Technology and Grit at the Grassroots

information technology, community engagement, and jobs in distressed rural communities

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NCSC wishes to thank the many small community leaders who shared their stories in *Technology and Grit at the Grassroots*. Their experiences in technology-led economic development serve as models and encouragement for other small and rural communities

A Message from EDA Assistant Secretary David A. Sampson

I believe economic development is of critical importance because it supports two important public policy objectives: creating wealth and minimizing poverty. The public sector role is to foster a positive environment where the private sector will risk capital investment to produce goods and services and increase productivity, thereby providing the higher-skill, higher-wage jobs that offer opportunity to all Americans.

In the last two decades, the expansion of information technology applications has been a major stepping stone toward the creation of these higher-skill, higher-wage jobs and toward President Bush's goal of helping American communities compete in an ever-changing, technology-driven world. Technology-led economic development has been the goal of many communities. However, while many urban citizens have prospered as a result of the technology revolution and technology-led economic development strategies, the application of information technology is often more difficult in rural areas.

Technology and Grit at the Grassroots examines the problems and promises of technology-led economic development strategies in distressed rural areas. Its 14 case studies provide valuable lessons and ideas on how technology can be applied to various situations.

David A. Sampson
Assistant Secretary
for Economic Development

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Introduction

The Launch of Information Technology

During the past two decades, our nation's schools, homes, and work places have become infused with new technology, especially information technology. While it took 35 years for the telephone to become commonplace and 25 years for the television to attain household popularity, Americans embraced the personal computer in just 15 years. The Internet rapidly followed and was adopted in a little over five years. Now, everything electronic, from e-mail to e-Bay, is commonplace.

Consider the staggering reports of computer and Internet usage. According to the U.S. Census Bureau's September 2001 Current Population Survey, 174 million Americans (approximately 66 percent of the population) use computers at home, school, and/or work, and 143 million (about 54 percent) are online. Approximately 2 million new Internet users come on board each month, leading Jupiter Communications to predict that more than two-thirds of the U.S. population will be online by 2005.

Internet use is rising for all Americans, regardless of income, education, age, race, ethnicity, or gender. The "unconnected" population continues to include those in households with very low incomes (75 percent of households with annual incomes under $15,000), adults with minimal education (87 percent of adults with less than a high school education), Hispanics (68 percent) and African Americans (60 percent). Yet the rate of growth in both computer and Internet use among all of these populations is on the rise.

Men were early adopters of information technology. Now the sexes are equal participants in the online world—users are 51 percent female and 49 percent male. Computers are employed by 90 percent of children between the ages of 5 and 17, particularly at school. At least 84 percent of public school classrooms are connected to the Internet.

Impact on Businesses, Economy

Information technology continues to shape our national economy, despite the September 11 terrorist attacks, dot-com failures, and the recent recession. According to a September 2002 Brookings Institution study, Internet technology will add one-quarter to one-half of a percentage point to the nation's productivity growth over the next several years. Over a decade, this increase will mean additional economic growth of 2.5 to 5 percent or added wealth of approximately $1,250 to $2,500 per person.

The impact of information technology is apparent in nearly every business, especially among small enterprises that have close commercial relationships with larger enterprises. Most small-to-medium-size enterprises (SMEs) are either suppliers for, or distributors of, larger businesses. Routine operations, such as reviewing catalogs, ordering supplies, and reporting inventories, once performed with paper and pencil or by fax, are now conducted electronically. These SMEs are being thrust into business-to-business e-commerce. The local tire seller, hardware store, car dealer, and small manufacturing shop are relying more and more on information technology and high-speed telecommunications.

Technology-Led Economic Development

Considering these profound changes, it comes as no surprise that the business of economic development —job creation and income generation—is now closely intertwined with information technology. Whether communities are striving to attract new industries, retain and expand existing businesses, inspire entrepreneurship, or manage growth, computers and the Internet play a vital role in the development agenda. This reality is the foundation of information technology-led economic development. (While other technologies—pharmaceutical, aerospace, and biotechnology—also play a role in creating jobs and generating income, particularly in association with universities and on the state level, these scientific technologies are outside the parameters of this project.)

The integration of information technology and rural economic development is both promising and problematic. Computers and the Internet should provide small, rural communities with an unprecedented opportunity to overcome the distance penalty, thereby leveling the economic development playing field. In theory, advances in information technology mean that people and companies can reside and work just about anywhere. Small businesses located in even the most remote places can participate in e-commerce, marketing and selling their products around the globe.

Students and teachers in the smallest of schools can engage in more diverse and advanced educational programs through distance learning. Patients can obtain remote medical consultation, diagnosis, and even surgery through telemedicine. Clearly, small, rural, and particularly economically distressed communities have the most to gain from these innovations in technology.

Catch-22 for Rural, Distressed Communities

Unfortunately, technology-led rural development also has a thorny aspect. The very challenges that information technology is meant to overcome—distance, isolation and low population density—actually can stand in the way of progress. Small, distant, stagnating rural communities can be poor candidates for high-speed telecommunications.

First, the high cost and physical difficulty of deploying advanced telecommunications such as DSL, cable, and wireless services can be significant barriers. Second, the residents of these communities rarely clamor for such services. For a variety of reasons, rural residents may not yet understand or appreciate how advanced telecommunications can strengthen their local businesses, schools, medical facilities, government, and other institutions.

Researcher Thomas Rowley explains the Catch-22 situation: "People who lack advanced telecommunications services cannot utilize and benefit from them. People who have not utilized and benefited from them are less likely to demand them. People who do not demand them are not going to get them." [1]

His analysis underscores the reality across the country. The Current Population Survey reports that the number of Internet users in rural areas (53 percent) nearly equals the national average (54 percent). Yet, when it comes to high-speed, broadband Internet access, almost twice as many urban residents benefit from fast connections compared to citizens of sparsely populated areas.

There are exceptions to this rule, including nearly all of the towns showcased in this guidebook. A number of rural communities offer high-speed DSL, cable, or wireless services, typically through small telephone/telecommunications companies and cooperatives. But rural America is playing catch-up.

Information Technology Is a Tool

Computers and the Internet offer fresh prospects for rural America. Particularly after September 11, some companies are planning to relocate or disperse their operations from congested metropolitan areas. Many independent-minded entrepreneurs are viewing rural towns with new eyes.

The 14 rural distressed communities highlighted in this guidebook illustrate the significant economic development outcomes that information technology can produce: increases in the numbers of skilled workers, en-

[1]Thomas Rowley, "Rural Telecommunications: Why Your Community Isn't Connected and What You Can Do About It," TVA Rural Studies Staff Paper 99-1, 1999, p. 5.

trepreneurial endeavors, markets for local products and locally employed individuals.

The case-study communities also demonstrate that the existence of high-speed telecommunications cannot be a goal in and of itself. Such technology is not a guarantee of economic development success. A town can boast the fastest telecommunications service imaginable, yet lack other equally (or more) important economic development qualifications: quality-of-life amenities, a skilled work force, proximity to a business market, and high-quality educational facilities.

A key lesson to be learned from these rural communities is that computers, the Internet and advanced telecommunications services are tools—promising tools to be used in conjunction with other economic development assets such as those listed above.

It's also clear that the tools of technology are worthless without vibrant and sustained grassroots leadership. In each of the project's 14 communities, determined individuals preached the benefits of computers and the Internet until they were blue in the face. Then they shepherded information technology to produce specific results. Hence the title of this guidebook -- *Technology and Grit at the Grassroots: information technology, community engagement, and jobs in distressed rural communities*.

How This Guide Will Help

Pursuant to an RFP and a funding award from the Economic Development Administration, the National Center for Small Communities (NCSC) set out to identify and explore effective technology-led economic development strategies for distressed, rural communities. We prepared this guidebook to inspire thoughtful technology-led economic development in rural America.

Concrete guidance on *how* to put computers, the Internet, and advanced telecommunications to good use is distilled from 14 distressed rural communities and supplemented by recent articles and reports. We believe that rural leaders learn best from on-the-ground experiences of similarly situated communities, not from "scaled-down" urban models.

Chapter 1 describes the project's research methodology and presents a set of findings, lessons, and recommendations distilled from the 14 case-study communities. Chapters 2 through 6 are organized around a set of technology-led economic development strategies:

Acquiring Advanced Telecommunications Services
Promoting Public Access to Computers and the Internet
Engaging Youth, Utilizing Schools
Increasing Local Business Productivity, Enhancing Local Labor Skills
Assisting Local Entrepreneurs

The guidebook concludes with an appendix listing helpful technology and economic development-related Web sites.

The 14 in-depth technology-led economic development case studies are dispersed among Chapters 2 through 6. Each of the case studies contains demographic data; a statement of the economic development strategy employed; a detailed project summary; bulleted outlines of benefits achieved, keys to success, and obstacles to success; sources of funds; and local contact information.

More comprehensive versions of the 14 case studies are included in NCSC's *Thriving Hometowns Network*, a free electronic database of 53 small town economic development success stories. It is housed on the NCSC Web site at www.smallcommunities.org. These comprehensive versions of the 14 case studies contain additional background information on the community/region; added details on project planning, implementation and results; and listings of project organizers and helpers.

The *Thriving Hometowns Network* offers a low-cost substitute for visiting successful communities—a kind of "virtual site visit." All 53 *Network* case studies can be searched by geographic region, population, economic development strategy, and key project organizers. Users can also perform key word searches. If desired, all 53 small town economic development case studies can be viewed and printed, at not cost.

The electronic database was developed with support from the National Rural Electric Cooperative As-

sociation (NRECA), Tennessee Valley Authority (TVA), and Appalachian Regional Commission (ARC).

The National Center for Small Communities welcomes your comments on *Technology and Grit at the Grassroots*. We are particularly interested in hearing if and how the guidebook is useful to your community. Your questions and ideas could tailor a future publication, in print or on the NCSC Web site. Please e-mail your comments to ncsc@sso.org and visit the NCSC Web site to learn about NCSC membership, publications, annual conference, rural development resources, and more.

Nancy Stark
Director, Community and Economic Development
National Center for Small Communities

Chapter 1

Research Findings, Lessons, and Recommendations

What are the characteristics of communities that successfully employ information technology? Which facilities, services, and conditions must be present for effective economic development? How does the case-study communities' involvement with technology compare to your locality?

This chapter describes the findings, lessons, and recommendations drawn from 14 rural, distressed towns/counties that can—with adaptation—steer technology-led development in your region. Although these communities were selected for their innovation and achievement with technology, they have much in common with localities throughout rural America.

Distance Learning, Telemedicine

A range of technologies exists within, or near, the case-study communities. In more than half of the communities (eight of the 14), residents have access to two-way interactive TV and other distance learning technologies. Distance learning equipment is particularly promising in remote areas, where smaller populations mean fewer local schools or educational offerings. City-owned or city-leveraged telecommunications services (e.g., telephone, cable TV, Internet service) are present in about one-third (five) of the communities. Some states prohibit localities, including municipally owned utilities, from entering the telecommunications industry.

Sixty percent (eight) of the communities have instituted telemedicine technologies that link health care institutions. This technology is increasingly vital to rural citizens, especially those living on low- or fixed-incomes. Together with distance learning, telemedicine is touted as an economical redeemer for rural America.

As expected, all 14 towns/counties have toll-free, 56 kbps (kilobits per second) Internet access. Less than a quarter of the communities (three) have had such telecommunications services for longer than five years; the rest acquired services during the past three to five years.

ISDN Service

ISDN (Integrated Services Digital Networks) lines, usually operating at 128 kbps, are available in more than half (eight) of the case-study communities. Most of these towns/counties (six) have had this service for more than three years. This finding is not surprising, given that ISDN is an early, and relatively slow, "advanced" telecommunications service. Since the Federal Communications Commission (FCC) reserves the terms "high-speed," "broadband" and "advanced telecommunications" for services with transmission speeds in excess of 200 kbps, ISDN does not meet this definition.

The extent to which ISDN services are accessible within the community is split. ISDN is widely available in four localities, while the other four limit its availability to specific sites (e.g., schools and libraries).

Several communities report disenchantment with ISDN because their local telephone companies no longer maintain ISDN equipment. This is an ironic scenario for small, rural communities. Telcos, in general, are switching their allegiance to newer technologies such as DSL. Yet, many telecos operating in rural areas are not eager to upgrade the necessary telecommunications infrastructure to deploy high-speed services. This leaves

How This Research Was Conducted

Supported by the U.S. Department of Commerce, Economic Development Administration (EDA), the National Center for Small Communities (NCSC) explored effective technology-led economic development in 14 distressed, rural communities and built this practical guidebook for leaders from the case-study analysis and supporting material. Members of the Project Design Team included a wide range of development organizations and distribution channels (e.g., listservs).

To launch the research, NCSC issued a broadly circulated electronic announcement that solicited candidates for rural, locally driven technology-led economic development case studies. Distressed, rural communities and regions that were successfully using information technology to generate jobs and/or increase income were asked to send a brief description to NCSC.

