The Education "Last Mile"
Closing the Gap from School to Work

2010 ICF Theme and Guidance Paper for
Communities Submitting a Nomination for the
Intelligent Community of the Year Award

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Table of Contents

The Last Mile

Education has cultural, social, spiritual and aesthetic value, but its most tangible value is in preparing a young person for work. Unless that young person successfully crosses the last mile from school to work – work in a prospering local industry that pays a living wage – the years of schooling produce little payoff.

How does your community – government, institutions and business working together – prepare young people to work in local industry? How do you work to connect the talent emerging from secondary schools, technical schools, colleges and universities to local career opportunities, instead of seeing it leave the community?

E ach year, ICF selects a theme to supplement the Intelligent Community Indicators (or criteria) on which the selection of the Smart21, Top Seven and Intelligent Community of the Year is based. The Indicators provide a framework for understanding how communities succeed in building inclusive and sustainable prosperity in the global Broadband Economy.

The theme focuses on a particular success factor in the work of Intelligent Communities, and allows nominees to highlight their achievements in this area. The theme, when evaluated as the one of the ICF's indicators, is weighted into the assessment of a community's nomination for the Intelligent Community of the Year awards. Past themes have included *sustainability*, *leadership* and *culture of use*, each the basis for solid progress by communities honored through the Awards program.

Purpose

In 2010, the annual Intelligent Community Awards program will take as its theme: "The Education 'Last Mile' – Closing the Gap from School to Work." The purpose of this white paper is to explain and explore the 2010 theme in order to guide communities in completing their nomination process. We also hope to raise awareness of a vital issue in community development in the Broadband Economy.

Knowledge Work

In 1973, management consultant Peter Drucker coined the term "knowledge work." He forecast that, within one or 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 first decade of the 21st Century, we have seen Drucker's prediction come true. A 2002 report from the US Department of Commerce, based on the 2000 Census, compared the average annual earnings of a full-time employee with a secondary school diploma, a university degree, and a professional degree, such as a doctor, lawyer or engineer. It makes clear how much of a premium today's economy puts on educational achievement:

	Secondary	University	Professional
Annual average	US$25,900	US$45,400	US$99,300
20-year average	$518,800	$910,000	$1,986,000
Difference	0%	175%	383%

The change has been profound. And for citizens with a poor educational history and few skills, it has been devastating. In earlier decades, they would have found work in manufacturing and earned wages that would have put them solidly in the middle class. But while manufacturing continues to be a

critical part of the global economy, it has lost its job-generating power in the world's industrialized nations.

In 2005, for the first time since the Industrial Revolution, fewer than 10% of American workers were employed in manufacturing, according to the Organization for Economic Cooperation and Development (OECD). In Europe, the figures were slightly higher – 14% in Britain, 16% in France, 22% in Italy and 23% in Germany – while Canada, with an historically strong manufacturing sector was at 14%. In all of the countries mentioned, however, the percentage of people employed in manufacturing has fallen sharply since 1970, by amounts ranging from 25% in Italy to 60% in Britain. In lower-skilled manufacturing, employment and economic activity has moved to developing nations, which offer not only lower wages but, more importantly, access to the world's fastest growing markets for manufactured goods.

To focus only on the migration of manufacturing jobs to low-cost regions, however, is to miss the point. The simple fact is that all desirable jobs in industrialized economies – and increasingly in developing economies as well – are requiring a higher component of knowledge. In Singapore, the two largest contributors to gross domestic product are manufacturing (26%) and financial services (22%). Yet manufacturing and service employers in Singapore pay the same premium for employees with more education. In 2000, the median income was S$7,930 for university graduate households and S$5,320 for technical school graduate households, 5.5 times and 3.7 times respectively the median income of households without any higher education. A 2006 white paper from the Federal Reserve Bank of New York reported that employment in high-skill manufacturing grew 37% from 1983 to 2002, while low-skill jobs declined 25% over the same period.[1] In the midst of the 2009 global recession, with the highest unemployment rate in 30 years, *The New York Times* reported that employers are desperately seeking applicants with specific, knowledge-based skills, from high-quality welding to critical-care nursing, and from electric linemen and special education teachers to experienced geotechnical and civil engineers.[2]

In 1990, the two largest categories of employment in America were farming and domestic service. The fact that farming now employs less than 3% of the population and domestic service is a category too small to count should remind us that the employment market is ever-changing, and that there will never be an end to the need to adapt to it.

