The Top Seven Intelligent Communities of 2009

Local Growth in a Global Economic Crisis

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Intelligent Community Forum

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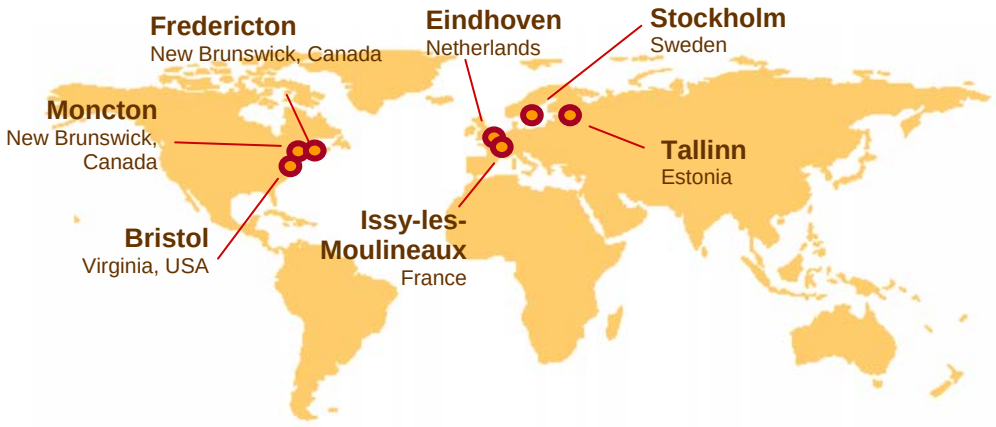
Intelligent Communities of the Year

Since 1999, the Intelligent Community Forum has presented awards to honor the achievements of communities tackling the complex task of building and maintaining competitive and inclusive local economies in the global Broadband Economy. The Top Seven Intelligent Communities of 2009 shown below represent the second stage of an annual process that attracts hundreds of nominations and, ten months later, names one city, town or region as the Intelligent Community of the Year.



ICF has developed a set of Intelligent Community Indicators (see page 10) that provide the first framework for understanding how communities and regions can build sustainable, inclusive prosperity in today's hypercompetitive global marketplace. To gain a place among the Top Seven, communities pass through an intensive analysis of their strategies, programs and results in five categories: broadband deployment, the ability to create and sustain a knowledge-based workforce, digital inclusion, innovation, marketing and advocacy.

The Top Seven excel in all of these areas. But that does not make them the seven "smartest" communities on the planet, whatever that might mean. Rather, it makes them the seven most compelling models of best practice in economic and community development worldwide. The Top Seven are leaders because of the strategic approach they have taken to creating prosperity in the Broadband Economy and the effectiveness of their execution. They are leaders in helping us understand the way toward the community of the 21st Century.

Cluster of Communities

This year's Top Seven Intelligent Communities fall into geographic clusters. Three are on the eastern edge of North America, two within a single Canadian province. Four are in Europe, two in the near-neighboring countries of Netherlands and France, and two on nearly the same latitude with only the

Baltic Sea between them. There is no particular significance to this clustering, but on the map it certainly jumps out to the eye.

While geographic clustering is accidental, however, the communities share common characteristics that have much to do with their success. In the profiles that follow, you will find many examples of successful *collaboration* among the government, business and nonprofit sectors. In **Moncton, New Brunswick, Canada**, economic crisis lead local governments to forge strong partnerships and invest in growth rather than fight over shares of a shrinking economy. In **Eindhoven, Netherlands**, a public-private venture called Brainport has institutionalized a remarkable rolling collaboration among businesses, institutions and government agencies whose sole purpose is the creation of opportunity.

You will also meet examples of *leadership*, in which an individual or group outlines a clear vision, attracts support for it throughout the community, and executes programs that deliver on the vision. The citizens of **Issy-les-Moulineaux in France** elected a visionary Mayor who devoted the next two decades to making the local economy a magnet for information and communications technology (ICT) businesses. In **Bristol, Virgina, USA**, the city council and its municipal-owned utility fought for the right to deliver ICT services to businesses and residents in a battle that went to the state legislature and cost the taxpayers US$2.5 million – but then saved customers four times more than that over the next decade.

A recurring theme is the need for *economic sustainability*. None of the communities profiled here approached its development as a pilot project with a limited life expectancy. Whether the aim was to generate income for the general fund, deliver public services more cost-effectively or to create a more attractive environment for business, the communities planned for the long term while insisting on achieving a return on investment. Carefully pegging their investments of public funds to measurable goals, they invested ahead of demand – but not very far ahead. Where private-sector partners contributed to the community's efforts, they found a business-like culture that made good business sense.

From Moncton creating an information-based economy in what was once a railroad town to Tallinn rising from the ashes of the Soviet empire, the Top Seven of 2009 have faced adversity and conquered it. The flexibility, adaptability and sensitivity to opportunity gained in the process will give them a major advantage in the challenging years to come.

In **Fredericton, New Brunswick, Canada**, local government saved large sums of money by creating its own telecom carrier to serve government facilities – then expanded it to meet business demand and found that they could provide free wireless broadband on top of this platform at a nominal cost. **Stockholm, Sweden** formed a company to dig up the streets just once, lay fiber everywhere, and then offer transmission capacity to a wide range of carriers for less than it would cost them to build their own networks.

No Intelligent Community succeeds entirely based on strategies, plans and return on investment. Success happens in people's heads. At ICF, we call it the *culture of use*. When citizens, employees and managers incorporate broadband into their daily lives, they gain the survival skills of the Broadband Economy and the power to tap new sources of knowledge and opportunity. Every citizen and business becomes part of the community's economic development strategy. In **Tallinn, Estonia**, the words "Tiger Leap" became the rallying cry for pushing past the barricades of the Soviet past and seizing a global future. In Issy-les-Moullineaux, culture of use was the CyberKindergarten, the CyberTearoom and the Participatory Budget system. In Neunen, a suburb of Eindhoven, it meant persuading homeowners and business owners that fiber-based broadband was just another property improvement that would easily pay for itself in time. It was volunteers in Fredericton using a Web-based system to organize the Harvest Jazz and Blues Festival, Bristol's schools conducting standardized testing over the fiber network, Stockholm's government running almost entirely online, and Moncton using WiFi to build ridership on its municipal buses.

Recession Resistance

This year's Top Seven Intelligent Communities are different from their predecessors in one important way: we are viewing their achievements in the context of the first global recession since the 1930s. The obvious question is: does being an Intelligent Community confer some kind of resistance to global economic crisis?

It is far too soon to tell, in this challenging period that is testing so many business models and economic assumptions. But a careful reading of their stories shows that most have faced severe challenges to their prosperity in the past. They have overcome those challenges, not by accident, but by working to understand the issue, gathering the political will to tackle it, finding partners to enhance their strength, and executing a well thought-out strategy.

No doubt, it all appeared to be a mess at the time. Hope and despair reverberated in the echo chamber of people's fears. Leaders pressed forward and were alternately praised and pilloried for it. But the majority of people went on with their lives. They carried on the work of the community until, in time, a new way of live emerged. The community engaged with the global Broadband Economy and found new sources of prosperity within it. From Moncton creating an information-based economy in what was once a railroad town to Tallinn rising from the ashes of the Soviet empire, the Top Seven of 2009 have faced adversity and conquered it. The flexibility, adaptability and sensitivity to opportunity gained in the process will give them a major advantage in the challenging years to come. ■

Best Practices of the 2009 Top Seven

ICF researches the best practices of Intelligent Communities and shares them with others around the world in order to help them become more prosperous, inclusive and sustainable. In the profiles of the 2009 Top Seven, you will find examples of the best practices described below.

Fredericton, New Brunswick, Canada (page 26)

Aggregate public and private telecom demand to fund network deployment

Government is a major telecommunications customer, which provides it with important leverage in broadband network deployment. Faced with a local incumbent carrier unwilling to invest in meeting the community's needs, Fredericton, New Brunswick, Canada began by aggregating the existing demand of major users. It formed a cooperative organization called e-Novations with 12 members including the city, universities, businesses and a large ISP. Using funds invested by the members, it built a fiber ring connecting their facilities and purchased bandwidth at wholesale prices. The carrier achieved positive cash flow and the members realized immediate cost savings, which put them on the path to payback of their original investments. More importantly, the fiber ring became the backbone for a major deepening of the city's broadband resources. To reach facilities beyond the reach of the fiber ring, e-Novations deployed point-to-point microwave, which proved both inexpensive and reliable. Fredericton deployed a zone of overlapping WiFi nodes across 65% of the city that tapped the fiber ring for connectivity, and did it so inexpensively that e-Novations provided wireless broadband in the "Fred-eZone" for free.

Stockholm, Sweden (page 38)

Encourage broadband competition with an open-access broadband network

Larger cities where carriers are already deploying broadband still struggle to create a competitive market that lowers costs and drives innovation in service. In most communities, it is the long-time incumbent that deploys broadband at its own pace and with almost total control over pricing. In Stockholm, Sweden, the city created competition by founding its own carrier called Stokab. The company dug up the streets once to install conduit and run fiber, closed them, and began offering dark fiber capacity to carriers for less than it would cost them to install it themselves. Today, the 1.2 million kilometer (720,000-mile) network has more than 90 operators and 450 enterprises as primary customers. The revenue stream from their lease payments allows Stokab to service its debt while continuing to invest in new capabilities. Experience shows that such "open-access" networks are most effective when population density is high. They are powerful means to open attractive markets to competition, because they remove the "sunk cost" advantage of the incumbent carrier and make it relatively inexpensive for new carriers to enter the market. But they cannot make a low-density rural market suddenly attractive to private carriers.

Bristol, Virginia, USA (page 18)

Market the community's expertise in network development

Many communities have developed valuable expertise in municipal network deployment, IT management, and the creation of applications in e-government, e-health, e-education or e-culture. In the case of Bristol, Virginia, USA, Bristol Virginia Utilities (BVU) management realized that the expertise the company had developed in network development and management had economic value, and invested in creating a consulting service called BVU FOCUS. Marketing through local government channels produced the first customer: Mi-Connections in the state of North Carolina. Under BVU's management, the US$80 million network grew its customer base 5% in the first year and exceeded budget by 27%.

Eindhoven, Netherlands (page 22)

Create a public-private innovation partnership

Creating a culture of innovation is a major challenge for Intelligent Communities. Local government can invest in innovative e-government services but this has only an indirect impact on local business, on which job creation depends. In Eindhoven, Netherlands, the regional authority, local governments and major employers created a public-private venture called Brainport and assigned it an aggressive mission: to spur innovation by matching the needs, expertise and goals of its members, which are Eindhoven companies and institutions. Sometimes government provides the impetus, as when police worked with local companies to establish a highly automated video surveillance network to deter and detect crime. In other cases, Brainport matched manufacturers to local training and IT companies, publishers to producers of digital media devices, or universities to athletic clubs. Brainport operates by working intensively to understand its members' requirements and ambitions, identify matches, and counsel the organizations through the difficult start-up period.

Issy-les-Moulineaux, France (page 30)

Tallinn, Estonia (page 42)

Make investments in e-government that promote a culture of use for ICT

Local government has a unique opportunity to lead by example when it comes to creating a culture of use for broadband and information technology, because it offers services that citizens and businesses use every day. Issy-les-Moulineaux, France turned responsibility for IT over to a private-sector company, which created a series of applications aiming to increase public involvement in government. When the Council put its meetings on cable TV and online, and invited citizens to comment by telephone and email, participation climbed from single digits to 45% of residents who participate regularly in Council meetings. An online citizen relationship management program provides a central point of contact for citizen complaints and inquiries. An online portal offers local news, online procurement, online filing for permits and certificates and Web-based access to public documents.

Though control of public services, Issy also pushed ICT-awareness into citizens' daily lives. It set up Cyber Kindergartens in which parents could see and interact with their children via Webcams, and Cyber Tearoooms where older citizens could receive training in digital technologies in familiar and comforting surroundings. A volunteer Citizen Panel is polled frequently for input into public policy, while others join a Participatory Budget-Making

program that gives them a voice in shaping investment decisions by local government. It is no wonder that 98% of respondents told a recent survey that the Internet had fundamentally changed their lives.

In Tallin, Estonia, e-government via the Web, email and mobile phone permeates the lives of citizens. An e-School platform connects students, parents, teachers and administrators and creates a shared learning environment. Parents register their children online for local sports teams and access a secure online health management system for doctors, patients and schools. An e-Meeting system connects members of government regardless of their location and invites citizens to collaborate in public decision-making.