NCSC received 44 nominations and narrowed the list to 29 candidates. The 29 communities were invited to complete a more detailed Screening Survey that included information on technology-led development goals, activities and outcomes. Twenty-one candidates complied with this request.

In selecting the 14 finalists, NCSC sought diversity with respect to community population; type of local government; region of the U.S.; source of economic distress; type of technology-led economy development activities; extent of outcomes achieved; and availability of technical and financial resources. Some finalist communities are tiny and isolated, such as Maddock, North Dakota, population 498. Others encompass rural territory, but are considerably larger and contain a few small cities, such as Klamath County, Oregon, population 63,000.

NCSC also aimed to focus the research on typical rural environments. As a result, none of the 14 selected communities are well known or endowed with significant resources, such as a major university or technology industry. The following communities met these criteria:

Abingdon, Virginia
Ashley, North Dakota
Bethlehem, New Hampshire
Colville, Washington
Douglas, Wyoming
Elsa, Texas
Garrett County, Maryland
Klamath County, Oregon
Maddock, North Dakota
McDermitt, Nevada
Meadville, Pennsylvania
Southeastern Kentucky (3 rural counties)
Watford City, North Dakota
Waushara County, Wisconsin

Community leaders in the 14 localities completed a nine-page Informant Survey, supplying in-depth information on their technology-led economic development resources, strategies, problems, and achievements. This quantitative and qualitative data was supplemented by 90-minute structured telephone interviews with one or two primary leaders and facilitators in each of the case-study communities. The interviews permitted NCSC to gain additional insight into local conditions, telecommunications services, collaboration strategies, obstacles to success, etc., and to formulate recommendations for similarly situated communities.

rural residents with less-than-speedy ISDN as the only "advanced" option (faster than dial-up).

High-Speed, "Always On," Broadband Services

All but one of the case-study communities have some form of high-speed (at least 200 kbps) telecommunications capability, via T-1 lines, DSL, cable modems or wireless. In at least half of these communities, however, these services are either limited (e.g., by geographic range of DSL availability) or barely affordable (e.g., T-1 lines).

In all but two of the towns/counties, residents can acquire high-speed T-1 lines that generally operate at 1.5 megabits per second (mbps). Since T-1 lines are expensive (usually about $1,000 per month), users typically are high-volume customers, including large businesses, government agencies, community colleges, schools, and libraries. Telcos also will sell a portion of a T-1, called a fractional T-1, which results in a slower, but more affordable, service. (Information on fractional T-1 availability was not collected in this research.)

The T-3 line is a new technology for users with very high transmission needs and a generous budget. With roughly 30 times the capacity of a T-1, fast T-3 lines operate at 45 mbps and cost over $20,000 per month. Given the cost, it is not surprising that only one case-study county, home to a growing community college, has T-3 service.

Digital Subscriber Lines (DSL) are available in half (seven) of the towns/counties and strongly desired in the other half. DSL uses traditional copper lines for rapid transmission and receipt of large quantities of data. There are several variants of this technology, with speeds ranging from 128 kbps (on par with ISDN) to 5 mbps or beyond (equal to T-1 or even T-3 service). When available, business users switch from T-1 to DSL, because DSL is more affordable. This change occurred in several case-study communities when the local telephone companies began offering DSL service.

DSL is widely available in four of these seven communities, and is restricted to certain sites in the other three communities. Restrictions usually result from the requirement that DSL users be located within three miles of a local telephone company switching station.

Although cable modems are common in metropolitan areas, they generally are scarce in rural communities. Less than one-quarter (three) of the towns/counties offer cable modems that operate at speeds from 300 kbps to over 1.5 mbps. Access to the Internet via cable requires a significant investment in the cable infrastructure, such as upgrades of the system from one-directional communication (suitable for cable TV) to bidirectional transport. Only one case study town, Douglas, Wyoming, has widespread cable Internet. Douglas is the regional headquarters for CommuniComm Services, a national cable TV company and Internet Service Provider.

The most intriguing finding about high-speed telecommunications is the high incidence of wireless services. Nearly two-thirds of the case-study communities (nine) supply "last mile" fixed wireless service that extends high-speed Internet into the outer reaches of a rural community.

Fixed wireless technology sends data via radio signals instead of using copper wire, cable or fiber. An antenna is installed on the roof or under the eaves of a home or business. Usually called a "dish" or transmitter, the antenna is about the size of a small pizza box. The user's antenna receives radio waves from the antennae on relay towers operated by the fixed wireless provider. The company's antennae are linked to its main switching station, which is the origin of the high-speed Internet connection. This "always-on" connection can offer speeds comparable to DSL and cable modems.

The requirement of a direct line of sight between the antennae can limit fixed wireless. It also can be affected by harsh weather conditions. Bidirectional transmission can be tricky, with upstream traffic sometimes moving slower than downstream traffic.

Technology-Related Barriers to Success

The case-study towns/counties encountered several technology-related barriers to community/economic development success. Some of these barriers continue today. All but one of the communities experienced a widespread lack of understanding of technology on the part of the community's citizenry. In over three-quarters of these localities (ten of the 13), however, extensive

community education efforts have improved community awareness.

The next three barriers are interrelated: the absence of a local telecommunications infrastructure (12); the cost of implementing telecommunications technology (12); and unresponsiveness on the part of local telecommunications providers (nine). These hurdles have disappeared in nearly two-thirds of the communities. This finding is consistent with the fact that advanced telecommunications, although limited and/or expensive, now exist in nearly all of the localities.

In nearly three-quarters of the communities (ten), lack of local technical expertise inhibited community/economic development. All but one of these ten communities have conquered this deficiency, however, thanks to improvements in telecommunications know-how as discussed below.

Business and government sectors' inability to utilize E-rate (education) discounts challenged nearly three-quarters (ten) of the communities, and continues to do so in all but three localities. While only schools and libraries are eligible for E-rate discounts, the Telecommunications Act of 1996 encouraged these eligible organizations to aggregate their telecommunications needs with other local entities. The aggregation of demand was intended to attract competitors and lead to lower telecommunications rates or other cost efficiencies.

In reality, only a small number of communities have been able to secure affordable access to advanced telecommunications through the leadership of their local school and/or library. Apparently, this intent of the Telecommunications Act has not materialized in much of rural America.

Local Telecommunications Expertise

An impressive range and depth of telecommunications expertise now exists in almost all of the case-study towns/counties, including Web site hosting services (12); Web site development services (13); and Internet access help desks (13). A significant majority of the communities (11) have technology support businesses that provide assistance with e-commerce, network, and computer maintenance. In nearly three-quarters of the localities (10), citizens can participate in computer and technology courses or labs that the school district offers to the broader community.

Several towns/counties credit local telecommunications providers with spurring community/economic development efforts. Almost three-quarters of the communities (10) identify Internet Service Providers (ISPs) as instrumental partners, particularly those located within the community. Other helpful collaborators include local telephone companies or cooperatives (seven), rural electric companies or cooperatives (four), and cable TV companies (four).

Local Economic Development Capacity

With few exceptions, the case-study communities have considerable local economic development capacity in the form of dedicated people and technology resources. Much of their success in technology-led economic development undoubtedly can be attributed to this fact. Over three-quarters of these towns and counties (11) maintain a local economic office/staff. All but two communities (12) are served by a regional economic development office or staff.

More than 90 percent (11 of 12) of the local or regional economic development offices or staff use a variety of technology-related tools in their daily work, including up-to-date computers and Internet access. These resources provide critical access to demographic data and information from community and economic development Web sites, e-mail, and word processing and spreadsheet software. Less than half of the offices and staff (five) have access to and use videoconferencing technology.

The technology-enabled communication tools that were identified as most beneficial to economic development goals were (in descending order) Internet access, e-mail, and the community's Web site and video conferencing (to a much smaller degree).

Dedicated people are key to the effectiveness of the local development efforts. However, the case-study communities have only a limited number of individuals carrying out local economic development efforts, probably due to their small size and rural nature. Thirteen out of 14 communities have fewer than 20 people engaged in leading, advising or implementing development ac-

tivities. On average, four to ten economic development leaders, two to three advisors and four to 20 implementers serve these towns or counties.

The involvement of, and reliance on, a limited number of highly committed individuals may actually contribute to the communities' accomplishments. In all 14 towns and counties, no more than one to three civic entrepreneurs ignite and lead new community and economic development initiatives. These sparkplugs are described in *Strategic Planning in the Technology-Driven World*, a recent EDA publication. Such civic entrepreneurs

- See opportunity
- Have an entrepreneurial personality
- Are boundary crossers
- Are trusted as credible intermediaries, and
- Work in teams.

Technology-Related Strategies

The 14 towns/counties employ a vast assortment of technology-led strategies to create jobs and generate income. While the strategies vary widely—from low-tech, common- sense tasks to more elaborate, technologically challenging efforts—they have a few common characteristics.

Overall, the technology-led tactics are achievable, affordable and replicable, though not necessarily cutting-edge. In fact, only 40 percent of the communities call their technology-led economic development strategies truly innovative. A more common evaluation is that technology is used in ways that are innovative for that specific geographic region.

All communities emphasize the use of technology to spur development among traditional economy firms, rather than to attract high-tech, information-intensive enterprises. Only one community is striving to create an industrial "smart park," which will be wired for high-speed telecommunications and targeted to high-tech business tenants.

In retrospect, this aversion to sophisticated Silicon Valley-like transformations was wise. Surely, last year's dot-com failures, the September 11 terrorist attacks, and the recent recession would have undercut such a costly, high-risk strategy.

The following technology-led economic development strategies are underway in the case-study towns and counties (listed in descending order of frequency):

- Providing, or facilitating the provision of, telecommunications infrastructure to existing or new businesses and industries.
- Assessing and aggregating demand for telecommunications in order to attract high-speed, broadband services to the region.
- Offering information technology or scientific training to enhance local labor skills.
- Teaching local businesses how to participate in e-commerce.
- Creating a business or technology incubator that provides advanced telecommunications infrastructure and other shared business assistance services to small businesses (especially start-ups).
- Establishing or using a distance learning or telemedicine network to link community schools or hospitals with those outside the community.
- Starting a community technology center where citizens can learn about and use computers, the Internet, and other technologies.
- Designing and using a Web site to market the region to tourists, retirees, and prospective businesses.
- Involving teachers or students with technology skills in local economic development efforts.
- Promoting the establishment of a call or data processing center to employ local residents at decent wages.
- Using scientific technologies to enhance the productivity of local businesses.

Direct Outcomes of Technology-Led Economic Development

Technology-led strategies are producing tangible community and economic development outcomes in the 14 case-study communities. In nearly three-quarters of the towns and counties, technology-related efforts are

- Generating more entrepreneurial endeavors,
- Attracting more highly skilled workers,
- Increasing the number of residents employed by local business and industry, and
- Attracting more technology-related businesses.

The outcomes evident in over two-thirds of the 14 communities are

- Expanding markets for local products,
- Improving access to business support services (e.g., accounting, legal),
- Increasing the number of locally owned businesses,
- Enhancing opportunities for higher wage jobs, and
- Growing tourism within the region.

On the other hand, technology-related strategies are not generating results in all areas. Few communities are seeing improvement in

- Spurring agricultural diversification and valued-added production,
- Increasing in-migration of retirees,
- Curtailing or reducing out-migration (e.g., of youth), or
- Retaining more local capital.

These outcomes also facilitate additional technology-led economic development. Technology-related initiatives inspire new project ideas; a string of initiatives gel into major, concrete progress for the community or region.

When tiny Maddock, North Dakota, created its business and technology incubator, the new center inspired several business start-ups. The increased entrepreneurial activity motivated a local pharmacist to explore e-commerce applications in his own business. It also encouraged city leaders to pursue and acquire a $202,000 EDA grant for technology infrastructure. EDA's investment stirred Homelink Televoice to bring high-speed wireless telecommunications to Maddock, offering residents and businesses two types of broadband service (DSL and wireless).

It is important to consider whether the outcome benefits are spread throughout the locality. In all but one of the case-study towns and counties, local leaders believe that the benefits are widespread, affecting the entire community. Leaders in the dissenting community see the benefits as unevenly distributed, primarily benefiting the government (versus business and residential) sector.

Cost-effectiveness is a related issue. Only one city estimates that the costs of technology initiatives currently exceed the benefits; the key players expect the cost-benefit ratio to improve soon. In more than one-third of the communities (5/14), local leaders approximate that the benefits are more than 10 times as great as the costs. None of these judgments about the distribution and cost-effectiveness of benefits have been confirmed independently.

Lessons Learned

Valuable lessons about technology-led economic development in distressed, rural communities are embedded in these research findings and woven through the 14 individual case studies. The following recommendations can guide your community or region in efforts to employ information technology to create jobs and generate income:

Use technology as a tool. Technology is neither an end goal nor a savior. High-speed telecommunications and other bells and whistles are meaningless to rural citizens unless they produce concrete results. "How can an investment in technology strengthen our community?" "How will computers and the Internet produce economic rewards for my small business?" "What's in it for me?" Local leaders who can answer these questions understand the power and limitations of technology.