Knowledge Work in the Intelligent Community

Every community's future today depends on a continuous improvement in the skills and knowledge of its citizens. In developing nations, where manufacturing is still in its booming adolescence, that may be a long-term concern rather than today's priority. But even so, when you visit many developing nation, you find the pages of the business press filled with stories about the skills gap and concerns about the country's ability to keep up.

How can communities address the challenge at the local level? How do they prepare young people to work in local industry? What assets do they bring to the struggle to upsize skills and knowledge? The list below provides a brief summary.

Youth

Pre-school programs
Funded by local, state and national government, support working families while preparing young children for the start of formal schooling

Elementary and secondary schools
Controlled at the local, regional or national level

Community and technical colleges
Operated by local, regional or national government as well as for-profit or nonprofit educational institutions

Undergraduate and graduate colleges and universities
Operated by regional or national government as well as private nonprofits

Adult

Continuing education and retraining
Offered by local, regional or national government as well as for-profit and nonprofit educational institutions

Internal Training Programs
Offered by employers

Basic Skills Training
Offered by government

Computer and Web Literacy Training
Computer and Web literacy training offered by government and nonprofit or for-profit educational institutions

The items on this list have something important in common: very few are under the community's direct control.

In most countries, pre-school, elementary and secondary education policy is set at the national level, although the US remains a notable exception with its tradition of local control. Higher education is generally managed at the national or state/provincial level, or is provided by private nonprofit institutions. Adult skills education is typically provided by nonprofit or for-profit technical schools or by businesses for their own employees. Many countries have publicly-funded skills training programs for youth and adults as well that are delivered at the local level using money from the national or state/provincial government. In short, there is little communities can do to influence most of the programs on the list.

What Communities Can Do

What communities *can* do is to improve the "educational market" that connects talent in their communities to *local* work and career opportunities. We hope that the output of education is a skilled, cultured and productive adult. The goal of the community should be to make sure that there are compelling reasons to keep those skills within the community that helped to create them through multiple layers of social and economic investment.

When young people emerge from secondary school, technical or community college, university or post-graduate study, what is their motivation to remain in the community? Can they find career opportunities equal to their skills? Intelligent Communities work consciously to develop an economy that offers opportunities to knowledge workers and an "efficient market" that connects supply (talent) to local demand (careers). Whether home-grown or newly arrived, talented people experience Intelligent Communities as relatively easy places to find employment that makes use of their talents and develop them into a lifelong career. No job-seeker, particularly in recessionary times like these, will tell you that such things are easy. But Intelligent Communities know how much their future depends on grooming, attracting and retaining talent, and that awareness is made manifest in community programs, social life and individual attitudes and experiences.

In telecommunications, the term "last mile" refers to the distance separating the end customer from the nearest node on the long-distance network. It is a truism that the last mile – whether copper, wireless or optical fiber – is the most difficult and expensive part of the circuit. The last mile is where complications enter, from rights of way to digging up the roads, and where it is hardest to find the efficiencies that reduce costs. But it is also where all the opportunity resides, because the customers live and work there.

We think this is a useful way to think about the educational challenge facing communities in making the community more prosperous, innovative and socially inclusive – making it, in other words, a good place to live now and in the future. Education has cultural, social, spiritual and aesthetic value, but its most tangible value is in preparing a young person for work. Unless that young person successfully crosses the last mile from school to work – work in a prospering local industry that pays a living wage – the years of schooling produce little payoff.