Moncton, New Brunswick, Canada (page 34)

Provide community leaders access to new challenges

Talent is the raw material on which Intelligent Communities are built. This is especially true when it comes to the political, administrative, nonprofit and business leadership that drives change. Moncton, New Brunswick, Canada is a small city where talent is always at a premium. Its volunteer culture, however, regularly recycles experienced leaders into new roles. From 2004 to 2008, the chair of the City Council's Prosperity and Economic Affairs Committee was the founder of the public-private Moncton Technology Planning Group. Members of this group, in turn, had previously served on the board of the Enterprise Greater Moncton economic development organization and the Chamber of Commerce. Enterprise Greater Moncton has both the current Mayor and top economic development officer on its board. By creating the expectation that experienced leaders will transition into new roles, Moncton avoids losing their expertise and maintains the continuity needed to achieve its goals.

The Broadband Economy

Whether you know it or not, you are living in the Broadband Economy. It is the new global economy - what many call "globalization" - emerging from the deployment of broadband around the planet.

It is an economy in which, for all intents and purposes, the hard-working people of Mumbai, Shenzen and Bangladesh live right next door to the hard-working people of Montreal, San Francisco and Berlin, because their communities are connected It is an economy based on digital collaboration and cooperation across time zones and cultures, which has opened markets, boosted productivity, created employment, and improved living standards. In the Broadband Economy, companies look for opportunities to locate their facilities where they can gain the greatest advantage in terms of cost, skills and access to markets. So does money: broadband has made capital investment in businesses, factories and facilities highly mobile. Billions 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.

Communities With the Same Goals

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 give those young people enough economic opportunity to allow them to stay and raise children of their own. In the Broadband Economy, that task is more challenging than ever. Where geographic location and natural resources were once the key determiners of a community's economic potential, it is increasingly the skills of the labor force, and the ability of business and government to adapt and innovate, that power job creation.

Powerful Tools for Community Development

The Broadband Economy may challenge communities, but it also hands them powerful new tools to build competitive and inclusive economies. Broadband offers smaller communities in remote locations the opportunity to move from the periphery to the center in economic terms. It enables small companies to be global exporters - including the export of skills and knowledge which were never before transportable across time zones or national borders. It can ensure that schools in remote regions have access to the latest information tools and reference sources. It can link 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.

Becoming an Intelligent Community

In a study funded by the Province of Ontario, Canada, the Intelligent Community Forum defined five critical success factors for the creation of Intelligent Communities. This list of Intelligent Community Indicators, as the study termed them, provided the first conceptual framework for understanding all of the factors that determine a community's competitiveness in the Broadband Economy.

Broadband

Broadband has been the fastest-growing communications technology in history. From 2000 to 2007, the number of Americans subscribing to broadband grew 684%. The French saw 2,800% growth during the same period, while the British boomed at a rate of 28,300%. The South Koreans saw only 264% growth during the period – because they got started deploying broadband well before 2000.

Yet not everyone benefited equally. Carriers in monopoly markets have had little incentive to invest in new infrastructure. Competitive carriers give priority to places with the best short-term business case: urban areas, high-income neighborhoods, and business districts. High cost areas, such as rural regions, and low-income markets, remain at the bottom of the priority list.

Where the private sector has deployed affordable and high-quality services, broadband is not an issue. But in other communities, local and regional governments have found many ways to involve themselves in spurring access to broadband for their constituents. The most successful have all begun with the same first step: establishing a clear vision and communicating why broadband access matters. If constituents believe that broadband is just about downloading music or playing online games, they will not provide political support when it is needed. But if they see broadband as a path to prosperity and greater citizen participation, it will be quite a different story.

Once communities know what they want to do and why, they take different paths to get there. The Intelligent Community Forum has identified five approaches taken by the communities we have studied.

1. **Development Policy.** Remaining safely within the bounds of tradition, governments direct the usual tools of development policy at broadband deployment. They set broadband-friendly building codes. They conduct inventories of existing broadband networks and access points. They offer tax credits and craft rights-of-way policies to support network development.

2. **Networks for Government.** Local and regional governments are big users of communications, and they are generally as free as any business to build private networks for their own use. To reduce costs and gain new capabilities, they construct a fiber or coaxial network linking all government offices, schools, libraries hospitals and other public facilities. By making these investments in networks and services, governments become a vital anchor tenant for broadband and stimulate demand for broadband services.

3. **Public-Private Partnerships.** In other cases, government sets its sights on building a public-access network from the start but chooses not to build, own or operate it. Public-private partnerships take many forms, limited only by the imagination and legal framework in which the municipality operates. Some communities issue municipal bonds to fund construction of a network, which they lease to private carriers, with the lease payments covering the debt service. Others create nonprofit organizations to develop networks in collaboration with private carriers or provide seed investment to jumpstart construction of networks that the private sector is unable to cost-justify on its own.

4. **Dark Fiber and Open Access Networks.** Yet another variation on deployment strategy leverages the municipality's control of its roads and rights of way to encourage the private sector to invest. In these communities, government stops issuing permits to carriers to lay cable or fiber and instead builds its own system of conduits and lays "dark fiber" throughout the network. It then leases access to the fiber to carriers. By digging up the streets once and then closing them to further construction, local governments protect their citizens from the disruption of repeated road work. The municipalities price the leases to cover their construction and maintenance costs as well as providing a positive return on investment. In some cases, the municipalities go a step further by creating an "open network" management platform that permits carriers to provision services almost instantly, which encourages competition and innovation.

5. **Direct Competition.** The most aggressive posture a community can take is to invest public funds in setting up a broadband carrier, building a network and delivering service to outside customers. Local government typically takes this path after repeated attempts to interest incumbent carriers in upgrading networks have failed because the carriers could not make a business case for investment. Since municipalities need to earn a return sufficient only to pay capital and operating costs, they can frequently make such a case themselves – particularly if they already own and operate water, gas or electric utilities, as many small rural communities do.

Knowledge Workforce

The term "knowledge work" was coined by management consultant Peter Drucker, who forecast in 1973 that, within two decades, it would become impossible to maintain a middle class lifestyle by working with one's hands. Drucker's prescient comment signaled that the world we knew was changing. He called the new work that would be required to enter the middle class "knowledge work" and the people who performed it "knowledge workers."

In the last decade of the 20th Century and first decade of the 21st, we have seen Drucker's prediction come true. Today, all desirable jobs in industrialized economies – and increasingly in developing economies as well – require a higher component of knowledge than they did in the past. In Singapore, the two largest contributors to the economy are manufacturing

(26%) and financial services (22%). Yet employers in both sectors pay the same premium (up to 5.5 times) for employees with more education.

What are the tools available to a community to promote the development of a workforce able to do knowledge work? It is generally accepted that the opportunity to create healthy and productive citizens begins in infancy and continues throughout our lives, ranging from pre-school programs to secondary and graduate education to adult skills training. The challenge to communities is that only some of these assets are within their control. When communities tackle development of a knowledge workforce, then, they must do it in a complex dance of collaboration with many levels of government, nonprofit institutions based in the community, and local business leaders.

Communities take different approaches depending on their situation and available opportunities.

- **Coordinating Assets.** Some communities have available a wide range of educational offerings and focus on making the "educational market" more efficient. They connect educational buyers and sellers, and ensure that education reaches not only those who can afford it but also those who need it most.
- **Creating Assets.** Not all communities are blessed with the presence of prestigious universities. They undertake the tougher job of creating educational institutions and services, from computer labs to public Internet kiosks, teacher training to online learning tools.

Growing your own knowledge workers is one part of the task. Keeping them and attracting more is another. In general, knowledge workers seek a good quality of life and believe they should be able to afford it. Because they have skills, they are also willing to move in search of it. Intelligent Communities invest in e-government programs that deliver services online and engage citizens in governing partly to create an attractive culture for knowledge workers. Wise investment and smart deployment of these programs can make even small and remote communities highly competitive in the global battle for talent.

Digital Inclusion

When we talk about digital inclusion, we're really talking about preventing digital exclusion. As broadband deploys widely through a community, there is serious risk that it will worsen the exclusion of people who already play a peripheral role in the economy and society, whether due to poverty, lack of skills, prejudice or geography. Deeper exclusion increases income inequality and all of the ills that go with it, while raising yet another obstacle to social mobility.

When markets fail to create infrastructure that benefits society, it is generally agreed that government or some non-commercial entity has a duty to do something about it. This is why governments around the world offer investment tax credits, build roads and rails, and develop seaports and airports. It is why, in every industrialized nation, the government has played a role in ensuring widespread deployment of electricity, telephone, radio and

television service. They view it as morally necessary, politically savvy and as increasing the growth potential of the entire market, thus raising living standards across the board. And so it is with digital inclusion.

Typically, communities seek to promote digital inclusion through programs addressing:

- **Access.** When local governments conclude that market failure is preventing some segments of their population from having access to broadband, they respond by building networks or partnering with private-sector carriers to reduce business risk to acceptable levels.
- **Affordability.** Even when broadband is available, the cost of the computer and connection can be out of reach for some parts of the population. Communities typically respond by providing free access to computers and connections at public sites like libraries and community centers, as well as by subsidizing computers and connectivity for target groups.
- **Skills.** A computer and broadband connection are useless without the right skills, ranging from basic literacy to keyboarding, PC literacy and facility with the Web. Communities respond to a skills gap with training programs for every age group in schools, libraries, community centers and special purpose facilities.

Every community that has addressed digital inclusion promotes the same set of achievements. So many public-access computers installed at libraries, municipal buildings, community centers and convenience stores. New classes on technology in primary and secondary schools. But successful Intelligent Communities go deeper. In crafting digital inclusion programs, they go beyond the basics to focus on fundamental change in the dynamics of digital exclusion:

- **Literacy and Numeracy.** The tools of the digital age require reasonable literacy and numeracy, or workarounds that allow illiterate segments of the population to access online services. In industrialized nations, illiterate adults typically deny their inability for fear of humiliation and often develop elaborate strategies to avoid exposure. Digital inclusion programs must make literacy and numeracy training readily available in ways that preserve the dignity of users. Web sites designed to provide essential information to citizens can also be written on a low reading level and make use of colors and images to guide users. In developing nations where literacy rates are far lower, communities have developed interesting workarounds to help reach the excluded.
- **Relevance.** Not surprisingly, people who have never used a computer or accessed the Web may think they have nothing of value to offer. (Older adults are more likely than young people to feel this way.) Fortunately, local government and institutions are in a perfect position to change their minds. Community Web sites can offer information and services on schools, careers, taxes, recreation, transit, health, and other topics important to people in their daily lives. Where segments of a community have strong religious, ethnic or

cultural identity, government can work with institutions from houses of worship to social clubs to bring them online.

- **Capacity-Building.** The long-term solution to digital exclusion is to have members of excluded groups – whether the working poor, the homeless, the elderly, an ethnic minority or caste – involved in providing access, delivering content and developing services. Because they are members of the group, they understand the group's needs and interests better than any outsider can. They also, it is to be hoped, have a deeper and more long-lasting commitment to moving their group from the digital periphery to the center.

Innovation

The Broadband Economy is an innovation-driven economy. The spread of global and local connectivity has had a fundamental impact on the necessity for innovation, its speed and its economic value. Why?

- The first requirement for innovation is knowledge: of what customers want, of what other innovators are doing, and of what level of opportunity the market offers. Broadband has become the knowledge pipeline of the planet, making it possible for innovators to learn more faster than ever before.
- Another critical requirement for innovation is access to talent. Broadband has allowed both multinational companies and small business to efficiently tap the world's best and brightest.
- Innovation also requires access to markets. Broadband has made it far cheaper and easier to run a network of remote facilities or sales offices, to enforce standards of operation, branding and all the other factors in a successful marketing effort. And for innovators whose product can be delivered digitally, broadband opens the door to a global market.

By supercharging innovation, broadband has provided us with an amazing stream of better, cheaper, faster technologies for everything from healthcare to agriculture, entertainment to education. But innovation has also raised the bar for everyone who participates in the Broadband Economy. The challenge for communities everywhere is to ensure that they have what it takes to innovate or benefit from innovation, because it is the new basis of sustainable economic growth.

Creating, attracting and retaining knowledge workers are the most important steps a community can take to raise its innovation rate. Unlike traditional business as most of us conceive it, an innovative business is all about people.

In addition to building a knowledge workforce, Intelligent Communities focus on building the local capacity to innovate rather than achieving a few "big wins" in the business attraction game. Sustainable economic growth is no longer built on attracting the manufacturing facilities, R&D labs or distribution hubs of the world's biggest companies. Why? Because the world's biggest companies are not net creators of jobs. They have been shrinking in terms of total employment for decade.

Where do you look instead for local income growth? To new companies. In the 20 years between 1980 and 2000, all of the net growth in American employment came from firms younger than five years old. The US offers one of the world's friendliest economies for start-ups, but the same trend is visible throughout the industrialized world, according to the Organization for Economic Cooperation and Development.