Build technology into a proactive, diversified economic development strategy. Technology-led development is not synonymous with business attraction. Its value also is not limited to information-intensive businesses. As a tool, information technology can play a vital role in all economic development initiatives, from the basic level (e.g., building a community

Web site to market tourism offerings) to more sophisticated approaches (e.g., creating an incubator to provide high-speed telecommunications that is geared to start-up enterprises). Successful communities use technology to diversify the local economy and expand options for working people.

Seek and secure the commitment of local elected officials. Technology champions will produce few results without the local government's support and active involvement. Elected officials who appreciate information technology are well positioned to enact relevant ordinances (e.g., grant right-of-way use for telecommunications infrastructure); negotiate franchise agreements (e.g., push cable companies to deploy broadband in particular areas); dedicate tax revenue; create legal entities; donate public facilities; pursue grant funding; and preach the virtues of e-commerce to local businesses. Unfortunately, many rural elected officials —especially seniors—have minimal experience with computers and the Internet.

Inform and engage citizens in technology-related decisions. Tech-savvy rural communities dedicate months—sometimes years—to educating citizens about technology issues through well-publicized community surveys, monthly town meetings, civic bulletins, news articles and other communication devices. The most effective public campaigns target a wide spectrum of individuals, from private sector VIPs to welfare recipients. Often, the young people in the community energize the community's interest in computers and Internet, simply because technology is second nature to them.

Exploit local technical expertise; forge partnerships with local telecommunications providers. It comes as no surprise that nearly 75 percent of the 14 towns and counties boast a community-based ISP that has been instrumental in community and economic development efforts. Through collaborations with local providers—ISPs, rural electric cooperatives, local telephone companies and cable companies—communities acquire an array of needed services, including technology training, engineering expertise, survey design, administrative support, capital investment, and political backing.

Utilize the local school as a critical resource and computer access point. The local middle or high school's computer labs are convenient venues for "Introduction to Computers" classes geared to elected officials, small business owners, would-be entrepreneurs, senior citizens, etc. With appropriate guidance and support, high school students can take a leadership role in teaching hands-on technology skills. Experiential learning is a mechanism for showcasing business applications and generating local support for additional telecommunications investments.

Acquire up-to-date computers, software, and other equipment. While used or donated equipment may be cheaper in the short-run, it can trigger costly maintenance headaches over time. Slow or defective machinery will not demonstrate the effectiveness of computers and the Internet to reluctant business owners and elected officials.

Strive and plan for financial stability. Reliance on a pay-as-you-go, phased-in telecommunications infrastructure investment approach prevents cost overruns. Affordability is also a factor in pricing smaller items such computer training classes. Inventive, cost-sharing partnerships and outside funding (e.g., grants, contracts) keep tuition within reasonable limits.

Reflect, evaluate and correct. Technology-led economic development is uncharted territory for most small, rural communities, so refinements along the way are sound practice. Your evaluation can use a formal system of continuous improvement or a more relaxed process of asking questions (to users and partners) and making necessary adjustments. User surveys (print or electronic), program evaluations and small discussion or focus groups are the most common vehicles for monitoring and guiding corrections.

Keep at it! Note the key words in the guidebook's title, *Technology and Grit at the Grassroots.* It takes dogged persistence to achieve technology-led development successes in rural, distressed communities. In some small, economically stressed communities, the conditions are not necessarily ripe for technology-related initiatives. There is no magic wand. Yet, the pairing of technology and grit can produce powerful changes at the grassroots, as demonstrated by the 14 rural communities showcased in this guidebook.

Chapter 2

Acquiring Advanced Telecommunications Services

High-speed telecommunications are the essence of technology-led economic development. Especially in the years ahead, few rural areas will be positioned to create quality jobs and generate significant income without affordable access to advanced telecommunications services.

Why is high-speed, broadband access so critical? Advanced telecommunications services permit users to send and receive data at volumes and speeds (at least 200 kpbs) far greater than those afforded by Internet access over traditional telephone lines. Only broadband affords users the reliable exchange of high-quality voice, data, graphics, and video.

Speed alone is a tremendous asset. Consider the task of downloading 10 megabytes (mb) of data, which is roughly equivalent to three *Technology and Grit at the Grassroots* guidebooks (in PDF format) or four x-rays. According to the Federal Communications Commission (FCC), it would take a dial-up modem (14.4 to 56 kbps) up to 1.5 hours to download 10 mb of data. ISDN (128 kbps) would cut the time to about 10 minutes. A DSL (8 mbps), cable modem (4 mbps) or T-1 connection (1.5 mbps) would accomplish the same task in 10 to 52 seconds. The extremely fast and expensive T-3 or DS-3 would transmit the file almost instantaneously.

Beyond speed, broadband access bestows a continuous, "always on" connection with no dial-up requirement. Conventional dial-up access requires repeated connections with the ISP, consumes a phone line, and can be interrupted easily by hiccups in the system.

Finally, advanced telecommunications offers symmetry. Broadband has "two-way" capability, which means that data can be transmitted at high speeds in both directions. High-speed transmission can run from the provider to the consumer (downstream or download), and from the consumer to the provider (upstream or upload).

Benefits to Rural Communities

With broadband's speed, ease and symmetry, activities that entail large exchanges of data can take place anywhere. The new opportunities afforded to local businesses, schools, medical facilities, and local government are endless.

Advanced telecommunications enable rural businesses to communicate with their business partners electronically, which increases productivity. The local hardware store, car dealer, or franchise operation that used to order wholesale goods by mail, fax, or phone can now rapidly complete these transactions over the Internet. (In fact, many suppliers now require their business customers to order products online.) A manufacturing enterprise encountering design problems can avoid costly travel expenses by "virtually" trouble-shooting engineering options with an expert who is located miles away. With the capability of advanced services, other mainstay business activities—sales and marketing, just-in-time manufacturing, inventory control, in-service training, online banking, and videoconferencing—can be accomplished quickly and at little expense.

High-speed telecommunications permit even the most remote communities to offer first-rate education and medical services, which are two chief factors in

business location decisions. Through distance learning, small schools can provide students with electronic access to a vast catalog of courses, instructors, and experiences outside their community. In telemedicine, rural patients gain access to medical experts and special procedures, which sometimes can be performed from a remote location. With escalating health care costs and the mass closure of rural hospitals, telemedicine is a lifesaver for rural areas. Conventional dial-up services do not permit either distance learning or telemedicine.

Advanced telecommunications are a prerequisite for rural communities seeking to attract telemarketing firms (call centers) or data processing companies (back office operations). The telemarketing industry is a target for economic developers because it generates a sizeable number of jobs (some with decent wages), and can aid in attracting other information-intensive businesses. Telemarketing firms need a large number of telephone lines for calling customers and accessing online databases. They also are attracted to regions boasting a dependable labor force with basic skills and a strong work ethic.

Telework is a variation on back office operations. In this approach, employers headquartered in cities hire rural residents who work from home or in satellite offices. Washington State University's experimental Rural Telework Project uses technology to bring urban jobs to rural communities, including Colville, Washington (see page 22). In North Carolina, the state's Rural Internet Access Authority is aggressively promoting affordable, high-speed Internet access to rural areas. It is also spearheading the creation of several rural telework centers and developing online health, learning, and e-commerce applications for small communities.

Fewer Options in Low-Population Areas

According to the FCC's *Third Report* (issued February 2002), the availability and use of advanced telecommunications services continues to grow. Investment in high-speed telecommunications infrastructure also remains strong. The FCC identified approximately 9.6 million high-speed subscribers as of June 2001, a 36 percent increase during the first half of 2001 and a 250 percent increase since December 1999.

Increased deployment of these services is narrowing the digital divide between rural and suburban/urban areas. The number of rural zip codes with at least one high-speed subscriber swelled 17 percent over the previous year, while the growth in urban zip codes increased only 2 percent. Yet, this divide has not disappeared completely. The FCC study discovered that 98 percent of the most densely populated zip codes have at least one high-speed subscriber, in contrast to only 37 percent of rural zip codes.

Certain factors, such as population density and income, continue to correlate closely with the availability of high-speed services. In rural areas, the barriers to expanding advanced services include the high cost of deployment (primarily due to distances), a lack of cost-effective equipment scaled for smaller companies, and low customer demand. As a result, about 25 to 30 percent of rural telephone subscribers probably will not have access to high-speed services in the near future.

Affordability is also a key concern. In many of the rural areas with high-speed services, the only option currently available is a T-1 line. At approximately $1,000 per month, this T-1 fee is beyond the reach of most rural, small businesses.

Who Deploys Advanced Services?

In rural communities, the typical provider of advanced telecommunications is the local telephone company or cooperative, not the large regional bell operating company (RBOC). Although RBOCs serve at least 80 percent of rural telephone customers, the economies of scale discourage RBOC investment in rural markets. By selling their rural local exchanges to smaller carriers or ignoring the telecommunications market altogether, RBOCs have largely deferred deployment efforts to local providers. Many of these smaller companies—perhaps operating under a different business model—are making the necessary capital investment to upgrade networks and support advanced services.

The National Telecommunications Cooperative Association (NTCA) reports that its members—independent, community-based telecommunications providers—serve approximately eight percent (13 to 14 million) of the nation's access lines, but cover almost 40

percent of the land area. More than half of these companies currently offer high-speed services, and more than 80 percent will make broadband available to the majority of their residential and business customers during 2002.

Critics of public interventions urge communities to rely on market forces to bring competitive services to their area. Yet, the private market appears dormant in numerous geographic regions. If a telecommunications provider fails to step up to the plate, some local government officials take matters into their own hands and wire their communities for commercial broadband service (see Abingdon, Virginia, see page 27). When permitted by state law, cities and counties lay municipally owned dark (unlit) fiber and then lease portions to competitive, private operators. Lighting the fiber is the responsibility of the lessee, not the local government.

New Technology Solutions

Currently underserved rural communities are likely to benefit from exciting advances in satellite and wireless technology. In fact, a host of very small towns—including nine of the 14 case-study communities featured in this research—are already profiting from "last mile" fixed wireless service.

According to the FCC's recent study, high-speed lines in service over satellite or "last mile" fixed wireless technologies increased by 73 percent (to nearly 200,000 lines) during the first half of 2001. The dramatic explosion in satellite and fixed wireless services outpaced increases in other high-speed options over the same six-month period, including DSL (36 percent) and cable (52 percent).

A number of technology companies—DishTV, EchoStar, DirecPC, and StarBand—offer satellite Internet access. (Many other companies were casualties of the dot-com bust.) Although this service is more expensive than other high-speed options (DSL and cable), satellites can operate from anywhere. This flexibility makes them an attractive alternative for sparsely populated outlying communities and severely underserved areas (e.g., tribal territories). Users need only a rooftop satellite dish and an unobstructed line-of-sight in the direction of the satellite high above the earth.

An even more common alternative for distant users is "last mile" fixed wireless service. With fixed wireless, microwaves provide high-speed connectivity from a local relay tower to the user's home or business. Fixed wireless is becoming a popular vehicle for distributing local fiber over wireless equipment, thereby spreading T-1 or DSL speeds into the most rural areas. Local ISPs and several national companies, including AT&T Wireless and Sprint, are providers of fixed wireless services.

Other promising technologies are under development, such as DSL extenders. This special equipment may allow providers to increase the geographic range of advanced services. Current customers must be located within three miles of a local telephone company switching station to receive DSL. If the three-mile range can be extended, carriers may be able to serve additional users, making the provision of advanced services more cost-effective.

Chapter Case Studies

Success in acquiring advanced services in small, distressed communities is attributable to rural government and civic leaders who raise public awareness and build a business case for telecommunications investment. To galvanize support across public and private sectors, local leaders may take many actions: inventory existing telecommunications infrastructure, survey current users, demonstrate e-commerce applications, assess and aggregate demand for services, employ local government powers, draw on local technical expertise, and seek state and federal government intervention.

This chapter showcases the telecommunications deployment experiences of two rural counties (Klamath County, Oregon and Garrett County, Maryland) and one small city (Colville, Washington). In all three regions, rural government and civic leaders rallied public support, engaged local partners, and pressured telecommunications providers. Their experiences—both triumphant and discouraging—are instructive examples for other similarly situated communities.

Klamath County, Oregon [2] (pop. 63,435)

County Unemployment: 8.8%
County Per Capita Income/State Per Capita Income: $20,886/ $27,023
Percentage of Older Population: Data not available
Project Timeframe: 1995 to present

Economic Development Strategy:

Modify the business climate to expand telecommunications options, and spur economic diversification. The first project (1995) used demand aggregation techniques to convince a local carrier to invest $5 million in a new fiber optic route. The second project (2000) used an innovative public-private sector approach to develop an alternative open access fiber route through underserved rural communities in Klamath County.

