Intelligent Community Indicators

http://www.intelligentcommunity.org/index.php?submenu=Research&src=gendocs&ref=Research_Intelligent_Community_Indicators&category=Research

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. In its work since then, ICF has also identified a number of success factors for Intelligent Communities in both industrialized and developing nations.

1. **Broadband Connectivity**
   Broadband is the new essential utility, as vital to economic growth as clean water and good roads. Intelligent Communities express a clear vision of their broadband future and craft policies to encourage deployment and adoption.

2. **Knowledge Workforce**
   A knowledge workforce is a labor force that creates economic value through the acquisition, processing and use of information. Intelligent Communities exhibit the determination and demonstrated ability to develop a workforce qualified to perform knowledge work from the factory floor to the research lab, and from the construction site to the call center or Web design studio.

3. **Digital Inclusion**
   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. Intelligent Communities promote digital inclusion by creating policies and funding programs that provide “have-nots” with access to digital technology and broadband, by providing skills training and by promoting a compelling vision of the benefits that the broadband economy can bring to their lives.

4. **Innovation**
   For business, broadband has become to innovation what fertilizer is to crops. Intelligent Communities work to build the local innovation capacity of new companies, because these produce all of the job growth in modern economies, and invest in e-government programs that reduce their costs while delivering services on the anywhere-anytime basis that digitally savvy citizens expect.

5. **Marketing and Advocacy**
   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. Effective marketing shares this story with the world, while advocacy builds a new vision of the community from within.

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.

1. Broadband Connectivity

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. Very high cost areas, such as rural regions, and low-income markets remain at the bottom of the priority list.

Why Government Gets Involved

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.

Mention municipal broadband, and most people think you are talking about direct competition with the private sector. But direct competition is just one of many strategies and by no means the most common. Intelligent Communities everywhere want the same thing: to get their citizens the broadband utility they need at a price they can afford.

2. 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.

Assets of the Knowledge Workforce

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.

What Communities Can Do

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 programs to online learning tools.

Creating a Culture for Knowledge Work

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.

3. Digital Inclusion

When we talk about digital inclusion, we're really talking about prevent 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.

Promoting 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.

Challenges to Digital Inclusion

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.

4. 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.

Building Innovation Capacity

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.

The Role of E-Government

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.

5. 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.

Marketing

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

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.