Most small companies are not fast-growing. But a percentage of small businesses are what MIT researcher David Birch termed "gazelles" – nimble, aggressive start-ups with big ambitions hungry for the resources needed to achieve them. Successful "gazelles" throughout the industrialized nations create the income growth on which the rest of the local economy feeds. To empower them, communities should work to:

- **Reduce the bureaucratic load.** If your nation, state or province makes it difficult to start a business – as so many of them do – find out what your community can do to make it easier. Provide potential entrepreneurs with advice, help them with paperwork, even represent them before the various licensing and regulatory agencies. Convince local universities and technical schools to help entrepreneurs license technology on straightforward terms and develop progressive intellectual property policies. A community that makes it easier and faster to start and grow a business than its neighbors will enjoy a serious competitive advantage.

- **Create a pipeline for talent.** Improving the educational assets of a community is a big job, which can take years or even decades to bear fruit. But it takes far less time and effort to create a more effective "pipeline" through which local business can find the talent it needs. The work starts with talking to the significant employers in your community to learn what skills they need. From that point, communities conduct multi-faceted efforts to attract and channel talent to their employers.

- **Expand access to funding.** While slow-growing "income replacement" companies can fund themselves from cash flow, fast-growing "gazelles" need investment capital to realize their ambitious dreams.

Governments may not directly create the business innovation that powers economic growth. But local government can play a powerful supportive role. In addition to the steps described above, Intelligent Communities also invest in e-government programs that simultaneously reduce their costs while delivering services on the anywhere-anytime basis that digitally savvy citizens expect.

E-government has an impact at the local level that is both subtle and complex. Leading by example, e-government raises the public's "digital awareness" and helps to create a more innovative culture that attracts leading-edge individuals and businesses. Money spent locally on IT products, services and support increases local demand for them. Effective e-government also signals to businesses and citizens that the community is a good destination for the "digiterati." In short, properly executed, e-government can do more than save money and improve service delivery. It can also become a robust economic development tool.

Marketing and Advocacy

In its 2001 study, *Benchmarking the Intelligent Community*, ICF included marketing among its five Intelligent Community Indicators. This may seem odd, because all communities engage in some form of marketing, and it is not immediately obvious how effective marketing makes one community more "intelligent" than another.

Yet both marketing and advocacy are vital to in helping communities survive and prosper in the Broadband Economy. Why? With markets, capital and business operations more global than ever before, employers and citizens enjoy the biggest range of location choices in history. Just like businesses facing greater global competition, communities must work harder than ever to communicate their advantages and explain how they are maintaining or improving their position as wonderful places to live, work and build a growth business. Marketing and advocacy are the final necessary pieces of the transformative process for Intelligent Communities.

The external marketing efforts of Intelligent Communities are distinct in two ways. First, Intelligent Communities make sure to focus on selling the strengths that make them competitive in the Broadband Economy. They expand beyond the typical "talking points" – location, transportation, cost of living, tax rates – to cover their Broadband Economy strengths: broadband connectivity, the quality of primary and secondary education, the availability of continuing education, the degree of economic inequality in the population, and the culture and practice of innovation in business, government and civil life. They are also unafraid to dramatize the story of their transformation. Many Intelligent Communities have executed – or are in the midst of executing – a shift from post-industrial decline to Broadband Economy success. Rather than glossing over the problems of the past, they use them to dramatize how far the community has come. In so doing, they highlight the leadership, community involvement and innovation that have powered the transformation.

Advocacy is the process by which communities build an internal vision of their broadband future. It important not only for building hope in the future and boosting "community spirit." It is also vital to job creation. Why? In industrialized economies at least, job growth comes from new, innovative companies. They do most of their growing in the community in which they were founded. So "growing your own" is the single most powerful way to develop the local economy. There will always be a need for external marketing to attract outside businesses into a community, but increasingly, Intelligent Communities focus on:

- Creating a culture that attracts the "raw materials" needed by innovative companies: access to knowledge, markets and talented people.
- Positioning the community both externally and internally as one where innovative new companies will find the perfect fit.

The Intelligent Community Indicators provide communities with a framework for assessment, planning and development, as they work to build prosperous

local economies in the Broadband Economy. The Indicators also reveal the interactions that can create a "virtuous cycle" of positive change. Broadband connectivity feeds the development of a knowledge workforce as well as creating the foundation of digital inclusion programs. Both contribute to a rising level of innovation in the community as well as increasing demand for connectivity. And Intelligent Communities make this wave of change the core "value proposition" in economic development marketing. ■

The 2009 Top Seven Intelligent Communities

Population
17,500

Labor Force
8,120

Top Industries
Manufacturing, mining, healthcare

Key Leaders
Mayor Jim Rector

Kurt Pomrenke, General Council, Graceway Pharmaceuticals

Lisa Meadows, President, Bristol Chamber of Commerce

SMART 21 Communities of the Year

Bristol, Virginia, USA

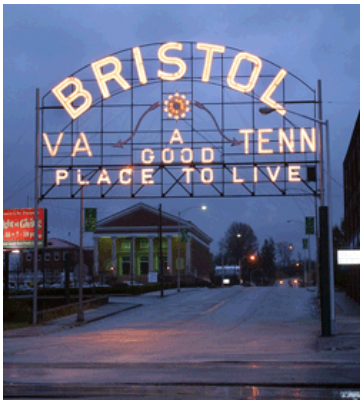
Fighting for the right to fiber

Bristol is one of the few communities in the world with a political boundary running down its spine. Lying to the south of the center line on State Street is the city of Bristol in the state of Tennessee. On the north side is a different city with the same name: Bristol, Virginia.

Bristol (www.bristolva.org) is nestled deep in Appalachia, a mountainous rural region of the American Southeast known for coal-mining, tobacco-growing and their traditional companions: poverty, poor education and lack of opportunity for bright young minds. The city's per-capita income in 2007 was only $20,000 compared with the Virginia average of more than $41,000 and the US average of nearly $39,000. Bristol is proud of its reputation as "The Birthplace of Country Music" and as home to a 160,000-seat NASCAR car racing venue known as "The World's Fastest Half-Mile." But Bristol's leaders knew that a proud history and the ability to attract fans on race day are no foundation for prosperity in a 21st Century community.

Electric Legacy, Broadband Future

Like many rural American communities, Bristol Virginia owns and operates its own electric company, Bristol Virginia Utilities (BVU). City-owned and cooperative utilities are a legacy of the last wave of rural development in the United States, which focused on electrification. In 1998, Bristol's city council voted to allow BVU to construct a fiber-optic backbone to improve communications and control among its eight electric substations. The business case was straightforward and the implementation successful. By 2000, BVU had extended the network to local schools and government offices to support telephone, data and broadband Internet, which reduced the city's operating costs and expanded the capabilities available to users. It also spurred demands from local businesses and real estate developers to provide service to them. So, in 2001, the council and BVU agreed to begin offering fiber-to-the-user (FTTU) service, branded OptiNet, to all residents and businesses.



Private-sector carriers were quick to challenge the move. One incumbent objected to the Virginia public utility commission, which regulates communications, stating that Virginia law barred municipalities from offering retail telecommunications services. Such a law was indeed on the books but, in Bristol's view, had been rendered invalid by passage of the federal Telecommunications Act of 1996. Only after Bristol sued the state did the Virginia General Assembly pass legislation in 2002 overturning the old law on its books. As BVU prepared its commercial launch later that year, the

incumbent cable TV operator claimed that the utility lacked the legal authority to provide television service. A court agreed. BVU returned to the Assembly seeking legislative and charter changes, which were granted in 2003. But later that year, the company's chief financial officer was back in the state capital testifying before a commission on the issue of cross-subsidies. The incumbent had accused BVU of charging phone rates that were below its costs and making up the difference on other services. The commission ruled against the complaint. Finally, after three years and $2.5 million in legal fees, BVU had won the right to deliver retail communications.

Financial Success Spurs Growth

As it turned out, the private sector was right to fear competition from BVU. Market research conducted by the company in 2001 suggested that 70% of respondents might switch telephone and television service from the incumbent operator, while half might switch Internet service. By August 2008, BVU's OptiNet FTTU service had captured more than 62% of the available residential and business market in its service area, thanks to effective marketing to electric customers with whom BVU already had a relationship. Despite millions of dollars of investment, OtpiNet had reached financial self-sufficiency on $16 million in net revenues in the 2009 fiscal year. A 2008 study conducted for the BVU Board determined that OptiNet customers, while enjoying the bandwidth bonanza of FTTU, had saved nearly $10 million over incumbent competitors' rates or special offers since the start of service.

The Tennessee-Virginia border runs down the center of Bristol's State Street

The OptiNet service area was no longer limited by the city lines. BVU entered into partnership with the Cumberland Plateau Planning District Commission in 2003 to build CPC OptiNet. Managed by BVU, the network began with a 45-mile fiber-optic circuit reaching to Richlands, Virginia, funded by grants from the US government and the Virginia Tobacco Commission. It grew gradually to 200 miles across four rural counties with the help of additional grants. (The Tobacco Commission distributes money paid to the state by US tobacco companies following the 1998 settlement of the largest class-action lawsuit in US history.) BVU's success in designing, building and operating the network led it to establish a business unit called BVU FOCUS, which stands for Finding Opportunities for Communities throughout the United States. BVU FOCUS offers consulting and management services to other entities that seek to build advanced telecom networks. The unit's first customer in 2007 was MI-Connection, a telecom co-op owned by two communities in the state of North Carolina. Under BVU's

management, the $80 million network grew its customer base nearly 5% in its first year and exceeded budget by 27%.

Creating a Broadband Culture

While the struggles of OptiNet make an exciting story, Bristol did not become a fiber carrier in order to win competitive battles with business. The city council's goal was economic and community development and, though the network is still so new, early results are positive. BVU's extension of the network convinced two major companies – CGI and Northrop Grumman – to build multi-million-dollar facilities in a regional business park during 2007. Since the network extension was completed in 2007, 185 businesses in the four-county service area have become customers and two new industrial parks began construction. Recent media reports indicate that business growth resulting from the broadband build-out has created 1,220 jobs in seven coal-producing counties worth $37 million in annual payroll, and attracted $50 million in new private investment. The new jobs entering the area are paying about two-thirds more than the normal weekly wage. To leverage this success, Bristol has launched a marketing campaign called AccessBristol, which makes its 1 Gbit broadband capacity the centerpiece of business attraction.

The entry of these major employers into the region has sparked a multi-level effort to develop a local knowledge workforce. Both CGI and Northrup Grumman discovered that it is difficult to attract outside employees to the region because payrolls are scaled to its very low cost of living. No matter what the arithmetic, employees resist accepting a reduction in salary as part of a move to a new area. The University of Virginia at Wise stepped forward to create the first undergraduate software engineering program in the Commonwealth, while three community colleges have joined forces to offer advanced technology classes.

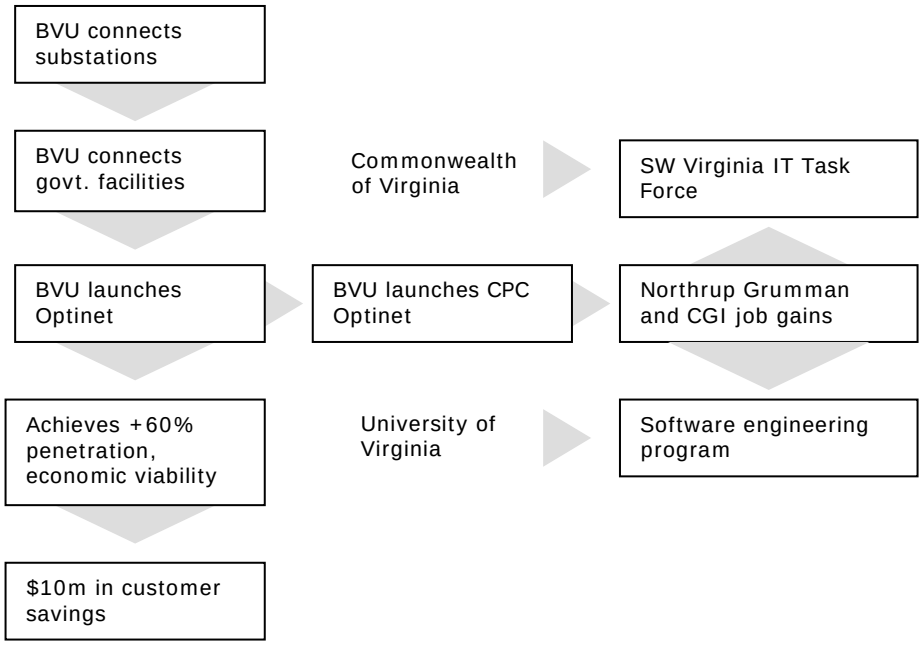

University of Virginia at Wise

These efforts are not occurring in a vacuum. Northrup Grumman's decision to locate a data center in southwest Virgina was not random; it was part of an outsourcing contract with the Commonwealth. A Southwest Virginia IT Task Force lead by Virginia's Secretary of Commerce brings together major area employers with state, county, educational and nonprofit organizations to identify requirements, develop programs and monitor their progress. In addition to the educational programs, projects include a "Return to Roots" campaign that seeks to attract highly skilled former residents to return to Southwest Virginia. Thirty percent of employees in Northrup's data center are locals and the percentage is expected to rise as the University graduates its first software engineering majors.