Project Summary:

The small, rural communities of Klamath County have lived through numerous boom-and-bust cycles associated with farming and timber harvesting, resulting in declining populations, high unemployment rates, and low wage levels. But as new technology brought economic growth to the state's metropolitan areas, Klamath's public officials resolved not to be left behind.

In 1995, Klamath Falls (the largest city in Klamath County) asked US West (now Qwest), their telecommunications provider, to lay fiber optic cables to help spur economic development. The company declined, professing insufficient local demand for high-speed, broadband services.

Klamath County learned that Sykes Enterprises, a national customer support company, was looking to open a new call center facility on the West Coast. Sykes had a history of locating in rural areas, and was intrigued by the amenities available in Klamath Falls, including a quality work force, higher education opportunities, site development options, and enthusiasm displayed by the local governments and general population.

However, even with these assets, Sykes would not commit to constructing a new 44,000 square-foot facility without fiber optic infrastructure in place. Fortunately, the community was ready to address this issue because of efforts implemented over the prior eight months. They had been working in earnest to develop a business case for telecommunications investment. When the business proposal was combined with the Sykes opportunity, US West finally recognized a sufficient demand to justify their investment. Sykes now employs 600 workers who field an average of 6,000 technical support phone calls a day.

In the years immediately following the Sykes recruitment, Klamath Falls experienced telecommunications service disruptions. The first outage left Klamath without service for 18 hours, which impacted companies like Sykes, which racked up losses of $44,000 per hour of interruption. With so many companies growing dependent on telecommunications to support business functions, developing diverse fiber

[2]Demographic information for the 14 case-study communities is the recently available data derived from the following sources.
Population: Bureau of the Census, 1999.
County Unemployment: Bureau of Labor Statistics, 2001.
County/State Per Capita Income: Bureau of Economic Analysis, 1999.
Percentage of Older Population: self-reported and generally for population age 55 and over.

Klamath County, Oregon (cont.)

optic and provider service options became an economic imperative.

Through the '90s, many telecommunications companies installed fiber optic infrastructure to meet the connectivity demands of the information age. These builds were designed to connect urban hubs and seldom provided access to the smaller communities through which they passed. Communities seeking access demanded compensation for use of public rights-of-way. Demands ranging from new roads and sidewalks to cash payments escalated the cost of creating networks. In addition, delays and change orders threatened implementation deadlines.

In 1999, Klamath County officials decided to skirt these disputes and negotiate an entirely different arrangement. They joined with local cities and neighboring counties to develop an alternative public-private network: an "open platform" that would encourage competition among a wide variety of providers, and bring high-speed broadband services to otherwise ignored communities. Then these small towns could use the new technology to provide critical services in the areas of distance learning, telemedicine, and economic development.

In 1999, city and county government officials in Klamath and Lane Counties formed the Regional Fiber Consortium. This consortium responded to issues raised by several new companies interested in establishing fiber optic routes through the region.

Through this process, the communities within the consortium received the following benefits: $6 million, 180-mile long-haul fiber route installed at no cost; 12 fiber optic strands granted for economic development purposes (asset valued at $1 million per year); $10 million investment in broadband services for all communities, with new services and rate reductions of over 50% where similar services existed; and expanded opportunities for third party telecommunications providers.

In exchange, the providers received the following benefits: cost-effective negotiation with the consortium, versus separate negotiations with 13 jurisdictions; fast-track permit approval process; agreement by consortium communities to waive all franchise and permit fees; state and federal lobbying by communities, to expedite the plan; and support for oncgoing expansions and modifications to the route.

Later in 1999, a second consortium (Fiber South) formed among governments of west central Oregon. Soon thereafter, the Regional Fiber and Fiber South consortia joined together to form a new combined consortia, connecting the two fiber routes and merging technical assistance functions.

In spring 2000, the Regional Fiber and Fiber South consortia issued a joint request for proposals (RFP) for a facilities-based provider of residential, commercial, business, and governmental open-platform broadband Internet access and competitive voice, video, and data services. Twelve companies responded to the RFP, and in May 2001, the consortia chose a local company called Preferred Connections, Inc. (PCINW) to "light the fiber." None of the incumbent telephone companies submitted proposals.

PCINW anticipates full implementation of the network by Fall 2004. It will deploy new opportunities for DSL services and other digital connections, including broadband voice and data, wireless, and video conferencing services that are typically available only in metropolitan areas. Through this out-sourcing arrangement, participating communities will enjoy new service choice, cost reduction, and quality enhancements.

Benefits:

- Attracted Sykes Enterprises, a 600-seat incoming-call center.
- Furnished rural customers with a wide variety of telecommunications services, at an affordable

Klamath County, Oregon (cont.)

cost. The winning bidder, PCINW, will deliver broadband services at a fee that is 50 percent less than Qwest's current fee.

- Provided 23 communities on the open access route with the telecommunications capacity to recruit information-intensive businesses, increasing economic diversification and providing alternative employment for local residents.
- Incubated new telecommunications providers. Fireserve.net constructed relay towers on two of the highest hills in Klamath Falls, bringing the first high-speed (256 kbps) wireless Internet service to the Klamath Basin and surrounding areas. Customers pay $300 for a rooftop dish and a monthly fee of $35.

Keys to Success:

- Strong desire to develop telecommunications infrastructure that could provide participating communities with a clear strategic advantage in business recruitment and retention.
- Resolute campaign, over a two-year period, to describe and discuss the virtues of this unusual telecommunications brokering model with local government and business leaders. County officials and volunteers orchestrated surveys, working groups, local committees and testimonials from peers. They sought and received coverage in local newspapers, gradually convincing citizens of the need for high-speed telecommunications services.
- Emphasis on economic diversification, even as agriculture remains the region's prevailing sector. People were tired of being retrained in the wood products industry, with limited future potential. Their frustrations pushed them to consider the opportunities brought forth by technology.
- As a requirement for participation in the consortia, each eligible jurisdiction had to be represented by an elected official. It was felt that elected officials had the strongest ties to the local population.

Obstacles to Success:

- Complexity in understanding and acting on technology issues. Providers offer limited information. The terminology can be intimidating, leading local leaders to believe that few options exist.
- Constant turnover among elected officials; mission creep. Difficulty in cultivating a strong base of leaders that can endure change and in creating the understanding that leads to good decisions.
- Reluctance on the part of local officials to waive right-of-way fees, which can be up to eight percent of a local government's gross revenue.
- Opposition from competing providers. While the first long-haul provider strongly endorsed the consortium concept, other providers did not and fought against the process.
- State and federal legislation restricting local right-of-way management.
- Tax incentives. Rural investments are seldom profitable in the beginning, limiting the utility of tax incentives.

Sources of Funds:

Local governments (aggregated in-kind legal and administrative support); Private businesses (Technomethods Corporation in-kind facilitation and consulting); State (grant for additional legal support).

Klamath County, Oregon (cont.)

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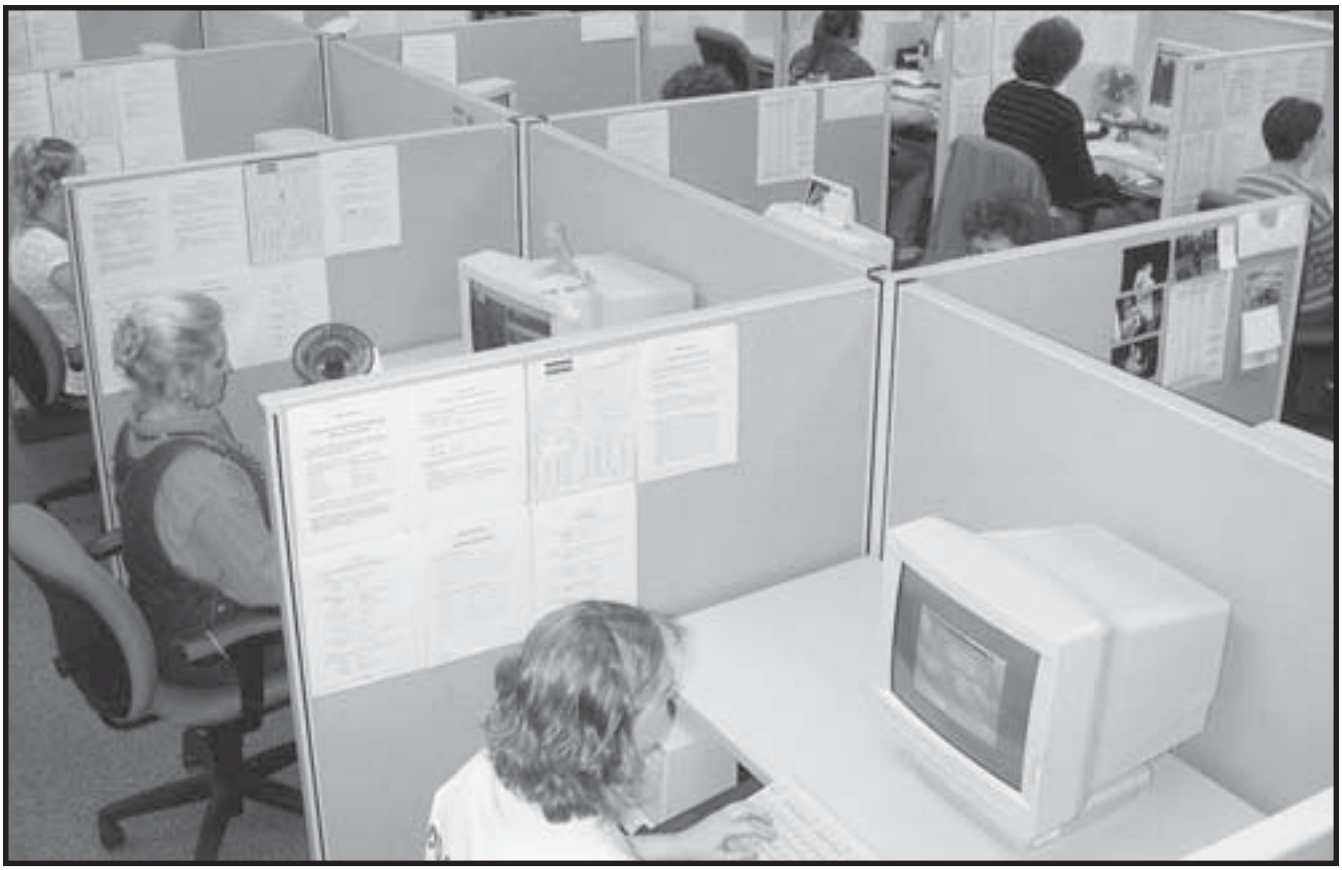
Web Sites:

www.ruralfiber.com (Consortia Web site)
www.pcinw.net (Preferred Connections, Inc.)
www.technomethods.com (Technomethods Corporation)



Advanced telecommunications services permit users to send and receive data at volumes and speeds (at least 200 kpbs) far greater than those afforded by Internet access over traditional telephone lines. Only broadband affords users the reliable exchange of high-quality voice, data, graphics and video. High-speed telecommunications are a prerequisite for rural communities seeking to attract telemarketing firms (call centers) or data processing companies (back office operations).

Garrett County, Maryland [3] (pop. 29,389)

County Unemployment: 7.4 %.
County Per Capita Income/State Per Capita Income: $19,360/ $32,465
Percentage of Older Population: 26%
Project Timeframe: 1994 to present

Economic Development Strategy:

Draw on a cooperative business model and resources of the local community college to bring telecommunications services and associated business development to rural Western Maryland.

Project Summary:

Garrett County is a mountainous, isolated region located in Western Maryland, approximately 3.5 hours drive from Washington, D.C. Like many Appalachian communities, Garrett had a legacy of high poverty, low population, minimal capital wealth, and little public understanding of the benefit of technology. Against this backdrop, the local community college set out to build the county's telecommunications infrastructure and nurture an information-based economy.

Garrett Community College (GCC) launched the Garrett Rural Information Cooperative (GRIC) in 1994, when the county had no local dial-up access to the Internet. Also known as GCNet (gcnet.net), GRIC is a private nonprofit cooperative serving the citizens of western Maryland. Even as late as 1996, local users were paying $150–200 per month in long distance charges to reach Internet service providers. GCC's strategy was to aggregate community users into a telecommunications cooperative, purchase a state-of-the-art system for community-wide private and public sector use, keep the user fees affordable, and recycle fees back into the system to support ongoing maintenance and development.

The telecommunications system was purchased and installed in 1995, with service beginning in 1996. By September 1996, GRIC had 800 subscribers, including 50 businesses. The cooperative expanded rapidly to serve 4,000 business and residential subscribers in a community of 11,000 households. Garrett Community College initially owned and operated the telecommunications provider, but soon privatized the system as a 501(c)(12) cooperative, with its own governing board.

GRIC's founders, based at the community college, chose the cooperative business model because coops (e.g., farm and electric) were a familiar institution on the rural landscape. Also, as a 501(c)(12) public utility, GRIC was eligible for state and federal loans and grants, which were needed to launch the new service.

