Internet even farther. That same year, Parliament passed a Public Information Act that required all public libraries to provide Internet access. When a chain of gas stations began offering free WiFi for all customers in 2003, it was a sign that the nation's IT revolution was well underway.

Ideas, Action, Policies

This early success set a pattern that has distinguished the progress of Tallinn and Estonia. Ideas came first, followed by action and only then by policy. Rather than creating a comprehensive plan, the government passed a set of Basic Principles for the Information Society in 1997, then stood back to let businesses and individuals get to work. An Informatics Council with representatives from government, business academia and nonprofits made sure that government stayed informed about developments. And when issues arose, government reacted. Banks in Tallinn began offering online services in 1997, for example, but only when online banking achieved critical mass did the government enact a law giving digital signatures legal status.

It was only in education and e-government that national leaders insisted on taking proactive steps funded from the state budget. From 1998 to 2004, the government pushed through three major projects. As part of Tiger Leap, the government made wholesale purchases of computers and persuaded banks to support leasing programs that included Internet access. State funding also went to building a backbone network linking Tallinn to other municipalities, which now supports a WiMax network covering 90% of Estonia. It encouraged the Look@World foundation to execute an education program that delivered computer literacy training to 100,000 adults. The government also introduced an electronic ID card and developed a public key data security system to support safe e-commerce. The third project was a massive e-government system backed by the 2000 Public Information Act, which required all government agencies to create interactive portals and make public a broad range of information - even the salaries and mobile phone number of public officials.

Strong Adoption, Strong Platform

Two aspects of the e-government program stand out. One is the range of services and strong adoption by users. Citizens now submit 82% of all personal income tax returns online, while business use tops 90%. Services for child and family support, medical insurance, passport renewal, tracking of pension contributions and domicile registry can all be done online. With mobile phone penetration over 100%, many of these services can also be executed by phone; today, Tallinn collects 50% of all parking fees via mobile phone. In 2005, 4.3% of total government funding was distributed through such e-services. Citizens registered with the State Chancellery portal can even propose legislation that, if it survives debate and an online vote, is accepted for Parliamentary consideration. Some 5% of such proposals have turned into law. In October 2005, Estonia held the world's first national election that offered users the chance to vote online.

The other aspect concerns the digital "plumbing" of the e-government platform. In order to bridge the many databases and systems that were springing up in different departments, the government created a "middleware" platform called X-Road. X-Road not only allowed different systems to

talk to each other securely but included standard tools to speed the development of new online services, so that it takes from a few hours to a few days, at a cost of US$1,000 to $10,000, to develop a new service. X-Road became the backbone of all e-government services. As of August 2006, it linked 64 databases to provide 921 different services across 363 institutions and companies.

Today, it is clear that the ICT gamble has paid off. Internet penetration stands at 58%, with all schools and public buildings connected via broadband. Business Internet connectivity is over 90%. A 2006 survey of the online availability of public services in Europe by CapGemini put Estonia into third place, and the country ranked among the top 22 countries in the UN's Global E-Government Readiness Report. After 10 years of average GDP growth in excess of 5%, Estonia per-capita income is still only about 40% of the EU15 average. But use of the Internet by Estonians is well above the average of its European neighbors. That suggests even greater things are in store for this "tiger" on the Baltic Sea.

Population
115,000

Labor Force
55,551

Top Industries
Education, research, insurance & financial services, information and telecom technology

Waterloo, Ontario, Canada

Waterloo is the smallest, geographically speaking, of seven cities that make up Canada's Technology Triangle. Small in size it may be, but this second-time Top Seven honoree casts a big shadow in terms of technology-based growth. The Triangle itself is home to 334 technology companies and another 404 providing related services that employ about 10% of the labor force, but account for 45% of job growth.

Among the seven communities, Waterloo is home to 40% of the high-tech firms. Its recent history illustrates the power of getting a few critical things right and then working together to nurture and manage the resulting success over time.

Intellectual Property

The community's first and perhaps most important "right thing" took place at the University of Waterloo. The University was founded in 1960 by two businessmen, Gerald Hagey and Ira Needles, who saw an opportunity to create a high-level technical institution to train local business leaders. In the 1970s, the University established an intellectual property policy that was unheard of in its day. The policy allowed students and faculty members to own rights in intellectual property they developed at the University.

The University's timing was excellent. When the introduction of the personal computer began a decades-long wave of ICT growth, Waterloo was positioned to benefit. Like Stanford University in Silicon Valley, it spurred spin-outs of technology-based businesses, and local entrepreneurs began to build clusters of companies working on the most exciting technologies of the day. Fast-forward a few decades and the Waterloo region is a place where investors have poured C$1.8 billion (US$1.5bn) over the past 10 years into acquiring privately-held technology companies. It is also the home of companies that, over the past eight years, made up 10% of successful IPOs on

the Toronto Stock Exchange. Publicly-held technology companies in the Waterloo region have generated a 26% internal rate of return since 1994, according to Pricewaterhouse Coopers, and the original investors in firms that were acquired or went public have received more than a seven-fold return on their investments. Waterloo's leading technology companies today include Research in Motion (RIM, creator of the BlackBerry), Sybase, Open Text, DALSA and Descartes Systems Group.