Bristol is also using the now 800-mile network to build quality of life and create opportunity for the next generation. Virginia High School in Bristol has nearly one computer for every student and relies on the rock-solid, high-speed access provided by the network to conduct all of its state-mandated standardized testing. BVU OptiNet has partnered with the Mount Rogers Regional Adult Education program to offer online access to preparation courses for the GED, a set of tests that give passing students the equivalent

of a secondary school degree. The fiber network now links local, county and university libraries, giving residents access to more than 1.8 million items, as well as rural health clinics and city hospitals. The Bristol SeniorNavigator program provides online access to a database of services for seniors, adults with disabilities and their caregivers through libraries, community centers and senior citizen housing. Programs like these aim to power deep cultural change in Bristol, which will ensure that the hard work and innovation of its current generation of leaders pays dividends far into the future. ■

BVU Jumpstarts the New Regional Economy



Population
730,000

Labor Force
335,000

Top Industries
High-tech systems and materials, automotive, medical technology, industrial design, food processing

Key Leaders
Mayor Jack Mikkers, City of Veldhoven

Arjen de Koning, President, Paradigit Group

Amandus Lundqvist, President, Eindhoven University of Technology

SMART 21 Communities of the Year

Eindhoven Region, The Netherlands

An open platform for innovation

Mention the Netherlands, and foreigners tend to think of water: the great seaport cities of Amsterdam and Rotterdam, and the network of carefully preserved canals that carried an earlier generation of trade and industry. Not to mention boys with their fingers in the dike. But travel 125 kilometers (75 miles) south of Amsterdam on the Netherlands' superb rail network, and you will come to the city of Eindhoven, at the heart of a 21-city region known as the Samenverkingsverband Regio Eindhoven (SRE) and also known as "Brainport." It has long been the industrial center of an industrious nation, with 730,000 inhabitants and a workforce of 335,000. Key clusters include automotive, mechanical-electrical systems, information and communications technology (ICT), medical technology, industrial design and food processing. It is home to multinational companies such as Philips, the healthcare, lighting and consumer product giant, and ASML, maker of photolithography equipment for the production of silicon chips. The Eindhoven University of Technology, with more than 7,000 students, is considered one of the top three research universities in Europe. The High Tech Campus Eindhoven founded by Philips houses over 80 companies employing another 7,000 residents. R&D spending in the Brainport region is four times the Dutch average and its employment rate, at 74%, is 113% of the average for Europe.

It is worth noting, however, what an unusual success story this is. The late 20th Century was not kind to manufacturing in the world's industrialized nations. Germany's Ruhr Valley, America's Upper Midwest, and the UK's Midlands suffered through vicious waves of de-industrialization that laid waste to regional economies and snuffed out opportunity for generations of young people. As the Netherland's manufacturing center, the SRE has seen its share of sharp peaks and troughs. From 2001 to 2003, the regional economy shrank between 1% and 3% before surging 6% in 2004. But the SRE has stuck stubbornly and successfully to its industrial roots while most developed economies have swung sharply away from manufacturing and into services. What is the secret?

Inside Brainport

The economy of the Brainport region can best be understood as a flexible and open platform for innovation. Making that platform work is the job of Brainport Development (www.brainport.nl), a public-private partnership of major employers, the cities of Eindhoven, Helmond, Veldhoven and research institutes, the Chamber of Commerce, the SRE, and leading universities. A small professional staff meets regularly with all the key stakeholders to

identify their strengths, needs and objectives, then looks for opportunities for stakeholders to collaborate on business, social or cultural goals. Any stakeholder of Brainport has the opportunity to create new initiatives or partner with other stakeholders. And the number of truly innovative projects is staggering.

Eindhoven's GLOW festival celebrates its industrial history with light art and design

Take SKOOL. This program provides over 800 Dutch primary schools with a combination of hardware and software that vastly simplifies the integration of information technology into education. Students receive SKOOL laptops from Paradigit, a systems integrator in Eindhoven that was founded in a university dormitory and built a fast-growth business producing built-to-order PCs and name-brand systems. When students start up the laptops for the first time, the systems automatically connect to the SKOOL server, download all of the applications specified for that school and configure themselves. SKOOL provides remote management of all servers and PCs at its client schools, as well as an online interface for students and teachers to communicate and share content securely. So "bullet-proof" are the hardware and software that SKOOL's technical support department consists of just three people. Arjen de Koning, founder and CEO of Paradigit, explains his strategy this way: "Our goal is to engineer systems so they *cannot* not work. Today, if you only sell hardware, you are going to be out of business."

The Viedome program takes advantage of the rich broadband infrastructure in the Brainport region to revolutionize the delivery of social services. Recognizing that the elderly and chronically ill want to stay in their homes as long as possible, Viedome uses video communications to connect people with housing, healthcare and social service providers over broadband. There are video connections not only to the helpdesk of Zuidzorg, one of the region's largest home care agencies, but also to a company called PuntExtra, whichorganizes additional services at home like handyman, gardening and shopping services. From a pilot program serving dozens of homes, Viedome expanded in 2008 to reach 400 households and continues to grow.

Eindhoven is home to the National Swimming Institute as well as of swimmer Pieter van den Hoogenband, three-time Olympic gold medalist. To capitalize on van den Hoogenband's fame, the Institute partnered with Philips and software engineers to create a unique swimming analysis and monitoring system. Thirteen cameras built into a pool above and below the waterline capture video of a racer from the dive to the finish. Custom software merges the separate video images into continuous coverage, and enables analysis down to the microsecond, so that swimmers can break bad habits that cost them precious time. Through sales to regional swim clubs, the system is earning back thousands of euros of its development costs and, more importantly, is positioning Eindhoven as a center of excellence in competitive swimming.

Manufacturing Knowledge and Quality of Life

The wide-reaching work of Brainport focuses on two goals outlined in a strategic plan called Brainport Navigator 2013. The first goal recognizes that the region's most valuable output is not hard goods but knowledge – its creation, sharing and conversion into economic value. The Brainport community will maintain and improve its edge by accelerating innovation, entrepreneurship, spin-off creation, business incubation and public-private venturing. An outstanding example is Eindhoven's DAF Trucks, one of the world's largest manufacturers of heavy vehicles. You could be forgiven for thinking that DAF makes big things that drive down the road, but what they really produce is reliability and low cost of ownership in transport. Every DAF truck is loaded with sensors that monitor the performance of hundreds of systems. When onboard computers detect problems, they connect via mobile phone to DAF's servers so that DAF's tech support department can diagnose problems and alert the trucking company. If a DAF trucks breaks down by the side of the road, it automatically alerts DAF, which arranges to dispatch help from a local dealer. And those dealers have access, both through classes in Eindhoven and Web-based tutorials, to some of the most intensive technical training in the world.

Brainport's other goal is to maintain and improve quality of life in the 21-city region. In a knowledge-dependent economy, the social and cultural offerings of the region must compete favorably with all the other places that highly-skilled workers could choose to live. And with fast growth in its elderly population, Eindhoven must find ways to meet new demands for quality of life without bankrupting government.

Broadband plays a major role in both areas. In 2000, Eindhoven was selected as the site for a pilot project of the Dutch government called Kenniswijk, or "knowledge city." The government provided a subsidy making it possible to link 15,000 homes to a fiber-to-the-user network. This subsequently motivated a private carrier to continue deployment in cities and villages with a total population of more than 230,000 residents.

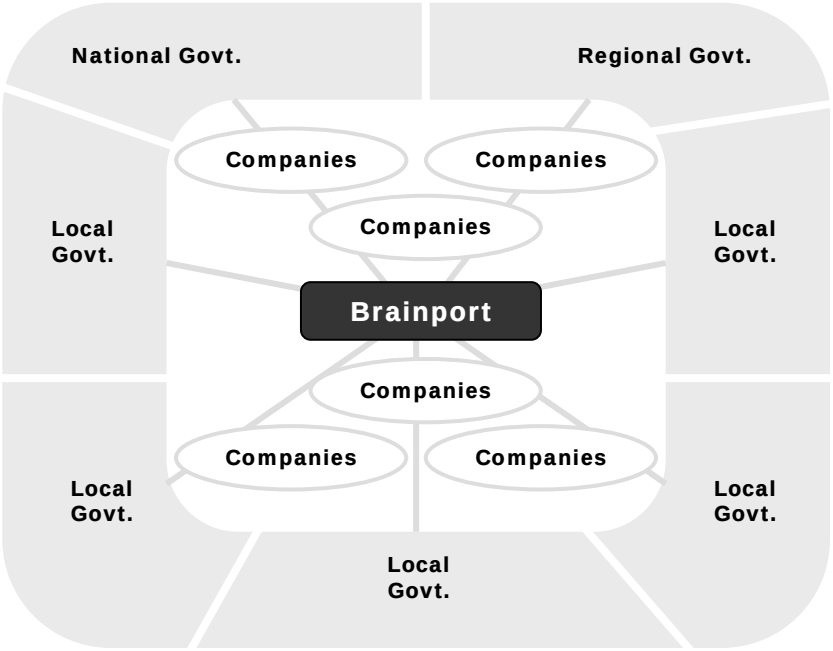
OnsNet founder Kees Rover (left) with ICF's Robert Bell

But before the Kenniswijk subsidy was ended, two determined gentlemen in the village of Nuenen convinced the government, over the strident objections of incumbent carriers, to apply the funds to the creation of a cooperative nonprofit company called OnsNet ("Our Net"). OnsNet used the money to fiber 7,500 of Nuenen's 8,000 homes and, within 3 months of start-up, achieved a 97% penetration level. What made this possible was the determination of Kees Rover (a retired banking executive) and Henri Smits (director of a local housing corporation) to improve the quality of life of Nuenen's citizens, particularly its large elderly population. OnsNet organized workshops for the community to explain what the project would mean to them. The concept of ownership – both actual and emotional – was vital. The case for citizens to put their own money into

the co-op was simple, according to Kees Rover: they were investing in a home improvement that would increase the value of their property. The citizens of Nuenen own 95% of OnsNet and join technical and operational executives at meetings to identify new ideas and solve current problems. And the pace of innovation has been unceasing. An online exercise and weight-loss program, with a "virtual fitness coach," is popular. A "Window on Nuenen" channel provides access to video cameras strategically positioned around town, which allows the housebound to stay connected to the life of the community. The OnsNet community TV service trains locals in the use of video equipment and makes it simple to upload video clips. Clubs and societies post video of their meetings and events. A local church offers live broadcasts of baptisms and weddings on a paid basis. Parents and grandparents chat over video with children and grandchildren far away. OnsNet provides a vivid example of a startling fact: that those on the far side of the digital divide may be those who can most benefit from ICT, and that reaching them is not as hard as it may seem.

In the past ten years, the Eindhoven region has gained more than 30,000 new jobs and seen its unemployment rate fall to 3.9% compared with a 4.5 Dutch average. The Brainport region is ranked among the top three regions in Europe for new patents and accounts for 20% of all Dutch R&D investment. The number of business starts per year has grown 275% since 2000, and the region has become Holland's second biggest export hub after Rotterdam, which is the largest seaport in Europe. Not bad for a place without a seagull in sight. ■

The Brainport Ecosystem



Population
51,795

Labor Force
31,135

Top Industries
Information technology, consulting engineering, healthcare, architecture, finance, insurance, legal services, education

Key Leaders

Mayor Brad Woodside

Andrea Feunekes, President, Remsoft

Anthony Knight, CEO, Fredericton Chamber of Commerce

Fredericton, New Brunswick, Canada

Building a competitive private sector from the ground up

At a time when governments around the world are becoming deeply involved in managing their economies, Fredericton owes its place among the Top Seven Intelligent Communities to decisions to *reduce* the role of government in the local economy.

In colonial days, Fredericton (www.fredericton.ca) served as the anchor of a vibrant regional economy based on trade with America's New England states. But over time, economic power gradually concentrated in the nation's geographic center, leaving the eastern provinces to become "branch office economies" dependent on decisions made elsewhere. It became so common for people to move west in search of economic opportunity that Fredericton called it "goin' down the road."