Although GRIC began in September 1996 with dial-up service only, faster options became available very quickly. Verizon (then Bell Atlantic) brought extensive circuits into the area, and negotiated a special customer-based, cost-for-services structure. The telephone company also offered to provide affordable flat rate (nonmetered) ISDN service for GRIC members. As a result, the county's first Internet Service Provider added two faster-than-dial-up choices (ISDN and T-1) to its mix of service options.

Today, GRIC has approximately 3,000 members (down from its high of 4,000) and is one of several ISPs now serving Garrett County and the surrounding area. Garrett Community College's state-of-the-art Information Advanced Technology Center (IATC) houses GRIC's communications hub. A large pipe,

[3] See footnote explanation on page 15.

Garrett County, Maryland (cont.)

known as a DS-3, handles the aggregated traffic from GRIC's dial-up service. Most rural dial-up services are supported by a T-1, but the DS-3 brings greater speed, capacity, and dependability.

Despite its growing tourism and recreation-based economy, Garrett County remains the only Maryland county without a point of presence. Verizon has no plans to upgrade its antiquated copper lines to accommodate high-speed DSL service. IC Electronics, a local ISP, offers point-to-point DSL (similar to a T-1) in some areas, but it cannot deploy DSL broadly without the infrastructural investment from Verizon. Most local businesses and households settle for dial-up or dedicated ISDN (offering 128 kbps), available widely. Users who desire faster speeds, consider last mile wireless, which is restricted to certain areas and not provided by GRIC.

Benefits:

- Encouraged local businesses to develop an Internet presence, participate in electronic commerce, develop an information-based product, etc. An example is Financial Computer Support, Inc., a twenty-year old local company providing practice management software solutions to financial professionals. FCSI's owner/CEO is current president of GRIC's board of directors.
- Acted as a stimulus to attract information-based businesses to Garrett County (especially from Washington, D.C. and Baltimore), since physical presence is no longer an obstacle to business success. More telecommuters and entrepreneurs may flock to rural Garrett County as neighboring metropolitan areas appear increasingly dangerous (e.g., terrorism) or congested.
- Strengthened Garrett Community College's overall stature and reputation for innovation; launched new services in education, training and conferencing.
- Led to GCC's selection as the test site for NETWork.Maryland, a state-funded pilot project providing high-speed DS3 connectivity across the state, advancing distance learning opportunities. The state looks to GCC for innovation and experimentation.
- Furthered the development of the Garrett Information Enterprise Center (GIEC), GCC's new business and technical support center for entrepreneurs. By fall 2002, GIEC will house as many as 20 information-based business start-ups.

Keys to Success:

- Cooperative business model that was understandable, acceptable to rural citizens.
- GCC's institutional capacity and eagerness to take a leadership role in telecommunications.
- GCC's early attempts (1994) to arouse enthusiasm for telecommunications services were unsuccessful. But once the product—a communitywide network—became available, people flocked to it. The dial-up service was so inexpensive that local businesses and residents decided to try it out. Word of mouth produced widespread interest in Internet classes, faster services, etc. Deliberate efforts to create readiness fell flat, but the product itself drove demand spontaneously.

Garrett County, Maryland (cont.)

Obstacles to Success:

- Ongoing close and complex relationship between GCC and GRIC. When GCC created the cooperative in 1994, there was no competition from private providers. As other ISPs came into the county, GCC's board of trustees recognized that its reputation as a public sector institution would be compromised if the college battled with private sector ISPs. GCC spun off GRIC as a nonprofit cooperative, but the college maintains a working relationship with the cooperative (e.g., GCC's houses its communications hub). Some local ISPs believe that this ongoing relationship promotes unfair competition.
- Verizon's reluctance to maintain ISDN equipment leased by GRIC and other ISPs, despite its lack of interest in deploying high-speed DSL service.
- GRIC's status as a cooperative spurred its initial development, but may be hindering its current growth. GRIC subscribers must pay a $10 per year membership fee that is not required by other private-sector ISPs. Yet, GRIC believes that the cooperative provide uniquely personal technical support services (e.g., many members are known on a first-name basis).

Sources of Funds:

State of Maryland (outright state appropriation); USDA, Rural Business Enterprise Program; USDA, Rural Utilities Service; Maryland Information Technology Council.

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www.gcnet.net (Garrett Rural Information Cooperative)
www.gcc.cc.md.us (Garrett Community College)
www.fcsi.com (Financial Computer Support, Inc., local business)
www.iceweb.net (IC Electronics, local ISP)

Colville, Washington [4] (pop. 5,154)

County: Stevens
County Unemployment: 10.3%
County Per Capita Income/State Per Capita Income: $17,316/ $30,392
Percentage of Older Population: 23.9%
Project Timeframe: 1999 to present

Economic Development Strategy:

Educate and mobilize community residents and survey local businesses' telecommunications needs, with the goals of expanding the region's high-speed telecommunications infrastructure to promote and support training and employment in the technology sector.

Project Summary:

Northeastern Washington is in a transition from a timber-based, natural resource extraction economy to a more technical, diverse economy. Colville's steady efforts in this direction have recently produced a new manufacturing plant, a planned new retail center, major road improvements, and other initiatives. But the most important prerequisite for further transitioning into a more robust, diversified economy is telecommunications capacity.

In 1999, Colville's leaders received $50,000 in start-up funding from the U.S. Forest Service to establish the Rural Information Technology Center (RITC). Spearheading the effort were Al Kowitz and Malcolm Friedman, two longtime residents focused on promoting the region's information technology training and employment opportunities.

RITC's first undertaking in late 1999 was a Microsoft Office User Specialist (MOUS) certification program. But RITC's founders had broader goals, including stimulating telecommuting opportunities for Colville residents. RITC also hoped to develop high-tech office facilities that would attract information technology professionals and small software companies to northern Stevens County.

To accomplish any of these ambitious goals, Colville had to address two nagging telecommunications issues. First, the issue of increased bandwidth: Colville's principal telecommunications provider, US West Communications (now Qwest), was not willing or able to provide high-speed telecommunications services. Second, the issue of redundancy: Colville's telecommunications traffic was microwaved out of the county to a fiber trunk north of Spokane, Washington. The system was at capacity and unreliable. Colville needed telecommunications redundancy: multiple paths in and out of town, so that if one path were cut, another could take over all traffic.

With these two goals in mind, RITC took many actions:

1. Organized a well-publicized community meeting, explaining Colville's telecommunications needs and options.
2. Formed a Telecommunications Steering Committee to study the region's technology needs. The committee included both public- and private-sector leaders.
3. Conducted a telephone survey of 108 area businesses and public agencies to assess their telecommunications capacity and future needs.

[4]See footnote explanation on page 15.

Colville, Washington (cont.)

4. Inventoried the community's telecommunications infrastructure.
5. Presented the survey results, and other documentation, to the Washington Utilities and Transportation Commission, when the WUTC was debating the proposed merger of US West and Qwest. RITC requested that the Commission require US West to speed up its timeline for expanding Colville's telecommunications capacity, as a condition for WUTC approving its merger with Qwest.
6. Negotiated a deal whereby CenturyTel, a smaller national telecommunications provider, would partner with CenturyTel to serve Colville and much of Stevens County. CenturyTel would complete an eight-mile gap in fiber, so long as Qwest agreed to use CenturyTel for transport.

In August 2000, the Washington State Supreme Court determined that US West, now Qwest, had routinely overcharged its customers. A multiparty settlement to the four-year-old court case ordered Qwest to provide $26 million in advanced telecommunications services and network improvements to Washington's consumers. Among the new initiatives was a $5 million grant program, administered by the Washington State Community Economic Revitalization Board (CERB), to finance telecommunications for rural economic development projects

The Tri-County Economic Development District, which serves Stevens, Ferry, and Pend Oreille counties, applied to CERB for $1.1 million to engineer a high-speed, fiber-optic connection between Spokane and Deer Park. The project would provide full redundancy for Stevens County and parts of Ferry County, positioning the region for a regional call center, expanded business incubator, and daily manufacturing and sales operations of local existing businesses.

By summer 2001, Colville achieved two major successes: CenturyTel lit the remaining eight miles of fiber, and the Tri-County Economic Development District's received approval of its $1.1 million application. The redundancy project will be completed by between April and September 2002. In a parallel effort, the Tri-County EDD successfully secured a $1.3 million grant from EDA to establish a technology incubator in Colville. During 2002, a database and service center company, employing 30 workers, will move into a building already purchased. Within two years, the company expects to increase its work force to 70 employees.

Benefits:

- Gathered accurate, current information about the community's telecommunications infrastructure and the needs and interests of local businesses, to document and plan Colville's future.
- Built a long-lasting partnership on telecommunications issues among area public and private organizations and agencies.
- Provided (or will soon provide) local businesses (e.g., Aladdin Hearth Products, Boise Cascade, Stimson Lumber, Northwest Alloys, local health care firms) with a redundant telecommunications system to support their daily manufacturing, sales, and communications activities. Without redundancy, several firms lost revenue of $2,000–3,000 per hour when cables were accidentally cut due to construction or severe weather.
- Acquired (or will soon acquire) the necessary telecommunications infrastructure to position Colville in the call center industry.
- Furthered Colville's economic diversification, especially as compared with other small northeastern Washington towns that rely heavily on a single, resource-based industry.

Colville, Washington (cont.)

Keys to Success:

- RITC's diverse membership that is independent of any one sector. Also, RITC's stature as the central organizing and coordinating body for telecommunications issues, working both inside and outside the community.
- Pledge to impart basic telecommunications literacy to the general public, with cooperation from the local media (e.g., explaining terms such as "bandwidth" and "redundancy").
- Long-standing legitimacy of RITC's top leaders within the community. Achievement in forging partnerships among all telecommunications providers serving Colville, including competing providers (Qwest and CenturyTel) and the local ISP (Internet Xpress). Partnerships were crucial in RITC's effort to inventory telecommunications infrastructure and service, since some of the requested information was proprietary.
- Long-term commitment to local economic development planning. Colville adopted its current economic development goals in 1978 as part of the city's comprehensive plan, and has worked for 23 years to diversity the local economy and bolster Main Street development. For example, in the mid-1990s, when Wal-Mart announced plans to build a store in Colville, the city hired a consultant to help downtown businesses with marketing and storefront renovation, even offering small grants.

Obstacles to Success:

- Numerous hearings and delays associated with the merger of US West and Qwest, and the rate case settlement.
- Adversarial relationship, which improved over time, between Colville and US West/Qwest.
- Need to rethink, alter strategies and maintain confidence as initial plans failed. For example, initially Colville's leaders thought that the Bonneville Power Administration might use their existing power lines (right of way) to string fiber for BPA's use, and offering surplus fiber to public users. The Administration operated such public benefit programs in other parts of the northwest, but Colville didn't interest BPA because it wasn't a high-volume area. The defeat pushed local leaders to engineer an alternative plan.

Sources of Funds:

Washington State Community Economic Revitalization Board; Economic Development Administration; U.S. Forest Service; local businesses; private donations.

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www.plix.com (Internet Xpress, local ISP)

Chapter 3

Promoting Public Access to Computers and the Internet

If information technology is to create jobs and generate income in rural communities, rural people must have ready access to computers and the Internet; yet large numbers of citizens still do not. In fact, the individuals who would most benefit from distance learning, technology skill development, and other online tools are those least likely to have computers and the Internet available at home or work, and to know how to employ information technology effectively. This is why promoting public access to computers and the Internet must be part of a region's technology-led economic development strategy.

The U.S. Department of Commerce's February 2002 report, *A Nation Online*, paints a mixed picture of computer and Internet use. As of September 2001, two-thirds (66 percent) of Americans used a computer at home, school or work. A little more than half (54 percent) of the nation was online, even in rural areas (53 percent). Access to information technology is surely opening up opportunities and new avenues for these citizens. But what about the 88 million Americans (33 percent) without convenient access to a computer, and the 122 million people (46 percent) not online?

The "unconnected" population includes people in households with very low incomes, adults with minimal education, and particular ethnic groups. Nonusers comprise 75 percent of Americans who live in households with incomes less than $15,000, and 66 percent of those with household incomes between $15,000 and $35,000. A majority of adults with low levels of overall education are not online: 60 percent of adults (age 25 plus) with only a high school degree, and 87 percent of adults with less than a high school education.

Hispanics and African Americans are highly underrepresented in the online community. Nonusers include 68 percent of all Hispanics, and 86 percent of Hispanic households where Spanish is the only language spoken. Sixty percent of all African Americans do not use the Internet. People with disabilities, especially those of low income or education, are also among the "unconnected."

Encouraging Signs, Chapter Case Studies

The numbers of individuals without easy access to computers and the Internet are likely to dwindle in the near future, especially in communities where expanding public access is a high-priority goal. Leaders in these communities understand that there is more to public access than stationing a few computers in the town's library. For information technology to be used intelligently, there are three key issues requiring attention: *where* computers are located, *how* individuals are introduced to technology, and *what* value users derive from the computer-based and online information.