We have been educating children – and repeatedly reforming education – for a long time. We know how to build and run community colleges, technical schools, universities and graduate schools. The challenge for Intelligent Communities is to "sweat the assets," in that striking business phrase – to make them work specifically for the benefit of the community and its citizens – by connecting the talent emerging from these institutions to local career opportunities, which ultimately produce local prosperity and the social and cultural values that depend on it.

Lessons From Intelligent Communities

How have Intelligent Communities sought to bridge the last mile separating career preparation from careers? What have they done to increase the supply of talent and ensure that it finds a ready local market? The following examples come from Intelligent Communities that have been honored through ICF's annual Awards program and are members of its "alumni" of Intelligent Communities today.

Waterloo, Ontario Canada (2007 Intelligent Community of the Year) is one of North America's major high-tech hubs, home to BlackBerry manufacturer Research in Motion and enterprise software maker Open Text. Like many such places, it is the product of universities that built their own last mile. In the 1970s, the University of Waterloo (UW) put into place an intellectual property policy that made students and faculty the owners of innovations they developed at the university. This spurred the founding of technology-based businesses that owed their existence to the university and stayed close to UW as a source of ideas, funding and talent. Today, the city and universities partner on numerous programs to keep the "talent engine" running.

■ UW partners with Wilfrid Laurier University to run a Launchpad $50k Venture Creation Competition for students, researchers and community members. Modeled on a successful program at the Massachusetts Institute of Technology, the competition awards cash prizes and in-kind services to three start-up companies each year. In so doing, they generate excitement about local entrepreneurship. More: www.launchpad50k.ca

■ Wilfred Laurier also runs a Center for Community Service-Learning, which aims to create a lifelong commitment among its students to community service. The Center places nearly 1,000 students each year in 200 partner organizations, with students contributing a minimum of 2 hours per week over 10 weeks. More: https://www.wlu.ca/homepage.php?grp_id=1934.

■ Waterloo businesses and nonprofit organizations have joined forces to create the Waterloo Region Immigrant Employment Network. As a high-tech center, Waterloo is a destination for skilled immigrants from around the world. The Network seeks to match recent immigrants quickly and efficiently to local career opportunities. More: www.wrien.com.

Taipei, Taiwan (2006 Intelligent Community of the Year) is the world's largest producer of laptop and notebook computers and computer motherboards, and the center of the Taipei Technology Corridor, where three major technology parks house more than 2,200 companies employing 85,000 people. To feed this growth

engine, the city government has made it a priority to reduce the time and resources needed to turn students into productive knowledge workers.

To prepare students, the city invests more than US$93m each year in IT education. It has attracted Microsoft to locate its first School of the Future there (www.microsoft.com/education/schoolofthefuture). The School of the Future is a Microsoft initiative for the complete redesign of schools – from building lay-outs to IT infrastructure to instructor training – to bring education into the 21st century and integrate information and communications technology into every aspect of learning. At the city's invitation, Cisco built one of its Networking Academies (www.cisco.com/web/learning/netacad) in Taipei. The Academy, which provides advanced IT training to prepare students for careers in net-working technology, has already served over 16,000 students.

Issy-les-Moulineaux, France (2007 and 2009 Top Seven Intelligent Community) focuses its resources on the young. It is common wisdom in science and technology education that waiting until secondary school, college or university to interest students is too late. To have enough time to acquire a foundation of knowledge, students must become interested and receive appropriate training by the late elementary years (grades 5-6). So Issy devotes 40% of its municipal budget to primary school. The commitment to information technology starts early. "Cyber-nurseries" and "cyber-kindergartens" introduce the Internet into the daily lives of young citizens, as well as allowing parents to join daily activities by videoconference. When children are away at summer holiday camps, a video system called "Papoo" connects them with their parents.