Fredericton is the capital of the province of New Brunswick and public-sector employment shielded the community for many years from economic decline. Then in the mid-1980s, the Canadian Federal government began running large deficits and responded by offloading public costs onto provincial and municipal governments. By the 1990s, Fredericton found itself with a government that was too large, a private sector too anemic to support it, and a doubtful future.

Building a Knowledge Economy

Local government responded in 1992 with an economic development strategy called Vision 2000. It called on Fredericton to build an economy based on its unique human and economic assets, and to stop looking to others to save the day. The study itself was probably less important than the people who participated in developing it. They included city officials, university leaders, the Chamber of Commerce, real estate developers, the region's telecom firms, the hydro-electric utility and a representative of a small group of software investors.

The universities had long played a major role in Fredericton's economy and culture. The University of New Brunswick (UNB) is Canada's oldest English-languge university and the first to create a computer science faculty and offer forest engineering programs. Saint Thomas University is Canada's only university focusing exclusively on teaching the liberal arts. The Maritime College of Forestry Technology is a business-government co-op that supports excellence in the management of one of Canada's most important natural resources. Through Vision 2000, the university sector began to engage in serious ways with both local government and the private sector. In 1994, UNB partnered with the city to develop the Knowledge Park, offering office space for knowledge-based businesses. The project plan emphasized quality of life with, in addition to office space, wooded areas, walking trails, and both daycare and pre-school facilities onsite. By 2007, the Park held three completed buildings totaling 90,000 square feet (8,360 m^2) with a fourth 90,000 sf building under construction, and tenants included

tech companies such as CGI, SkillSoft and Q1 Labs as well as the Wyndham hotel chain and the owner of the University of Phoenix, the Apollo Group.

It was the small group of software investors, however, who probably had the biggest impact. They saw Vision 2000 as an opportunity and used the government's clear show of support to form the first informal executive network in the community. Their timing was good. As provincial and local government froze hiring and began to downsize, the best and brightest civil servants left to start "knowledge sector" businesses in technology and services. They found support both from private investors and programs introduced by the provincial and Federal governments, including the Atlantic Innovation Fund, the BREAKTHRU Business Plan Competition and the Industrial Research Assistance Program.

The Vision 2000 plan was updated in 2001 and then every three years after that. It began to target development in specific sectors such as e-learning, aerospace training, health, network security and multimedia games. The 2004 plan included a bold statement of purpose: that economic development should focus first and foremost on supporting locally-owned firms and give second place to business attraction. That commitment was no doubt made easier by a track record of success. In 2005, the knowledge sector employed more people than did the provincial government for the first time in history.

But Fredericton's government, under the leadership of Mayor Brad Woodside, refused to leave all the innovating to business. Following the 1992 study, Fredericton launched a set of business process improvement programs to streamline and make more efficient a government that clearly had too many moving pieces. To further drive the process, the city entered the ISO-9001 quality management process, which forced it to understand, clarify and document everything government did. In May 2004, Fredericton passed its audit and became one of the few ISO-9001 certified cities in North America.

To support its focus on growing local business, Fredericton launched a series of awards for business excellence and contributions to quality of life, which targeted small and micro businesses as well as midsize and large companies and the entrepeneurs who built them. The city also began to focus on a weakness becoming increasingly apparent as the Nineties gave way to the new century.

The Broadband Barrier

As demand for Internet connectivity rose across Canada, Fredericton found itself a "have not" community. Carriers focused investment in the same geographic center that had so long dominated the Canadian economy and showed no interest in upgrading dial-up service in the "outer provinces."

After lobbying proved unsuccessful, Fredericton decided to form its own telecommunications company. e-Novations was established as a co-op. It obtained funding commitments from 12 founding members – including the city, the universities, business users and the region's largest Internet Service Provider – and used it to build a fiber ring connecting to their facilities. It then pooled their demand and purchased broadband capacity in bulk. Each member paid for a minimum guaranteed bandwidth, but had the ability to tap any unused bandwidth in the system on demand. Because networks tend to have substantial idle capacity, e-Novations immediately reduced the members' cost and established a new competitive price point in the region. By mid-2002, e-Novations had a stable fiber ring and positive cash flow but struggled with how to meet demand from new prospective members outside the downtown core. The answer proved to be point-to-point microwave links to such facilities as the local airport, which could be set up quickly and at lower cost than fiber to the premises. When commercial carriers became members of e-Novations in order to resell broadband to their small business and residential customers, it was clear that the community network model was a success.

In 2003, Fredericton took the next step. Using its fiber ring as a backbone, the city deployed almost 300 WiFi access points throughout downtown and the business corridor, in public facilities and retail malls. Rejecting the idea of hot-spots, Fredericton sought to blanket the area with overlapping coverage zones. It branded the result the Fred-eZone: an area covering 65% of the city in which access to broadband wireless is absolutely free. As Fredericton's Mayor Brad Woodside puts it, "We don't charge you to walk on our sidewalks. Why would we charge you for broadband?"

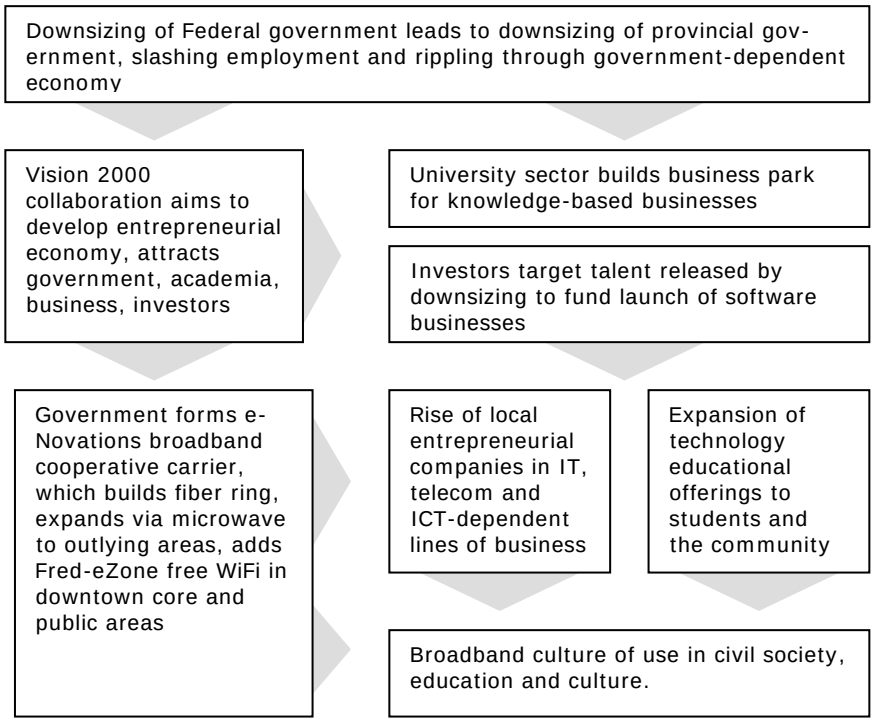
Fredericton's rich broadband offerings have created a growing culture of use for broadband and IT in daily life. The city Web site offers an online database of city services, and allows residents to register for recreation and meeting space online. Parents view school announcements and homework assignments over the Internet and can participate remotely in meetings of the school board. They access the FredKid.com online portal, created entirely by Fredericton families, to learn about programs and services available to support them. The Harvest Jazz and Blues festival, one of the largest music events in eastern Canada, attracts over 80,000 fans to Fredericton each year. It takes more than 800 volunteers to produce it, and they rely on a Web-based volunteer management system to make it happen. Fredericton is also home to the National Adult Literacy Database, a nonprofit that provides Internet-based literacy and core skills training to five million users a year.

The combination of smart strategy, hard-working private entrepeneurship and cooperative public investment in information and communications technology have completely transformed the economy of

Fredericton over the past fifteen years. More than 70% of New Brunswick's knowledge industries call Fredericton home and, on a per capita basis, the city hosts the largest engineering cluster in North America. The population of Fredericton grew 14.5% since 1992 but the labor force grew 22% over the same period and average household income has jumped 13.5% since 2003. The community has added 12,200 new jobs in the past decade, and seen two of its companies win the nation's top innovation award.

And being a political capital still doesn't hurt. Fredericton's aerospace training cluster serves Canada's largest military training base, located near Fredericton. After a nationwide search, Canada's National Research Council Institute for Information Technology established the first headquarters facility outside Ottawa in Fredericton, where its e-business facility offers local companies access to cutting-edge skills from more than 50 researchers and technicians. Sixteen companies in its incubator have attracted more than C$25 million in venture capital. What distinguishes Fredericton is its success in streamlining government and stimulating a robust private sector without sacrificing the advantages that come with its political position. ■

The Fredericton Flowchart



Population
61,800

Labor Force
70,000

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

Key Leaders
Mayor Andre Santini

Eric Legale, Managing Director, Issy Media

Ginette Broncy, Chairwoman, ICT Committee, Economic and Social Council of Issy-les-Moulineaux

Issy-les-Moulineaux, France

Building a new way of life on the Web

Some Intelligent Communities leap into action in response to economic crisis. Others are spurred others by demographic change or fears of eroding competitiveness. And some embrace change because a leader persuades them to.

In 1980, the people of the Paris suburb of Issy-les-Moulineaux (e-SEE leh mole-yin-OH) elected Andre Santini as their Mayor. It is doubtful if, on election day, they knew exactly how much change they had just agreed to embrace.

Issy-les-Moulineaux (www.issy.com), which is appearing on the Top Seven list for a second time, had enjoyed a symbiotic relationship with Paris, on the other bank of the Seine River, for all of its history. From being a center of winemaking in the Middle Ages and the "holiday resort" of the French nobility in the 17th Century, it evolved into the industrial zone of the Paris region in the late 19th and early 20th Centuries. It was also home to an army base that, in 1905, saw the historic first 1-kilometer circuit flight of aviator Henri Farman. After the Second World War, Issy resumed its role as the industrial engine of the region – but then watched its economy erode in the de-industrialization of the 1970s and 1980s. It was clear that the future would have to be different from the past if Issy was to sustain itself.

Leading By Example

Mayor Santini's vision was to rebuild Issy's economy for a time when information and communications technology would take the place of traditional industry as a generator of jobs. In the early Eighties, the outlines of the Broadband Economy were far from clear. But the Mayor was determined to grow the small base of IT, telecommunications and R&D organizations that Issy, with its proximity to the nation's capital, had already attracted. And he believed the way to do it was to lead by example.

As the Eighties gave way to the Nineties, the city administration took its first steps. Issy was the first French city to install outdoor electronic information displays and the first to deploy a cable TV network. In 1993, schools introduced a smart card allowing pupils to pay for lunch electronically. The following year, the City Council rebuilt its meeting room for multimedia and began broadcasting Council meetings over the cable system. The Mayor also challenged city departments to create a comprehensive Information Plan based on study of the evolution of the Internet in the United States. As an example of foresight, this is hard to beat. In 1994, the company that was to

create the first commercial Web browser, Netscape, was just being founded and the entire World Wide Web consisted of only 10,000 sites. Under the plan, completed in 1996, a Steering Committee representing municipal departments and elected officials was created to direct investment in projects and maintain focus on objectives.

Among its most striking decisions was to outsource, in 1997, the entire IT infrastructure of the city to Euriware, a 10-year-old Paris company. The goal was to create an efficient service organization that could quickly turn ideas from municipal departments into reality. Mayor Santini promoted it as the first essential step in transforming Issy into a "digital city."

The rate of change accelerated. In 1994, Issy launched the first version of an e-government portal to share information with citizens. By 1995, Issy had free Internet access in its Media Library and, in 1997, the Council added online access to its cable and Internet broadcast of meetings, inviting citizens to ask questions by telephone or email and get an immediate response. Public participation began to climb. Whereas few residents bothered to attend Council meetings in the past, an average of 45% now regularly participate remotely, according to Issy. Service was expanded in 2005 with the IRIS "citizen relationship management" system, through which citizens could make inquiries or lodge complaints online, via telephone, email or mail. By 2008, the portal (www.issy.com) was providing local news, online public procurement, online applications for certificates and permits, access to more than 15,000 documents, and was receiving over 1 million visits per year.

Making Liberalization Work for Issy

The first of January 1998 was a watershed moment in France. On that date, the state-owned France Telecom lost its monopoly on telecommunications. The history of such liberalization in telecom has been mixed at best. It has succeeded in lowering prices, particularly for long-distance service, but has failed in local markets around the world to loosen the grip of incumbents. Not so in Issy – because, well before the deadline, Mayor Santini's team launched negotiations with alternative carriers, which agreed to enter public-private partnerships with Issy to deploy networks. As a result, January 1998 was also when Issy became the first city in France to offer businesses a choice of carriers. Over the next decade, as it continued to welcome competitors, Issy gained a total of six alternative broadband networks, passing 100% of businesses, government agencies, institutions and households. The residential penetration rate for broadband is a bit over 80%, compared with the French average of 50%.