The question of *where* to place computers is not as simple as it sounds. Due to E-rate discounts, most localities make computers and the Internet available at the main public library, where anyone (with a library card) can go online. But not everyone visits the library, and the Internet is so popular that most librarians must ration the time alotted for each patron. Thirty minutes is rarely enough time to research employment opportunities, develop a resume, or complete an online lesson.

Thanks to the E-rate program, most middle and high schools are equipped with a computer lab, but these facilities are not typically open after school hours or available to nonstudents. (See page 33 for an discussion of the legal issues governing community use of a school's E-rate-supported technology facilities.)

A more creative and thoughtful approach to public access is to scatter computers in a variety of popular gathering places such as country stores, community recreation centers, the nearby shopping mall, and rural branches of the public library. Laptop lending programs are another innovative approach to facilitating public access.

Exactly *how* individuals are introduced to technology is another critical issue. People who have little or no experience with computers and the Internet need computer training classes, individual or small group coaching, and technical support. To deliver this hands-on assistance, communities draw on librarians, computer teachers, volunteer technology enthusiasts, and, high school or community college students (e.g., cyberguides). Even the smallest rural community has some local technical expertise.

Finally, there is the question of *what* value individuals derive from the computer-based and online information; the *content* of what people see and use. The Internet is a confusing place for newcomers. Many online searches are like looking for a needle in a haystack. Effective public access initiatives direct users to helpful online content, such as community information portals and online learning communities. Such mega-sites guide individuals to valuable electronic resources for education, training, employment, and civic engagement.

Inventive strategies for promoting public access are shared in this chapter's two cases of a small Virginia city (Abington), and rural Appalachian region (four counties in southern Kentucky).

In rural southeastern Kentucky, a team of high school students received college-level computer instruction and now serves as CyberGuides. The students assist businesses, organizations, and individuals with computer problems and basic computer instruction (see page 30).

Abingdon, Virginia [5] (pop. 7,920)

County: Washington
County Unemployment: 5.2 %
County Per Capita Income/State Per Capita Income: $22,385/ $29,789
Percentage of Older Population: 31.7%
Project Timeframe: 1995 to present

Economic Development Strategy:

Advance public access by engineering (early on) an affordable, extremely high-speed telecommunications network with 25 free computers in a town of just 7,800 residents.

Project Summary:

Abingdon is located in the far southwestern corner of Virginia, in a rural county dominated by agriculture, especially tobacco farming. Washington County covers 563 square miles and has a population of approximately 51,000. The Town of Abingdon is 15 miles from the Tennessee border and closer to five other state capitals than to its own (Richmond). A local economy that used to be dependent on energy (especially coal with its radical swings) is now dominated by tourism

In 1995, Virginia Congressman Rick Boucher called on all of the communities within his district to develop electronics capability. The Town of Abingdon responded by forming The Electronic Village of Abingdon (EVA) later that year, when few local government officials had even heard of the Internet. Initially undertaken as a demonstration project to showcase potential uses of a high-speed telecommunication network, EVA has become a critical ingredient of the town's community and economic development success.

The town established the EVA in cooperation with an ISP, a telephone company, and a core group of volunteers. Today, 25 free, high-speed (10 mbps) Internet access computers are available to the general public at four local locations. EVA-connected public access computers are also available at all four rural Washington County Public Library branches, located in the far four corners of the county (as far as 22 miles from the main branch).

EVA is the only fiber optic network in the Commonwealth of Virginia that is owned by a local government entity. Virginia is one of several states that restrict localities (including municipally owned utilities) from entering the telecommunications industry. Abingdon successfully secured an exception to this 1999 state law, and other Virginia localities (e.g., City of Bistol) are attempting to do the same.

Benefits:

- Trained more than 1,000 community members in how to use computers and navigate the Internet.
- Created at least 23 jobs, including positions in computer sales and repair, networking, and Web site development. One area business credits its Internet Web site for expanding its market overseas; another business retained its Abingdon operations due to the high-speed connectivity availability.

[5]See footnote explanation on page 15.

Abingdon, Virginia (cont.)

- Brought telemedicine applications and other services to rural patients through connectivity at the Johnston Memorial Hospital.
- Advancing the town's sustainable economic development goals. Abingdon recently bought a 75-acre property adjacent to the community college on which it will establish a high-tech industrial park, including a business incubator. The college will be used as a training facility.
- Greatly expanding library resources. EVA's high-speed connectivity and the area's demographics recently qualified the Washington County Public Library to receive a $134,000 grant from the Bill and Melinda Gates Foundation. Countywide, the system is now adding 40 new public access computers (on top of the original 12), including a new 11-computer training lab at the main branch for use by local businesses and non-profit organizations, free of charge. Employees of local businesses and organizations will receive training in how to use the most current software packages, etc. Also, recently established the Washington County Public Library as a Cooperating Collection for the Foundation Center, bringing vast fundraising information resources and grant-writing workshops to the area's nonprofits. The next nearest Cooperating Collection is located 140 miles away.
- Helping tobacco farmers to transition into new occupations. A Virginia Tobacco Indemnification and Community Revitalization Commission grant is financing a Technical Trainer who is teaching Internet, e-mail, and office applications to ex-tobacco farmers at several library branches, especially in extremely rural Mendota. Ex-farmers are being connected to additional educational and skill-building resources, such as those of Virginia Highlands Community College and Southwest Virginia Higher Education Center.

Keys to Success:

- Massive public education campaign, utilizing more than 200 volunteers from a wide spectrum of the community. Volunteers range in age from 15 to 75 years and come from a variety of occupations: lawyers, technicians, teachers, doctors, business people, homemakers, retirees, and students.
- Early cooperation of both Sprint (local telephone service provider) and NetAccess (local ISP). Sprint provides engineering and maintenance services; NetAccess supplies administrative services for the EVA network.
- Willingness of local elected officials, and the town's citizenry, to invest public funds in a start-up venture. EVA is a nonprofit initiative of the Town of Abingdon.
- System of pay-as-you-go, phased-in telecommunications infrastructure investment. The initial investment established high-speed connectivity within a four-block area at the center of town. Three additional phases, from 1996 to 1998, gradually expanded coverage to three linear miles radiating out from the town's center. Future network expansions will be accomplished through similar partnerships.
- Revenues generated through connection and user fees paid off the debt incurred in the initial investment, while monthly user fees are kept affordable. The rate schedule established in February 1998 remains in effect today. Following an initial $75 connection fee, the fees are: 10 mbps service for 1 computer, $35/mo.; for 2-3 computers, $22 each/mo.; and so on.

Abingdon, Virginia (cont.)

Obstacles to Success:

- Technology itself provided both a forum for disagreement and a platform for consent, as community members discussed thorny issues such as censorship, content, and degrees of access. Concerns about youth access were ultimately resolved in favor of open access. Educational materials explaining the Internet's vast resources and its hazards were distributed to parents at all public access sites.
- EVA Web site (eva.org) and the official Town of Abingdon Web site (abingdon.com) are two individual sites with some overlapping functions. The goal is to make both sites Abingdon's shared community portal, with increased functionality (e.g., pay taxes, get building permits) and numerous links between the two sites. But exactly how to engineer a blended community portal is still unclear, especially with EVA's reliance on volunteer labor.
- Ultimate goal is to install a fiber optic ring entirely circling Abingdon, with several spokes radiating in. But the town cannot yet afford that kind of investment.

Sources of Funds:

Town of Abingdon; Revenues from EVA connection and user fees; Bank loan and subsidy; Sprint (financed connectivity for first six months); Virginia's Center for Innovative Technology; Bill and Melinda Gates Foundation; Virginia Tobacco Indemnification and Community Revitalization Commission.

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Four Southeastern Kentucky Counties [6] (Owsley, Breathitt, Letcher, Harlan)

(All data are for Owsley County, pop. 5,375)
County Unemployment Rate: 5.1%
County Per Capita Income/State Per Capita Income: $13,663/ $23,237
Percentage of Older Population: 15%
Project Timeframe: October 1998 to Present

Economic Development Strategy:

Bring technology—and the ability to learn with technology—to low-income rural residents who lack access to computers or the Internet. Use technology as a tool to encourage civic involvement and engage youth in community and economic development.

Project Summary:

The four southeast Kentucky counties of Owsley, Breathitt, Letcher, and Harlan in central Appalachia are shouldered with long-term high unemployment (especially discouraged workers), generational poverty, low literacy, virtually nonexistent public transportation, and underachievement by youth. Family ties are very important, which is why some young people remain in the community after high school despite little economic opportunity.

Central Appalachia is also a region where access to computers and useful local online information has been extremely limited. The Choosing to Learn program is tackling these head on. The program aims to make technology a visible part of the community and economic development dialogue, such that citizens experience why and how information technology can improve their lives. It seeks to jumpstart new efforts to incorporate technology into community development strategies. Choosing to Learn also focuses on engaging youth in a more active relationship with their community.

Choosing to Learn is a learning initiative of the Mountain Association for Community Economic Development. MACED provides opportunities and resources to help citizens build sustainable, equitable, democratic and prosperous communities in Kentucky and central Appalachia. The nonprofit organization, established in 1976, is based in Berea, Kentucky.

While most communities place public access computers in schools and libraries, the Choosing to Learn program decided to go one step beyond: to put 26 public access computers where people most often are. Each computer has free Internet access and opens up to the community information portal site, www.actionteam.org.

Twelve of the 26 public computers are "kiosk" computers placed in country stores, community centers and other local gathering places in each of the four remote counties. Each computer is housed in a wooden cabinet specially made by local craftspeople. An example is Callahan's Grocery in Island City, where residents buy groceries, eat breakfast and lunch, collect their mail, catch up on local news, and gather around a Gateway computer. Although Callahan's owner doesn't know much about computers, he can provide customers with technology access simply by directing them to the computer in the back of the

[6] See footnote explanation on page 15.

Four Southeastern Kentucky Counties (cont.)

store. Public access printers are also available at some store locations, where owners made the capital investment and charge users a nominal fee per printed page.

In addition to the 12 computer kiosks, Choosing to Learn has a fleet of 14 "lending laptops," offered for home use, just as libraries lend books. Laptop computers have been checked out over 500 times since the lending program began in 1999. Most users borrow the laptop for several days, using the computer for everything ranging from homework, to genealogical and health care research, to entertainment.

Information workshops are ongoing, offering basic information about computers, the Internet, how to obtain free e-mail accounts, etc. Choosing to Learn has also created a plain language guide titled *A Guide to Computers and the Internet* which includes simple explanations, pictures, and contact information.

Fifteen high school students in the 9th, 10th, or 11th grades from the four counties have taken two community college courses in computers. These students form a corps of CyberGuides available to assist businesses, organizations, and individuals with computer problems and basic computer instruction. The CyberGuides serve their communities on a consulting basis, while developing their entrepreneurial interests.

A central goal of Choosing to Learn is to increase the availability of online information and content relevant to local needs and interests. In response, MACED created a friendly online portal to community information located on the Web at www.actionteam.org. The gateway site offers basic computer guidance and uses a simple picture map format to link users to nearby services and programs.

Benefits:

- Since the first public access computer became available in 1999, at least 1,500 individuals have prepared documents, sent or received e-mail, or searched online.
- Despite nearly constant use by elementary school children, teenagers, job seekers, and senior citizens, the computer stations have suffered little significant damage. There have been no thefts or fights among children, perhaps because the proud store owners will step in, if necessary.
- Having the computer at home means that newcomers can experiment without someone looking over their shoulder, and when time permits. Several low-income families first learned on the laptops and then devised ways to purchase their own computers, with help from MACED staff.
- The lending laptops have improved the lives of several individuals. Tony Carmack, a local social work student born with a degenerative neurological disorder, tried to use the library's public access computers to study for his exams. However, because the library's computer tables were not wheelchair accessible, Carmack instead relied on the laptop lending program to study the material provided to him on CD-ROM. He is now a graduate student at the University of Kentucky pursuing a masters degree in social work, and planning to return to Owsley County upon graduation.
- Local community-based action teams are examining their community development strategies and identifying ways in which technology can jumpstart their goals. An example is the Owsley County Action Team's achievement in establishing the CenterNet professional videoconferencing facility. The Action Team leveraged over $25,000 in local support over five years for this distance-learning initiative. CenterNet is opening up higher educational opportunities for Owsley County residents and helping to raise the literacy rate. In 1990, only 35.5 percent of the county's population 25 and over had a high school diploma. Just 9.8 percent were college graduates.

Four Southeastern Kentucky Counties (cont.)

Keys to Success:

- Strategic placement of the 12 public access kiosks at local gathering places. MACED asked plenty of questions and skirted the typical locations. The staff identified places where computers would be most needed, especially at extended hours of the day and night, when the local library is long closed. Computers are now provided in three remote areas of each of the four counties.
- Systematic approach to computer interest and use. In order to use a kiosk computer, parents or guardians of children age 17 and under must co-sign the Acceptable Use Agreement, and users age 12 and under must be accompanied by an adult. The program has also asked users to complete a technology survey to better help staff understand local technology needs.