One of the most innovative centers in all of Europe is located in Issy on school property. Le Cube (www.lesiteducube.com) is the first center in France, and perhaps the world, dedicated entirely to the development and enjoyment of digital art. Opened in 2001 as an initiative of the city, it allows citizens to hone their skills in the digital arts as well as produce and disseminate digital creations. Offering training for new users of computers and digital animation software, Le Cube also hosts an annual Digital Arts Festival.

Winston-Salem, North Carolina, USA (2008 Top Seven Intelligent Community) is one of America's hubs for the biotechnology industry. Two-year community colleges have been instrumental in bridging the last mile there. The Forsyth Technical Community College (www.forsythtech.edu) has a strong biotech training program – so strong that four-year colleges in the region exchange students with Forsyth Tech to ensure that their students are well versed in research competencies, lab safety and standard operating procedures. Forsyth Tech requires that biotech students

pursue 160-hour internships. Tim Bertram, vice president of science and technology at Winston-Salem's Tengion Inc., told the *Biotech Resource Line* newsletter that "the Forsyth Tech graduates we have hired are mature, with deep roots in the local community. We can build on the foundation that Forsyth lays. New employees spend an intensive six months in training at Tengion. I do not have the luxury of making a six-month investment in an employee just to have them walk out the door."[3]

Stockholm, Sweden (2009 Intelligent Community of the Year) focuses on nurturing the talent that starts new companies. In its Krista Science City, a nonprofit called Stockholm Innovation & Growth (STING) is Sweden's largest support system for the commercialization of ICT, medical and clean technology innovations into start-up companies. Lead by a former venture capitalist and entrepreneur, it carefully selects projects developed by university students and instructors, and offers a range of support including business development and financing. STING (www.stockholminnovation.com) seeks to contribute to the formation or growth of 12 new companies every 12 months. Most of its successful companies have between 15 and 30 employees within 60 months of start-up. Recent examples include Wussap, a service that creates social networks, and EPiQ, which focuses on diagnostic innovations for the treatment of coronary disease.

Northeast Ohio, USA (2006 and 2008 Top Seven Intelligent Community) offers an example of nonprofit cooperation in creating a talent pipeline across the last mile. The Cleveland Clinic (http://my.clevelandclinic.org) is a multi-specialty academic medical center, consisting of ten community and specialized hospitals, which integrates clinical and hospital care with research and education. Like many US hospitals, it faces a chronic shortage of skilled nurses. To combat the problem at its source, the Clinic partnered with the nonprofit network provider OneCommunity (www.onecommunity.org) and the metropolitan school district to bring extraordinary medical content into the public school system. The Clinic has equipped all of its operating rooms with video cameras and feeds for laproscopic ("keyhole") surgery. Through a grant to OneCommunity, the Clinic delivers narrated surgical videos, along with teacher lesson plans, to schools as part of a STEM (science, technology, engineering and math) curriculum. The videos are hosted on the OneClassroom content management and communications platform developed by OneCommunity for the school district. To extend this effort, the Clinic's Office of Civic Education has also introduced an internship program for secondary and community college students in the community.

In these examples, we see Intelligent Communities attacking many different aspects of the last mile challenge, from ensuring that children learn digital skills in primary school to creating "pipelines" that guide young people into specific local industries. They do not attack this challenge in isolation. Intelligent Communities simultaneously address many different development factors – broadband, knowledge work, digital inclusion, innovation, marketing and advocacy – because they reinforce and complement each other to produce a whole greater than the sum of the parts. Their efforts provide a model for communities around the globe.

The Intelligent Community Indicators

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.

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.

In its annual Awards program, ICF includes as a sixth criteria a theme that changes from year to year but focuses on a particular success factor in the development of Intelligent Communities. This white paper has been devoted to exploring the 2010 theme, The Education "Last Mile." ICF asks communities completing the Intelligent Community Award nomination forms are asked to provide specific information on their efforts and successes in this area.

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.

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.

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.

The Author

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NOTES

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