In the first years of the new century, Issy began offering services specifically designed to build a broadband culture of use among its people. The Internet broadcasts of City Council meetings expanded to include other content on a Web portal branded Issy TV. The city opened a digital arts center for multimedia artists called The Cube, and launched an ongoing

series of ICT training classes for children and adults. In 2002, Issy introduced four innovative programs spanning from youth to age. With its primary and secondary schools already equipped with broadband and PCs, it began to install systems in daycare and kindergarten classrooms, each equipped with Webcams so that working parents could connect to the classroom to participate in their youngster's activities. Issy took a similar approach to the elderly by creating Cyber Tearooms, where older citizens could experience digital technologies and receive training in familiar and comforting surroundings. Over 2,600 people have benefited from Cyber Tearoom training to date. For voters, Issy recruited representative volunteers for an interactive Citizen Panel, which the City Council consults regularly via Internet about policy issues. A Participatory Budget-Making program also lets citizens help the city in setting investment priorities. In the same year, Issy introduced Internet voting for neighborhood council elections and, by 2005, 62% of citizens were participating in the elections, of whom nearly 94% voted over the Web. In 2003, Issy became the first French city to introduce free public WiFi in locations ranging from government buildings to hospitals, hotels and convention centers.

Attracting ICT Employers

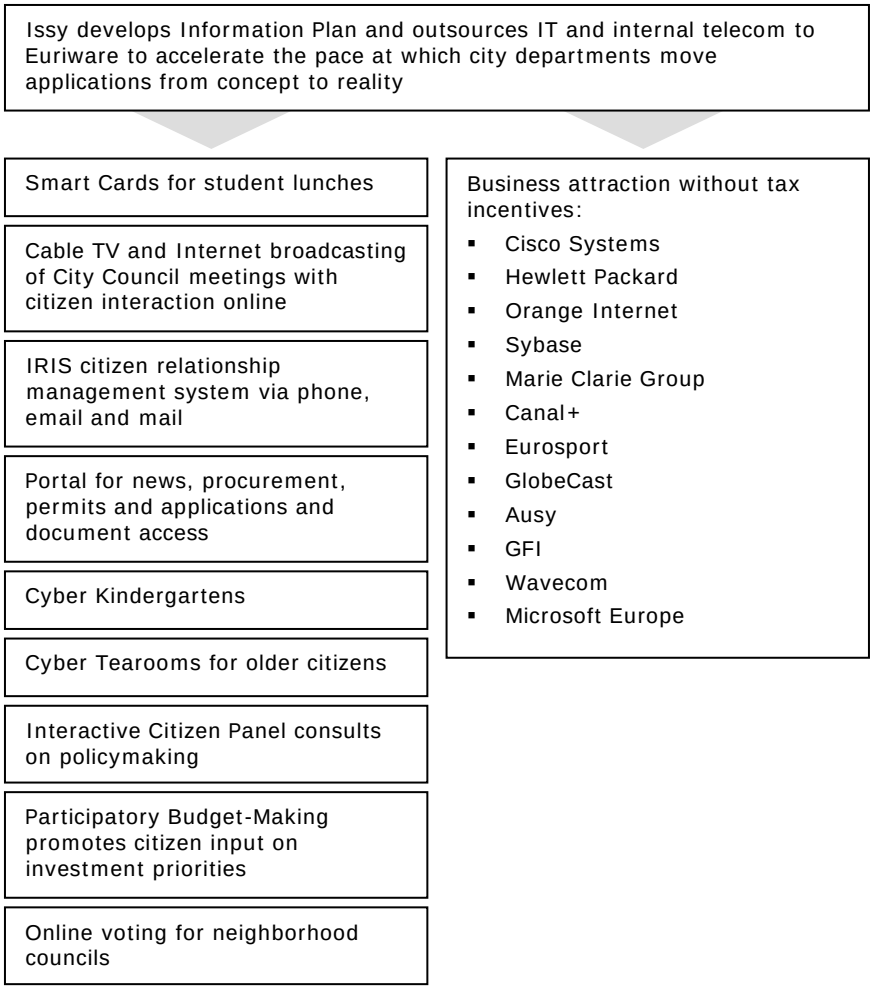
The French expect many services from their government, which created a host of opportunities for Issy to lead by example. But Mayor Santini's team also worked hard to build private-sector employment. The offer of public-private partnerships proved a powerful tool. It was critical to reducing the risk for the first competitive carriers that wired Issy in the 1990s, and a recent partnership with France Telecom R&D has made Issy a test bed for new applications, including a trial of 100 Mbps fiber-to-the-home. Recently, Issy lodged responsibility for its information technology and communications in a public-private venture called Issy Media. It is majority-owned by Issy but its remaining shareholders are companies based in Issy and its employees are considered private-sector rather than being civil servants.

Aside from such partnerships, however, Issy does not engage in typical tax-based incentive strategies. It has counted instead on offering a location near the economic and political center of the country with superior broadband infrastructure, a business-friendly climate and innovative e-services. The combination seems to work. Today, 57% of the companies in Issy are in the ICT sector, including Cisco Systems' European headquarters, Hewlett Packard, Orange Internet, Sybase, Marie Claire Group, Canal+, Eurosport, GlobeCast, Ausy, GFI, Wavecom and Microsoft Europe. A total of 1,500 companies employ about 70,000 people, half in ICT. A business incubator, "Le Pepiniere," offers support for business start-ups with a special unit devoted to ICT. A new development called Le Fort Numerique, scheduled to open in 2012, will convert a 19th Century fortress into a mixed-use residential and business facility focusing on innovation in ICT and "green" lifestyles.

Issy's economic success has funded the rich array of broadband applications deployed by government. The efficiency of these applications

has, in turn, made it possible for Issy's population to grow 35% since 1990 without any increase in government payrolls. With an employment rate close to 95%, Issy has the distinction of having 15% more jobs than residents, and a Web-savvy population in which 98% of respondents told a recent survey that the Internet had fundamentally changed their lives. Here's just one example: starting in 2008, the local football club introduced fans to a Web portal where they could not only watch matches, clips and interviews but also influence coaching and recruitment policy. Every week in Issy, these "cyber-coaches" hold a vote on which players should have their bonuses increased and which should be banished to the bench. That is a powerful way to encourage average citizens to build a Web-based way of life that actually strengthens their ties to the community. ■

Leading by Example in Issy



Population
125,000

Labor Force
75,600

Top Industries
Trade, health care, social services, manufacturing, transportation, logistics & warehousing, business support services, education, construction.

Key Leaders

Mayor George LeBlanc

Jon Manship, Chairman, Technology Ventures Corporation

David Gibson, Associate Director IC^2 Institute, University of Texas at Austin

SMART 21 Communities of the Year

Moncton, New Brunswick, Canada

Collaborative leadership in the face of crisis

For most of the 20th Century, the city of Moncton was the transportation hub of Atlantic Canada, a region made up of the four provinces bordering the Atlantic Ocean. The Canadian National (CN) railroad had its repair shops in the city, and a cluster of transport-dependent employers, such as the Catalog Center for the nationwide Eaton's department store chain, formed to take advantage of fast, convenient access to the national rail network. CN employed 5% of the workforce and its purchasing generated thousands more jobs.

In the 1980s, however, Moncton experienced the perfect economic storm. CN announced in 1985 that it was closing down the Moncton Shops facilities in a drive to boost productivity. The Eaton's Catalog Center also closed as the department store business model fell under attack, and several local factories fell prey to the period's rapid de-industrialization. A once-proud transportation cluster found itself facing not only economic upheaval in the short term but serious worries for the future. Because rail and transportation had dominated its economy for so long, Moncton's workforce was educated for an era of manual work, not the emerging knowledge economy. The city's downtown had a high vacancy rate and, due to lack of investment, the community's physical infrastructure was in decay.

Moncton's historic motto is "Resurgo," Latin for "I rise again." As the Eighties came to a close, it was an open question whether Moncton would ever be able to rise again.

Collaborative Leadership

ICF has identified strong collaborative leadership as a critical factor in the success of Intelligent Communities. The Moncton story explains why it is so important.

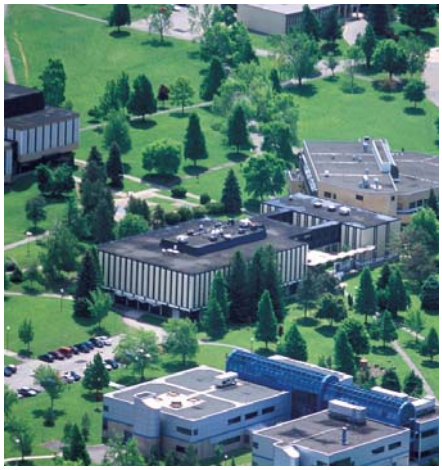
Moncton responded to the crisis by organizing a series of regional economic development planning exercises beginning in 1989. The first planning process, Symposium 2000, brought together local government and business leaders not only from Moncton but from the neighboring city of Dieppe and town of Riverview, as well as provincial and federal agencies. But it was not just a talking shop. The government and business leaders came prepared to make deals, and they reached agreement on a series of big steps. They formed and agreed to fund the Greater Moncton Economic Commission, the first regional economic development agency, and subsequently approved its first strategic plan. They forged a partnership between local and provincial government to focus on attracting new business to the region and made individual commitments to infrastructure investment. Most important, they formalized

collaboration among Moncton, Dieppe and Riverview on sharing the management of municipal services such as water and policing, and on joint development of projects like the Greater Moncton International Airport. This collaboration reduced the costs of government in the region while focusing everyone on pursuing new economic opportunities.

Call Center King

In the late Eighties, the hot opportunity turned out to be the call center. Both outbound and inbound call centers experienced a boom in this period, and Moncton had the potential to benefit because of its low costs and one special attribute: it has one of the highest rates of bilingual workforce in Canada, with half of the population speaking French and English. Both leadership and collaboration played a role in what happened next. The incumbent carrier NBTel (now Aliant Telecom), proved willing to step up to meet new requirements. The first Canadian carrier to build a 100% digital network in the early 1990s, Aliant created a suite of services to support call centers, including the leasing (rather than purchase) of costly switches and systems for home-based employees. The provincial government joined forces with Moncton to actively promote the city as a place to base telecom-intensive service and IT operations. The province helped the city to attract call centers for over two dozen national and international firms including ExxonMobil, UPS, FedEx and the Royal Bank of Canada. By 1994, call centers had become a major source of new jobs, exceeding goals set in 1991. But the 1994 plan recognized that success in call center development was not enough; the next step was to focus on "knowledge businesses" – natural and applied sciences, business and finance, computer programming and information systems.

More partnerships ensued. Moncton tapped the resources of national and provincial government agencies, including the Atlantic Innovation Fund and the New Brunswick Innovation Foundation, to spur attraction and start-up of knowledge-based businesses. A New Brunswick R&D Tax Credit helped companies justify location of scientific research facilities in the Greater Moncton area. The Greater Moncton Strategic Partnership linked local government with universities, colleges, local media and leading-edge companies to fund talent-attraction marketing in order to feed the rising demand for qualified people.



With the call center business continuing to attract companies including Fairmont Hotels, Rogers Communications and Lottomattica, Moncton increasingly saw homegrown ICT businesses prosper, from the Atlantic Lottery Corporation and Red Ball Internet to Vimsoft and PropertyGuys.com. By 2006, almost 45 out of every 1,000 workers in the Moncton Census Metropolitan Area (CMA) worked in customer service, information or related clerk positions, compared with an average of 12 for Canada. Moncton had witnessed a 300% increase in employment in ICT companies, a 153%

increase in employment for graphic designers and illustrators, and a 43% increase in jobs for writers and translators. While New Brunswick suffered a net loss of 3,900 people from 2001 to 2006, the Greater Moncton area gained 6,800.

In 2008, the call center sector paid more than C$290 million in payroll and generated a total of C$765 million in regional economic activity. But newer businesses were also making an impact. The community's hospitals have become catalysts for an emerging life sciences cluster focusing on medical informatics, bio-markers and bio-statistics. The Atlantic Cancer Research Institute is the largest in Atlantic Canada. L'Université de Moncton is well known for research on cellular lipid metabolism and is home to New Brunswick's only medical school, while private company DDx Health Strategies is pioneering in remote support for the pharmaceutical industry and MedSenses offers health care e-learning solutions. A local entrepreneur went from working as a video game repair technician to creating a state of the art video lottery machine system. Global lottery giant GTECH acquired this Moncton grown company in 2004 and was itself acquired in 2006 by Italy's Lottomatica, which chose to maintain production of the systems in Moncton. The result has been a gaming cluster, which now includes a unit of Oracle and a significant number of homegrown companies and development centers for multinationals.