Today, the University offers the world's largest post-secondary co-op program serving over 11,000 students. It operates more than 50 research institutes, 12 Federal and Provincial Centers of Excellence, is a partner with the city, region and nonprofits in developing a Research & Technology Park. But it does not stand alone. Wilfrid Laurier University is home to one of Canada's largest business schools as well as the Schlegel Center for Entrepreneurship, while the Conestoga College Institute of Technology and Advanced Learning has earned a #1 ranking from the Province of Ontario for eight straight years.

Engaging Business, Citizens and Government

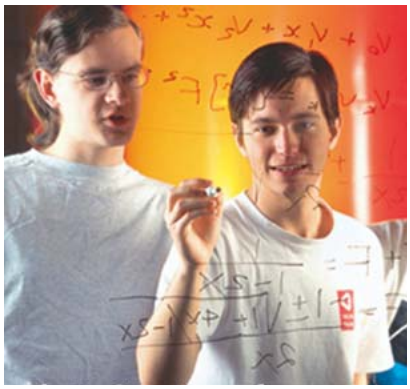
The community's second "right thing" was a local government that has engaged actively with business and citizens in planning for a prosperous future. A Strategic Resource Information Plan developed in 1990 set the pattern for data-sharing and integration among agencies and pointed the way toward the 1998 introduction of the award-winning, Internet-based Waterloo Information Network. Today, Waterloo offers a wide range of online services, from the minutes of council meetings and city program registration to tax assessment tools, interactive GIS maps and marriage license registration.

In 2000, the city undertook a year-long project called Imagine!Waterloo. This city-wide public consultation aimed to determine the best possible future for the city. Its recommendations ranged from environmental protection to transportation, culture to city communications. An Intelligent Waterloo Steering Committee formed in 2006 - led by Jim Balsilie, co-founder of RIM, Waterloo's Mayor and University of Waterloo President David Johnston - stages events to educate business leaders, academics and citizens about the challenges Waterloo faces and engage them in setting goals for educational achievement, access to services, investment in infrastructure and social inclusion.

Collaboration and Reinvestment

The third "right thing" in Waterloo is a culture of collaboration and reinvestment. Perhaps because cooperation among business, academia and government has been so successful, folks in Waterloo make partnership a priority and are eager to give back to the community. Waterloo-based Tech

Capital Partners manages C$95 million in venture capital for early-stage companies, while a group of business leaders has recently launched Infusion Angels to find and fund ideas from University of Waterloo students and alumni. UW and Wilfrid Laurier jointly run a Launchpad $50K Venture Creation Competition for students, researchers and community members who develop business plans and start successful businesses. Successful entrepreneurs have also reached into their pockets to fund or contributed their time to the founding of the Center for International Governance Innovation (CIGI), the Perimeter Institute for Theoretical Physics, Institute for Quantum Computing, Center for Wireless Communications, the Waterloo Technology StartUp Network, and Communitech, a capacity-building association focusing on technology in the region. Each fall, the Waterloo region celebrates Entrepreneur Week, North America's largest innovation festival.



Sharing the wealth extends as well to people for whom technology is more a challenge than opportunity. Like other Canadian communities, Waterloo participates in the Federal Community Access Program that places Internet workstations in public access locations. Waterloo's public libraries have become ICT learning centers that, thanks to company donations, lend laptops as well as books. Through Wilfred Laurier's Center for Community Service-Learning, nearly 1,000 students a year engage with 200 local partner organizations in programs that connect community service to classroom learning. Business and nonprofit organizations have joined forces to create the Waterloo Region Immigrant Employment network to help match recent immigrants to job opportunities, while the Waterloo Public Library has developed an online portal, ProjectNOW, to provide settlement and labor information to newcomers.

With 76% of businesses and 47% of households on broadband, and 75% of adults using the Internet, Waterloo is already a broadband economy success story. The challenge the community has set itself is to sustain and accelerate its success in a global economy that competes harder for investment, talent and ideas with each passing year.

About the Intelligent Community Forum

The Intelligent Community Forum (ICF) is a nonprofit think tank that focuses on the creation of prosperous local economies and robust societies in the "broadband economy" of the 21st Century. From global networks connecting business centers to DSL linking homes, broadband is revolutionizing business, government, education, work and lifestyles. By opening markets, it both creates new jobs and destroys existing ones. By making possible the export of services and skills, it puts workers into wage and skill competition with people around the globe. ICF conducts research, hosts events, offers site-tour programs, publishes newsletters and presents awards to help communities understand both the opportunities and challenges, and to promote best practices in economic and social development.

Intelligent Community Forum
+1 212-825-0218 fax +1 212-825-0075 www.intelligentcommunity.org