Obstacles to Success:

- Choosing to Learn hopes that users will employ the actionteam.org site as an organizing tool, and plans to build in additional content over time. However, content development takes time and requires continuous maintenance.
- Youth CyberGuides require a lot of one-to-one mentoring and regular monitoring to stay actively engaged in the program. Also many young people lack transportation, which hinders their ability to be computer consultants to local businesses. However, several CyberGuides have earned money in consulting and one is a VISTA volunteer at a local PowerUp site.

Sources of Funds:

U.S. Department of Commerce, National Telecommunications and Information Administration; People's Rural Telephone Cooperative, East Kentucky Internet and Microtek Internet Services (ISPs that donated Internet access accounts); BellSouth ($1,000 toward the costs of telephone lines at each kiosk location); Farmer's State Bank, Owsley County (funds for textbook purchases); AOL Rural Telecommunications Leadership Award.

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Chapter 4

Engaging Youth, Utilizing Schools

The school is the heart of most rural communities. It is often the primary employer and chief source of local talent and energy. Small towns, typically governed by part-time elected officials, must make efficient use of all local facilities and manpower, including the neighborhood school.

Youth- and school-based technology initiatives can help to tackle an illness plaguing many rural communities: the exodus of young people. Rural schools educate thousands of students each year, only to watch the capable graduates move elsewhere, often for good. While it is expected that young people will relocate for college, many leaving the state, it is also hoped that the region will furnish enough social and economic opportunity to draw graduates back home in later years. When youth- and school-based technology initiatives engage students in valuable experiences, the product can be a stronger local economy and a reason to return home.

Solving Community Problems, Spurring Development

The technology companies and agencies present in most metropolitan areas are rare commodities in small towns. Consequently, the local school—its staff, facilities and students—may be the rural community's exclusive supply of technical know-how.

While many adults fumble to use computers and the Internet successfully, their children and grandchildren maneuver through technology with great ease. This is the case across the country, even in the corners of rural America.

Technology-literate students and instructors are undertaking a range of projects to solve community-based problems and spur economic development. Youth are employing technology to identify and research local issues, devise solutions, and present their findings using powerful communication software. They are serving as part-time technology consultants (cyberguides) to local government and businesses. Students are even creating new technology start-up enterprises and nonprofit corporations, including an ISP. Along the way, youth are learning how to procure funding, hire assistants, manage a business or organization, communicate with the public, and measure results.

This chapter features three case studies on engaging youth and utilizing schools in technology-related endeavors. In all three communities (Douglas, Wyoming; Elsa, Texas; and, McDermitt, Nevada) youth- and school-based initiatives are teaching valuable lessons, while stimulating community and economic development.

Douglas, Wyoming [7] (pop. 5,677)

County: Converse
County Unemployment: 3.8%
County Per Capita Income/State Per Capita Income: $21,453/ $26,396
Percentage of Older Population: 21%
Project Timeframe: 1995 to present

Economic Development Strategy:

Use technology to strengthen the local infrastructure (including work force and youth), help existing businesses grow (new markets and higher productivity), and to recruit or develop new business (entrepreneurship).

Project Summary:

The legacies of Douglas and Converse County (covering 4,000 square miles of open space) are rooted in mountain men, Oregon Trail pioneers, and the wild western frontier. For generations, the economy of this east central Wyoming town was focused entirely on agriculture, mining, and the railroads. In the early 1990s, while much of the country grew through enhanced technology, Douglas remained tied to its historic roots. Along with a widening digital divide, Douglas experienced the mass exodus of local youth and a faltering business community that was barely competitive or prosperous.

The downward slide reversed in 1995 when Parker Moore, a longtime resident and self-employed computer whiz, partnered with a Casper, Wyoming-based ISP to bring Internet access to Douglas. With Moore's personal investment of $12,000, Douglas became one of the first communities in the state to gain local dial-up service.

By 1997, Douglas was served by several ISPs, and computers became a common tool in local schools and businesses. In that same year, local economic development leaders recruited CommuniComm Services, a national ISP, to locate their regional headquarters in Douglas. CommuniComm built additional fiber optic infrastructure and soon supplied very fast Internet access (up to 1.5 mbps) through their cable TV system, at affordable rates.

Leading Douglas' economic development and technology efforts is the Converse Area New Development Organization (CANDO), a local nonprofit corporation formed in June 1995. CANDO's mission is to encourage new and existing business growth, with the least amount of disturbance to the area's quality of life. The CANDO Tech Center, opened in July 2000, has trained more than 400 local youth and low-income families, through efforts such as these. Douglas' achievements in youth-centered, technology-led economic development focus on three initiatives:

Summer Youth Leadership Training Program: CANDO has engaged 50 local youth, over two summer sessions, in community problem-solving projects. Students used a variety of technologies to research their problem (on the Internet) and devise an intelligent, persuasive presentation to the community (with PowerPoint and other communication software).

[7] See footnote explanation on page 15.

Douglas, Wyoming (cont.)

Project CREATE (Creating Real Experience with Advanced Training and Education): CANDO provided youth, ages 14 and up, with technology training and real work experiences. After completing an initial training program, 37 students became part-time technology consultants to local government and businesses. CANDO drew up contracts with public and private clients, and the students earned $6 an hour creating Web sites, constructing databases, designing graphics, and diagramming business facilities.

Home-to-Careers Program:

CANDO offered new Gateway computers and intense work force technology training to low-income families. The program was overrun with interest, despite the requirement that the family's income (for family of four) not exceed $31,548. Using unspent state welfare funds (TANF), Home-to-Careers immersed each of 30 families in 120 hours of specially designed, hands-on computer training, with high-speed cable modems (CommuniComm Services), at the CANDO Tech Center (in Douglas) and the CERA Learning Center (in Glenrock). Upon completing the training, the same high-end computers were placed in the families' homes, along with one year of prepaid Internet access.

Benefits:

- Forged a unique, collaborative effort in the arenas of technology training, youth leadership, business assistance, and work force development.
- Created a critical asset (CANDO Tech Center) for recruiting new businesses, upgrading technology skills of the local work force, and aiding local businesses with e-commerce solutions and other technology applications.
- Enlarged eTRAIN West's training capacity and staff. As the Tech Center matures, it is likely to incubate additional technology entrepreneurs.
- Furnished local youth with paid part-time technology employment and a grounding in the "soft skills" (good work habits such as punctuality, decent attire, cooperation).
- Advanced 75 percent of Home-to-Careers participants into better jobs, or back to school to prepare for better jobs.
- As a follow-on to the Summer Youth Leadership Training, established a local Youth Council to advise Douglas' policy makers, and appointed two students to be non-voting members of the city council.
- Broadened youth leadership offerings. CANDO is developing a 6–10-week summer youth entrepreneurship residential camp for high school students statewide, to be held in summer 2002.

Keys to Success:

- CANDO's economic development leadership and innovation skills, leading to the CANDO Tech Center and other initiatives.
- Open-mindedness among local elected officials who embraced technology early on (City of Douglas was one of Parker Moore's first customers), and listened to youths' ideas about solving community problems (and acted on them). The fact that citizens regularly run for elected office is another indication of the community's vitality.

Douglas, Wyoming (cont.)

- Provision of high-speed cable modem Internet access furnished by CommuniComm Services, Inc.
- Expert technology training instruction invented and delivered by eTRAIN West, a local firm specializing in technology training to teachers. The company's head is a former special education teacher who understands and accommodates differing learning styles and can work with atypical students.
- Use of new, high-end computers (at Tech Center and placed in low-income homes) so that participants are training on state-of-the-art equipment.
- Technology leadership among local education leaders. Converse County School District was one of the first districts in Wyoming to gain Internet access and is now connected to the Wyoming Equality Network, a fiber optic system serving the state's public schools. The School District has provided partial financial support for Summer Youth Leadership Training and Project CREATE, along with other youth development programs.
- Readiness of local businesses to hire student technology consultants, after some convincing on the part of CANDO.
- Crafting youth-adult partnerships so that young people have concrete input, but they are not expected to lead independently. Originally, students were to direct Project CREATE, but the program faltered with only youth leaders. The move to youth-adult partnerships was an important shift.

Obstacles to Success:

- Despite CANDO's many achievements in youth development, young people are still leaving the region for better opportunities in California, Colorado, and elsewhere. However, the local economy is still strong because Wyoming tends to go in the opposite direction of the national economy. Recent booms in the mining and gas well drilling, and interest in constructing power plants and transmission lines (in reaction to California's energy crisis) are stimulating new employment opportunities.
- Difficulty in acquiring the necessary funding (especially large grants) to purchase and maintain computers and other equipment.
- Challenge of accommodating the many learning styles and schedules of youth and adult trainees at the CANDO Tech Center. Some people learn fast, others learn slowly; everyone leads complicated lives with conflicting demands.

Sources of Funds:

City of Douglas; Converse County; Converse County School District #1; School to Careers Program (federal funds funneled through state and local partnerships); Converse County Business Council; Wyoming Department of Employment; Wyoming Department of Family Services (TANF funds); Workforce Investment Act youth funds; private donations and corporate grants; donations from community-based youth service organizations.

Douglas, Wyoming (cont.)

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www.netcommander.com (CommuniComm Services, Inc.)

Community Use of School Technology Resources

Piggybacking on a school's computer and Internet resources would be a win-win situation for rural communities. It could advance the community in the areas of distance learning and economic development. But community use of a school's technology resources is a complicated and evolving issue.

Nearly every school across the country has recently acquired computers and Internet access through the E-rate (education rate) program, created by the Telecommunications Act of 1996. The E-rate is funded by the Universal Service Fund (USF), which was established in 1983 to ensure that all Americans can afford telephone service wherever they live. While all schools (and libraries) are eligible for E-rate discounts, the program grants larger discounts to schools with high poverty rates and to rural schools, because telecommunications costs are generally higher in rural areas.

In December 2001, the Federal Communications Commission (FCC) issued a new ruling that may permit some rural schools (and libraries) to share their precious E-rate-supported technology resources with the larger community. Current E-rate rules require schools to certify that the facilities and services acquired through the program are used for educational purposes only. This means that the high school's E-rate-supported computer lab cannot easily double as a community technology center or e-commerce training site.

The FCC's recent unanimous ruling approved a petition from the state of Alaska to let its residents use excess capacity from a school's E-rate-funded Internet connection. Alaska is home to many remote villages served by satellite telecommunications only. These satellite hook-ups are commonly financed through E-rate discounts. Unlike wireline systems, satellite services are delivered on a "non-usage sensitive" basis, meaning that schools pay a set fee for unlimited use. When school closes for the day, the Internet-equipped computers sit idle; that's a missed opportunity for the larger rural community.

In approving Alaska's petition, the Commission specified that the Internet can only be used by nonstudents when school is not in session, and only if this extra use doesn't result in an extra fee charged to the E-rate program. Additionally, access to the school's connection is only permitted in communities where there is no local or toll-free dial-up Internet access available.

The FCC has demonstrated a willingness to waive its rules if special circumstances so warrant, and if the exception serves the public interest. The Alaskan petition qualified on both of these grounds, perhaps opening the door for other underserved, rural communities.

Elsa, Texas [8] (pop. 6,048)

County: Hidalgo
County Unemployment: 12.7%
County Per Capita Income/State Per Capita Income: $13,339/ $26,858
Percentage of Older Population: 16%
Project Timeframe: 1992 to present

Economic Development Strategy:

Engage local youth and high school alumni in collectively researching, strategizing, and communicating solutions to community and economic development concerns.

Background:

The small town of Elsa, Texas, is located 15 miles north of the Texas-Mexican border in the Rio Grande Valley. For generations, this region has been isolated geographically and socially. In the early 1920s, real estate and development companies came into the area, creating what is still known as the "Magic Valley." They built an economy dependent on uneducated and poorly paid Mexican laborers.

Elsa combines with neighboring rural communities (principally Edcouch, pop. 4,100) to form the Edcouch-Elsa High School (E-E HS), serving the state's fourth-poorest public school district. Approximately 98 percent of the student body is of Mexican origin. Since 1992, E-E HS has operated a nationally recognized college placement program, sending 45 high school graduates to Ivy League institutions such as Harvard, Brown, Yale, and Columbia. This is quite an achievement for a school district in which approximately 90 percent of households have an annual income of less than $10,000 and few parents have a high school diploma or fluency in English.

In 1997, local leaders established the Llano Grande Center for Research and Development, a school- and community-based organization housed at E-E HS. The organization's unique agenda grew out of its early work, in 1997, mapping community assets. Among the most critical assets identified were local youth who were leaving the Edcouch-Elsa community in pursuit of higher education at elite universities. The Center viewed this trend not as a "brain drain," but as a hemorrhaging of community assets. Elsa's leaders sought to reclaim talented human resources by engaging local youth.