Moncton ploughed economic growth back into infrastructure, building a new City Hall, widening bridges and roads and opening up parcels of land to development of corporate headquarters, call centers and media studios. One of the most satisfying milestones was the opening of the Emmerson Business & Technology Park on the brownfield site that had been home to CN's Moncton Shops. The developer, Canada Lands Company, put C$50 million into cleanup and redevelopment of the 249-acre site, which also includes the CN Sportplex and residential units.

Connecting to the Internet Age

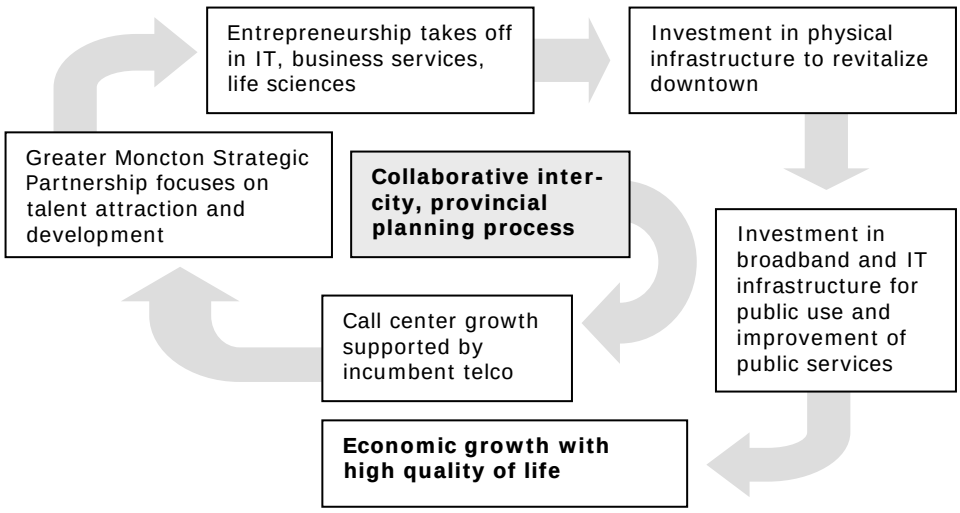
Greater Moncton's latest plan, Vision 2010, calls for updating the region's economic development for the Internet age. In 2007, Moncton partnered with Cisco and Hewlett-Packard to install the first free outdoor wireless mesh network in Canada. In a mesh network, data traffic is handed off between wireless nodes, most of which operate without a landline connection. This reduces the cost of cabling but requires high-quality design and a large number of nodes to succeed. City workers installed the entire system, mostly on lampposts and traffic signals, in three days across six city blocks. The network has since been expanded selectively to local parks, shopping districts and the Magnetic Hill concert site, where it supports e-commerce for local merchants as well as communication and Web browsing. The City has even created a Community Access mobile WiFi service that allows it to deploy coverage for special events on demand.

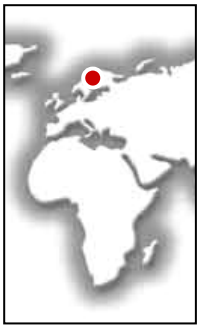
But mobility is not just for sporting events and concerts. Moncton's municipal buses also offer free WiFi. By making it convenient for bus riders to access broadband, the new service has increased usage of public transit, with positive impacts on both emissions and congestion. In response to demand, the bus fleet is scheduled to grow from 27 to 52 buses by the end of 2010.

Moncton is also deploying ICT to improve municipal services. A van equipped with high-speed data collection technology evaluates the condition of pavement on city streets and feeds information into the city's Asset Management System. The city has also installed 20,000 wireless meter-reading devices in its water system. They measure water flows so precisely that they can detect leaks within the household, which saves citizens money while promoting conservation. Building inspectors and other outside workers are taking laptops on the road and connecting securely into city systems to access information and file reports.

One constant amid these waves of changes has been the process by which Moncton built and continues to build its broadband future. Community leaders in government, academia, institutions and businesses continue to connect and collaborate to a remarkable degree. From 2004 to 2008, the chair of the City Council's Prosperity and Economic Affairs Committee was the founder and chair of the public-private Moncton Technology Planning Group (MTPG). Members of MTPG have been board members of Enterprise Greater Moncton. The Mayor of Moncton and senior staff also sit on the Board of Enterprise Greater Moncton, and are involved in MTPG as well as the city's Prosperity and Economic Affairs Committee, of which the past chairman of the Chamber of Commerce is a member. Representatives from provincial and national government agencies also have representatives in most of the groups. In some places, having such a tightly knit leadership group becomes a barrier to progress by reducing transparency and stifling new ideas. But in Moncton, it seems to have been key to the successful fight back from the economic brink and the continuing effort to build a strong, diverse and prosperous community. ■

Moncton's Virtuous Cycle





Population
795,163

Labor Force
442,500

Top Industries
High technology, finance, consulting, light manufacturing

Key Leaders
Carina Lundberg-Uudelepp, Deputy CEO, Executive Office, City of Stockholm

Åke Plyhm, Deputy CEO, TietoEnator

Erik Johansson, Project Manager, Svenska Bostäder

SMART 21 Communities of the Year

Stockholm, Sweden

Making "big" work better

The city of Stockholm stands on fourteen islands on Sweden's south-central east coast. According to legend, the city's name tells you how it was born: as a fortress made of logs ("stock") on an island ("holm") guarding the entrance to lake Mälaren. Stockholm has been Sweden´s political, cultural and economic center since the 1200s.

Sweden has charted its own economic and political course throughout the 20th Century. Stockholm was spared the destruction of two world wars and saw its economy boom in the post-war years, when Sweden instituted very high levels of social spending that consumed almost 50% of GDP in taxes. The bursting of a real estate bubble in the early Nineties caused a severe economic crisis, in which employment fell 10% and a run on the currency forced the Central Bank to briefly raise interest rates as high as 500% in an unsuccessful effort to defend a fixed exchange rate. In 1994, with a budget deficit exceeding 15% of GDP, the national government instituted multiple reforms and slashed spending to put its financial house in order. The result was to strike a new and apparently sustainable balance between cradle-to-grave social benefits for citizens and strong economic growth based on knowledge, creativity and innovation.

One out of every eleven Swedes lives in Stockholm, and in the first decade of the new century, their city has continued to find way to make "big" work better. The economy benefits enormously from Stockholm's status as the political and cultural capital. Most of the country's head offices and one in three foreign-owned companies are located there. Nearly one in three new Swedish companies is located in the county of which Stockholm is the capital. Education levels are high (51% of Stockholmers have studied at university levels compared with 35% nationwide) and average salaries are proportionally higher. By law, Swedish cities must deal with everything from childcare to the burial of a person, though in practice, much of the work is outsourced to private companies. The City of Stockholm is one of Sweden's biggest employers, with 42,000 employees (one for every 19 citizens) and a budget of 37.4 billion kronor (3.9bn Euros or US$4.6bn). Its efficiency and effectiveness inevitably go a long way toward determining the economic competitiveness of the city.

The Stokab Model

During the early Nineties crisis, the City of Stockholm decided to pursue an unusual model in telecommunications. The city-owned company Stokab started in 1994 to build a fiber-optic network throughout the municipality as a level playing field for all operators. Stokab dug up the streets once to install conduit and run fiber, closed them up, and began offering dark fiber capacity to carriers for less than it would cost them to install it themselves. Today, the 1.2 million kilometer (720,000-mile) network has more than 90 operators and 450 enterprises as primary customers and is now in the final year of a three-year project to bring fiber to 100% of public housing, which is expected to add 95,000 households to the network. Stockholm's Mayor has set a goal of connecting 90% of all households to fiber by 2012.

As an information utility, the Stokab network has become an engine for driving efficiency in every aspect of government. The City's Web site hosts a huge range of applications through which citizens can request and receive service online, from applying for social housing for the elderly to a schools portal that facilitates collaboration among students, teachers, school administrators and parents or guardians. Over 95% of renters use the housing department's portal to find apartments, and the library portal provides online access to the content of 44 individual libraries. After pilot projects in 2005, the city has also instituted a contact center to handle inquiries and complaints from offline citizens and to support users of e-services. There is a special telephone line for the elderly to call.

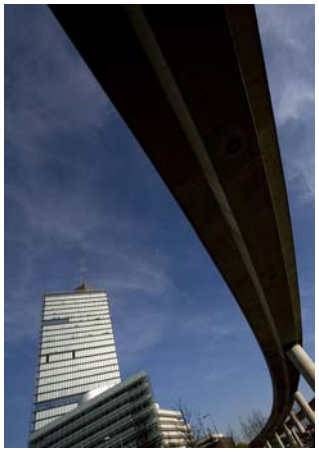
Much of the efficiency gain happens inside the walls of government offices. Stockholm uses a Web-based tool to manage its operations at all levels from the Municipal Assembly to schools and housing for the elderly. The system aims to automate routine administrative tasks, such as accounts payable and applying for vacation time, and encourage collaboration across agencies. Citizens can follow City Council meetings through Internet video, Internet radio and broadcast radio, as well as having online access to the minutes and documents of each meeting. The city is investing about 650 million kronor (59m Euros or US$72.2m) in developing the various services and in using IT to reduce operating costs and improve citizen services. To prevent redundant investments, Stockholm has introduced a coordination program through which agencies apply for funding for e-service projects from a central office.

In 2007, the City of Stockholm published Vision 2030, identifying the key characteristics the city aimed to have by that year. In 2030, according to the plan, Stockholm would be a world-class metropolis offering a rich urban living experience, the center of an internationally competitive innovation region, and a place where citizens enjoyed a broad range of high-quality, cost-effective social services. All employees of the city receive online training three times per year on the goals of the program and the changing

nature of their responsibilities. The city also uses Web-based tools to track progress toward its goals and publishes good examples on the city-wide intranet to inspire others.

Exporting Innovation

For over a century, Sweden has been an export economy. Timber, iron ore and hydropower remain important exports but 50% of Sweden's output now comes from its engineering sector, including telecom, automobiles and pharmaceuticals. These are the industries in which Stockholm leads. The big pharmaceutical company AstraZenica manages its global life sciences research in the Stockholm region. ABB, a global leader in automation and robotics, has R&D facilities in nearby Vasteras (a 2006 Smart21 Community). Ericsson, one of the biggest names in network equipment and related services, does most of its R&D in Stockholm's Kista Science City.

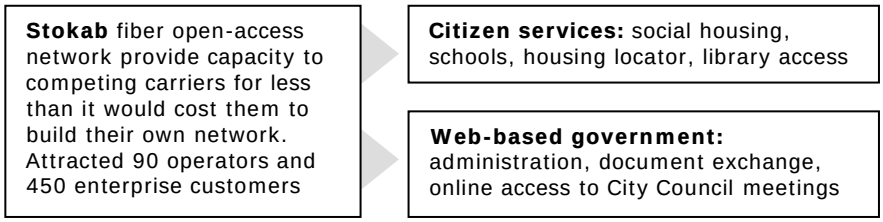


Kista got its start in the mid-Seventies as a mixed-use satellite city combining workplaces and apartments. Several companies including Ericsson and IBM placed factories or facilities there, and small to midsize companies began locating there to gain access to them. In 1985, the City of Stockholm decided that Kista needed more active management and brought together stakeholders, companies and universities in a non-profit foundation to encourage knowledge transfer. This motivated several research institutes to start operations there, including a branch of the Royal Institute of Technology and the computer-science school of the University of Stockholm. As the ICT cluster gained momentum, Stockholm created the Kista Science City Company and the Stockholm Innovation and Growth (STING) incubator. Today, about 31,000 people work in Kista Science City, which houses 1,400 different companies of all sizes. *WIRED* Magazine, in a review of technology clusters around the world, ranked Kista second, beaten only by Silicon Valley.

In addition to Kista, Stockholm economic development efforts focus on its life sciences cluster, ranked third in Europe, and on its clean tech industry, consisting of 2,700 companies with annual export growth of 16%. City government is a significant customer for clean tech, currently investing 1.7 billion kronor (160m Euros or US$207m) in energy-efficiency equipment. This has been characteristic of Stockholm since the mid-1990s. City government believes in making big investments of money, resources and time in the economy and society without neglecting the need to make sure that "big" continues to get better. On February 23, 2009 the City of Stockholm was appointed the first Green Capital of Europe by the European Commission. Stockholm was appointed for its holistic vision that combines

growth with sustainable development and includes the ambitious target of becoming independent of fossil fuels by 2050. ■

Government by Broadband in Stockholm



Population
401,000

Labor Force
222,700

Top Industries
Wholesale and retail trade, transport and storage, communication, real estate, business services, software development.

Key Leaders
Toomas Sepp, City Secretary

Valdur Laid, Chairman and CEO, Elion Ettevõtted AS

Jüri Jõema, CEO, Estonian Association of Information Technology and Telecom

Tallinn, Estonia

Building a new economy on the ashes of empire

Estonia became independent in 1991 after half a century of rule by the Soviet Union. While still celebrating the return of freedom, Estonians began to face a future of horrendous uncertainty. Overnight, the country's industrial output plummeted as it lost its Russian markets. Inflation was sky-high, the country's infrastructure was decrepit and its schools were literally falling apart through neglect.

Yet by 2005, Estonia had been admitted to the European Union and *The New York Times* was calling it "a sort of Silicon Valley on the Baltic Sea." That progress was the product of inspired public policy on the national level and skillful execution in the nation's capital city of Tallinn (www.tallinn.info), a 3-time Top Seven Intelligent Community.

Tiger Leap

The national government responded to crisis by taking radical measures to tame inflation and abolishing business taxes to encourage investment while still requiring a balanced budget. In 1999, the government sold 49% of its undercapitalized and underperforming state-owned telecom carrier to Telekom Finland and Telia of Sweden. A Telecommunications Act, Digital Signature Act and Public Information Act were passed in quick succession in 2000 and 2001 to create the conditions for growth in all forms of telecommunications. Policymakers and the government of Tallinn were equally welcoming to Finnish and Swedish banks, which grew to dominate the financial sector.

The best-laid plans of policymakers, however, could not compete with the impact of comments made in 1995 by Estonia's ambassador to the US and Canada, Toomas Hendrik Ilves. The Ambassador (who was to become Estonia's President) began talking about the need to connect Estonia's schools to the Internet. Lennart Meri, then president of Estonia, supported the idea and the government created a program called "Tiger Leap" that aimed to provide all schools with PCs and Internet connections by 1999.

The program fired the public imagination beyond any reasonable expectation. Suddenly, there were Tiger Leaps taking place across Estonia. The name was applied to e-banking services (which are now used for 95% of all transactions), online editions of newspapers and an NGO-funded program that put computers into vehicles to introduce ICT to the rural population.

Because few could afford computers at first, the National Library introduced the first public access Internet services in Tallinn with funding from UNDP. The Soros Foundation began a program that invited enthusiasts to create public Internet 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.

Meanwhile, time and enlightened policy had begun to heal the country's manufacturers. After privatization and a painful restructuring, the surviving traditional businesses in machine building, metal processing, textiles, food and furniture found new markets in Western Europe and North America. New foreign direct investment went into the manufacturing of electronics, automotive components and maritime services. More investment went into rebuilding the Port of Tallinn and the Tallinn International Airport to bring them up to international standards. The volume of goods moving through the airport jumped 120% from 2007 to 2008, and trade through the port outpaced Helsinki, Gdansk and Riga.

Attracting Human and Financial Capital

It was all very exciting, but Tallinn's government understood that it was not enough. If Tallinn was to grow at a pace sufficient to raise standards of living to the levels of Western Europe, it needed to attract foreign investment, new businesses and skilled people on a major scale. That meant reinventing the medieval seaport city as a new center of the Broadband Economy.

National initiatives continued to provide a strong wind beneath Tallinn's wings. The Estonia government introduced e-government in 1998 and continued to expand and improve it. Today, laws move in 100% electronic form through the legislative process. The government also introduced an electronic ID card and developed a data security system to support safe e-commerce. The ID card is a mandatory document for all Estonians over the age of 15, and 1.1 million cards were issued through October 2007. In addition to providing visual identification and a legally valid digital signature, the card can be used as a ticket on public transport, as a bank card and as an authorization card for online voting. The government also created an e-government "middleware" platform called X-Road (winner of ICF's 2008 Founders Award) to bridge the many databases and systems that were springing up in different departments. X-Road not only allows different systems to talk to each other securely but includes standard tools to speed the development of new online services. It now 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 has become the backbone for all e-government services in Estonia.

In Tallinn, the Council set up an e-Meeting system that permits members of government to participate in meetings regardless of their location.

An e-School platform introduced in 2006 offers a common environment for managing the municipal school curriculum and provides real-time data exchange between students, parents and teachers. The Youth Sport Activities Support System, also introduced in 2006, now registers 20,000 children per year with over 250 local sports clubs. Residents pay for parking via mobile phone and the Municipal School Health System, which entered development in 2008, will provide a secure online health management system for doctors, patients, students and schools. Ninety-five percent of office buildings in Tallinn are connected to super-fast broadband and over 90% of its companies use the Internet daily.

To spur further growth in services, Tallinn recently adopted a development plan that calls for expanding on the 325 existing public Internet access points and providing more digital training for young and old. Tallinn will also, in partnership with private operators, add online services via mobile phones, interactive communication channels with city officials and more free wireless access in public areas.

Innovation Strategy

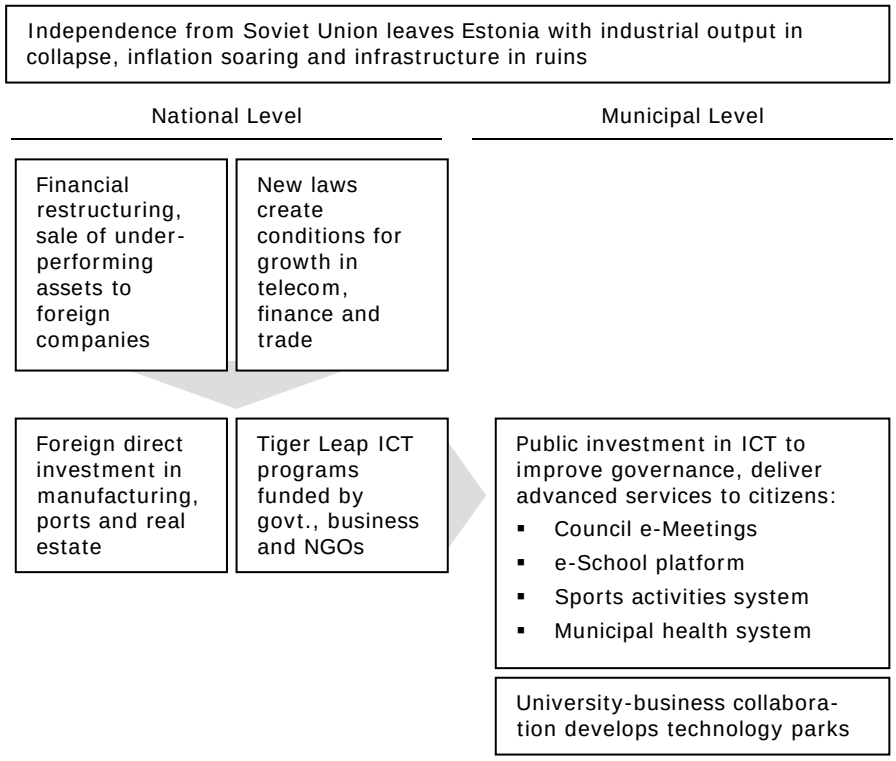
Today, seven out of ten residents of Tallinn work in the service sector, in which 70% of revenues are produced by business services, from consultancy and accounting to advertising and design. Tallinn's new five-year Innovation Strategy (2009-2013) targets business attraction and formation in IT, mechatronics, biotechnology, creative services, maritime and logistics and financial services.

The strategy specifies that innovation will take place through collaboration among business, government and academic institutions. Two technology parks are the venues for much of that collaboration. The Tallinn Technology Park (TEHNOPOL), based on the campus of the Tallinn University of Technology, houses 150 knowledge-based, high-growth companies (including the world-famous Skype) as well as Estonia's biggest business incubator. A new tech park, Ulemiste City, provides an energy-efficient, environmentally-friendly home for IT companies. In May-June 2007, Estonia underwent a much-publicized denial-of-service cyber attack that flooded its servers and threatened to bring down Web access and e-commerce. The nation's successful defense led NATO to announce that it would create a Cooperative Cyber Defense Center in Tallinn to conduct research and training on cyber warfare and develop NATO standards and capabilities for cyber defense.

Tallinn is the only 2009 Top Seven community in a developing nation. As such, it could be more vulnerable than its fellow honorees to the global recession that exploded on the scene in late 2008. The country entered the

recession with strong fundamentals, including an A rating on its sovereign debt from S&P, the fourth highest per-capita income in its region, and a reputation as a "star reformer," in the words of *The Economist*. As the countries of eastern Europe grapple with the economic undertow, Estonia has found itself strong enough to support other nations, as when it joined with the Czech Republic in contributing to a bailout of the Latvian economy in the first quarter of 2009. But it is certain that Tallinn will be put to the test in 2009 and 2010, and the world will see whether the initiatives that made it an Intelligent Community will also give its economy the resilience to battle recession and bounce back stronger than ever in the future. ■

Municipal-National Collaboration in Tallinn



The Selection Process

ICF's Intelligent Community of the Year Award program serves two purposes. It honors the achievements of communities tackling the complex task of building and maintaining competitive and inclusive local economies in the global Broadband Economy. It also gathers data on strategies and best practices for ICF's international research program.

Each year, hundreds of communities submit detailed nomination forms during the late spring and summer. In September or October, an internal committee selects from among the complete nominations the most compelling group to become its Smart21 Communities of the Year. These are announced in October at a ceremony hosted by the prior year's Intelligent Community of the Year.

Following the naming of the Smart21, academic researchers conduct a thorough review of the nominations and generate quantitative scores in each of six areas: the five Intelligent Community Indicators developed by ICF and a sixth topic that changes from year to year. In 2009, our theme was Culture of Use. ICF invited nominees to discuss how their community helps citizens and organizations to make broadband applications a part of their daily lives and thereby create the digital experiences and digital engagement that make them unique Intelligent Communities. Becoming "instinctive users" of broadband helps citizens and organizations increase their efficiency, expand their knowledge and improve living standards. Examples of how communities create a local culture of use include:

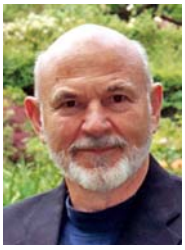
- Developing or expanding broadband networks
- Educating citizens of all ages on the use of computers, the Web and Web-based applications
- Putting government functions and civic life online
- Celebrating digital experiences and engagement through local events, conferences, promotion through special events and local media campaigns

The analysis was conducted by ICF associates based at Laurentian University in Sudbury, Ontario, Canada and at Ohio University in Athens, Ohio, USA.

- **Dr. Sylvie Albert** is a professor of Strategy and Organizational Behaviour at Laurentian University (Ontario) in the Faculty of Management. Dr. Albert has published two books on the intelligent community movement and has completed her doctoral dissertation and several articles on this topic. She spent six years as a human resource planning consultant, five years as a Director of Economic Development, and ten years as a consulting project manager on dozens of economic development and telecommunication projects across Canada under her own company Planned Approach Inc. She has served on the Board of the Telecommunications Access Partnership, the Northern Ontario Heritage Fund Corporation, and

the Ontario Jobs and Investment Board. In 2000, Sylvie was named one of the Most Influential Women of the Year by the Northern Ontario Influential Women Award.

- **Dr. Don Flournoy** is a Professor of Telecommunications Studies at the School of Media Arts and Studies at Ohio University. His research focuses on the application of information and communication technologies to the solution of human problems and the establishment of public policy that facilitates free and open public access to broadband communication networks. Dr. Flournoy is the author of eight books and numerous scholarly and professional articles. He is the Editor of the *Online Journal of Space Communication* (www.spacejournal.org) and the Education VP of the Society of Satellite Professionals International (www.sspi.org).



The statistics they produce undergo a final review by ICF's internal committee prior to publication of the Top Seven Intelligent Communities of the Year. In May, after a second evaluation process conducted by an independent research company, one of the Top Seven is named Intelligent Community of the Year.

The Author

Robert Bell is Executive Director and co-founder of the Intelligent Community Forum. Mr. Bell has led economic development missions to cities in Asia and the US; authored articles in *The Municipal Journal of Telecommunications Policy*, *Telecommunications*, *Public Power, Satellite News* and *Asian Communications*; and appeared in segments of ABC World News and The Discovery Channel. He is a frequent speaker at municipal and telecommunications industry conferences. The author of ICF's pioneering study titled *Benchmarking the Intelligent Community*, he leads research efforts for the Forum as well as overseeing its operations and finances.

The Intelligent Community Forum

The Intelligent Community Forum (ICF) is a 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. But it also provides communities with powerful new tools to develop their economies, strengthen community ties and improve government. 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.

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Friends of the Forum

ICF gratefully acknowledges the support of leading individuals and organizations for its awards, research and educational programs.

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