When the Llano Grande Center established an e-mail list-serve, E-E HS graduates emerged as influential leaders who could contribute ideas and strategies for critical projects back home. Along with the sustained electronic conversations, many college students returned to the area during school and summer vacations to orchestrate community research, communications, and policy-development efforts.

One of several E-E HS graduates is Ernesto Ayala, a 1995 graduate of Brown University, who returned to Elsa in June 1999, and is the Center's Director of Community-Based Research. Ayala teaches survey instrument development, marketing, programming, and statistical analysis to E-E HS students. Students conduct interviews and gathered data on local issues within the public health system, housing, water quality, and the labor market. They use SPSS (Statistical Package for the Social Sciences) and other tools to run frequencies and cross tabulations to detect important trends. The Internet

[4]See footnote explanation on page 15.

Elsa, Texas (cont.)

serves as an important resource for accumulating background information and structuring the research. The students employ communication technologies to present the information in a format that can be easily grasped by local citizens.

The Llano Grande Center for Research and Development has started other on-going, grassroots initiatives, all of which involve local youth with high-end information and communication technologies (e.g., radio and video production; digital editing; layout and photography). The Center's Seminar Series is a forum for community topics, and a showcase for local talent. Launched with a grant from the Kellogg Foundation, the Series is now supported by State Farm Corporation and airs on the local PBS station.

Benefits:

- Continued to build on a nationally recognized college placement program, begun informally in 1992. Dozens of students involved in the Center have gained admission to very competitive universities across the country. "The Center creates space for youth to do good work, and good things happen."
- Sustained the involvement of hundreds of high school graduates, scattered around the country, in local community and economic development initiatives.
- Produced over 75 jobs (part-time/contractual and full-time) in existing or new small businesses (e.g., print shop, copying center, video production). Some businesses started and operated by students, as an outgrowth to an E-E HS Economics class. Students used the Internet to search for inputs for such businesses.
- Planted the seeds for new entrepreneurial endeavors. For example, new Spanish immersion program for visiting high school students has resulted in additional jobs for host families and language tutors. Students from across the country are learning Spanish near the Mexican border, rather than traveling overseas.
- Nurtured local youth's interest in monitoring and advancing key community and economic development issues. High school students visit City Hall, interview local elected officials, ask pointed questions, and relay educated responses to the citizenry. Student researchers studied and formulated a new regional economic development plan.
- Generated momentum on important projects in health, infrastructure, educational reform, and more. For example, students partnered with local churches to educate low-income families on how to obtain affordable health insurance.
- Received the Distinguished Service Award from the Texas Department of Economic Development for the Center's role in educating local youth and contributing to the state's economic development.

Keys to Success:

- Extraordinary collaboration among local educators, community activists, city officials, and business leaders. The unusual partnership is evidenced by the Chamber of Commerce housed within the Llano Grande Center, within the E-E HS.
- Llano Grande Center's assets-based approach: refusing to see poverty and social status as the community's determining factor; empowering young people by learning from their elders; seeing

Elsa, Texas (cont.)

youth and adults as both teachers and learners.

- A commitment to put people first, technology second. The Center's effectiveness in collective electronic conversations hinged on nourishing longtime relationships between local people. Technology is just a tool.
- Dedication of E-E HS graduates to "give back to their community" by participating in electronic conversations or summer internships. Some graduates have returned to the community on a full-time basis.

Obstacles to Success:

- Obtaining financial support to honor students (current and former) with financial compensation. Llano Grande Center has had considerable success in this area, but some compensation has been in-kind.
- No high-speed Internet access for households, businesses and governments in the Edcouch-Elsa community. An exception is the Edcouch-Elsa High School which has a T-1 line, also serving the Center and the Chamber of Commerce.

Sources of Funds:

Annenberg Rural Challenge; Kellogg Foundation; State Farm Corporation; Morino Institute; Houston Endowment; USDA Empowerment Zone/Enterprise Community Program; Federal Workforce Development Funds (OET/JTPA); City of Elsa; City of Edcouch.

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Web Sites:

www.llanogrande.org
www.surveysystem.com
(survey research software)
www.utexas.edu/academic/uip
(University of Texas-Austin, Urban Issues Program)

McDermitt, Nevada [9] (pop. 383)

County: Humboldt
County Unemployment: 5.8%
County Per Capita Income/State Per Capita Income: $23,332/ $31,022
Percentage of Older Population: 17.4%
Project Timeframe: 1998 to present

Economic Development Strategy: Establish a nonprofit, high school-based, student-run enterprise that offers affordable, high-speed Internet access to users in remote northeastern Nevada.

Project Summary:

McDermitt and Humboldt County are located in northeastern Nevada, straddling the border with Oregon. The tiny desert town is 74 miles north of the next major population center, Winnemucca (pop. 7,000), which is the county seat. Reno is a three-hour drive.

Like most mining towns, McDermitt has seen its economy boon and bust. In the mid-1800s, McDermitt was a popular pit stop for miners traveling by ox team between Sacramento, California, and Silver City, Idaho. Since then, it has experienced the ups and downs of cattle raising, sheep farming, bank failures, and mercury mining. The nearby Cordero Mine was one of the nation's principal sources of mercury until excess capacity caused the mine to close in 1990. Back in the 1950s, when two mines were operating around the clock, the town's restaurant, motel, and trailer park were alive with families. But since the early 1990s, some people think of McDermitt as a modern-day ghost town.

McDermitt has a small store, two gas stations, a casino, and one restaurant. There is no town square or beauty parlor. McDermitt carries on without a mayor, police chief, doctor, lawyer, or banker. The main employer is the McDermitt Combined School, with about 30 employees for 212 students in K-12. Local unemployment is at least double the state's average, and most working people hold minimum wage jobs. Other than the school, the only income-generating activity in the county is supplied by three gold mines and several ranches and farms.

But things changed for isolated McDermitt four years ago, when a new business opened up within the confines of the McDermitt Combined School: the region's first ISP, run by high school students, offering affordable, reliable Internet access.

In 1998, three McDermitt educators—a business teacher, a science teacher and the high school principal—were trying to figure out a way to get Internet access for their students in this remote community. At that time, the only connection for the school was through one modem that was shared with five computers. It was slow as molasses. The only alternative was to connect to the Internet through an ISP located in Idaho, which resulted in costly long-distance charges.

Since local telephone lines could not accommodate Internet access, satellite service with wireless connections was the only option. McDermitt could connect via satellite through Intellicom, a telecommunications provider based in Livermore, California. But there was the problem of cost, namely $1,700 a month. While schools and libraries are eligible for educational discounts (E-rate) through the federal government, the satellite service was not part of the program; it wasn't considered to be sufficiently reliable.

[9]See footnote explanation on page 15.

McDermitt, Nevada (cont.)

Since the school district could not afford the retail rate by itself, the only way to acquire Internet access was to sell the service to surrounding residents. According to calculations, seventy customers paying $30 a month would make the service self-supporting. When Patrick Goff, the business teacher, asked his class of high school seniors if they wanted to organize such an enterprise, they jumped at the chance.

With leadership from Goff, the students studied various organizational options, and decided to incorporate as a nonprofit; applied for grants from two consortiums, and, conducted a survey to determine how many residents would be interested in Internet service. They launched McDermitt's Humboldt Internet Provider (M-HIP) in 1998, hoping to sign up 70 customers. Within just two months, M-HIP grabbed 74 subscribers. Today, it boasts 310 customers, most of whom Goff and his students know on a first- name basis. In addition to providing affordable dial-up service, M-HIP now offers high-speed wireless within a four-mile radius of the ISP.

The wireless services were originally fed by a satellite connection with 64 kbps uplink and 2–4 mbps downlink. But in April 2001, M-HIP incorporated an underground T-1 line into the system. The new line expanded M-HIP's service area from a 65-mile radius to 100+ miles. It also increased the speeds of both dial-up and wireless services.

Nine students spend an hour a day, five days a week running the enterprise. Most of the work of running M-HIP's school-based business is done in a single two-hour class, including board meetings, billing, and maintenance of the school's and customers' computers. A technical support line is staffed by individual students in the role of teacher assistant. After-school technical support is provided by Mr. Goff at his home.

At school year's end, upcoming juniors and seniors apply for the positions and undergo an interview process with the current board members. So far, everyone who has applied has been hired. However, the bylaws do allow the board to vote out anyone who is not contributing.

Benefits:

- Provided residents, schools, and businesses in seven rural communities in northern Nevada, southern Oregon, and a small part of southwestern Idaho with Internet access at an affordable cost.
- Started a program of hands-on technology training and business experience for high school students. Students use the Internet to research homework assignments and college scholarship opportunities online.
- Expanded the educational offerings of extremely small, remote schools. The Jackson Mountain School, located 75 miles outside McDermitt, has just five students. But with Internet access through M-HIP, teachers bring distant people and places to the their one-room schoolhouse.
- Initiated distance learning. Several parents are taking college courses online, advancing their professional options.
- Launched a scholarship program, financed through M-HIP profits, for students who participate in the program. Four 1999 graduates who had participated in the first year of the enterprise, received $1,000 each in 2000 for their college education.
- Set up an apprenticeship program for younger students, so that as each class graduates, there are others to take their place in running M-HIP.

McDermitt, Nevada (cont.)

- Introduced and encouraged local e-commerce applications. Three local mines use the service to send data back to home offices. Farmers rely on the Internet for stock and weather updates. Ranchers market their cattle electronically.

Keys to Success:

- A motivated teacher and hard-working students.
- The increasing presence of the Internet through television and newspaper advertising and articles is stimulating more demand from rural residents.
- Substantial financial support from technology and education consortiums.

Obstacles to Success:

- The Internal Revenue Service (IRS) did not have a previous model in which a high school class organizes itself into a nonprofit and sells services. This slowed down IRS approval for nonprofit status and required help from a congressman.
- The project is so ambitious and unusual that it requires a lot of time and dedication to set it up.
- Satellite technology can be affected by weather and seasons, slowing down service.
- McDermitt remains one of the most difficult places in the state to earn a decent living.

Sources of Funds:

Northeast Nevada Technology Consortium; Northeast Nevada Schools to Career Consortium; M-HIP's approximately 310 customers (initially paid $30/month, now pay $25/month); AOL Foundation (Rural Telecommunications Leadership Award of $10,000).

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(McDermitt/Humboldt Internet Provider)

Chapter 5

Increasing Local Business Productivity, Enhancing Labor Skills

The dot-com bubble may have burst on Wall Street, but small businesses are just beginning to put information technology to good use. Especially in rural areas, small firms are "Web-ifying" ever so slowly. Likewise, the unemployed and underemployed citizens of rural America are still newcomers to computer skill training and distance learning.

But progress doesn't need to move at a snail's pace. Community leaders can generate momentum by introducing e-commerce and other technology applications to area firms and by facilitating labor skill training for interested workers. Doing so will undoubtedly toughen the local economy and give birth to new sources of employment.

Technology Revolution for Small Businesses

More than half of all new jobs arise from the expansion of existing businesses. For firms to stay and grow in the community, they must be productive. That's where technology comes into play.

Electronic commerce (e-commerce) is transforming nearly every business, from homespun "Mom and Pop" stores to routine manufacturing operations. E-commerce exists in two varieties: (1) business-to-consumer e-commerce, through which company Web sites market consumer products, expedite online purchases, and deliver customer support; and (2) business-to-business e-commerce, through which the firm's electronic networks link with its suppliers and distribution partners.

Business-to-consumer e-commerce is powerful tool, well understood by the average citizen. (Who hasn't heard of Amazon or e-Bay?) But the real guts of e-commerce is business-to-business transactions. B2B lets firms buy goods from suppliers and send information to warehouses and distributors at lower costs, which diminishes paperwork and personnel. It cuts significant costs out of the supply chain and facilitates better procurement and resource planning. As a result, B2B is spreading exponentially. Jupiter Media Metrix, an Internet market research firm, projects that more than 40 percent of transactions between companies will move online by 2005.

On top of e-commerce, there is an assortment of other productivity-enhancing, information technology tools of use to rural businesses, including inventory software, accounting programs, videoconferencing capability, computer aided design (CAD), geographic information systems (GIS), collaborative engineering (e.g., with document camera), and database controls. Another major productivity boost for companies arises from online, in-service training. In place of expensive and time-consuming out-of-town travel, firms employ nearby computers and the Internet to upgrade employees' skills.

Online Education and Training

Scattered throughout rural America are countless numbers of unemployed and underemployed individuals. Information technology is a lifeline for such people, offering computer training and distance learning in any number of subjects. Online education and training also benefits the community at large. It enhances the region's ability to attract new business and industry, by supply-

ing a ready and skilled work force.

Tiny Aurora, Minnesota, tucked away in rural Iron Range, is a case in point. When the LTV Mine closed its doors in February 2001, thousands of workers lost their livelihoods. With no college or university nearby, some former employees are turning to the Internet to train for their next careers. Minneapolis-based Capella University is one of several sources for online certificates and degree programs. With courses in business, education, human services, psychology, and technology, Capella offers rural residents a way to stay in their communities and earn a college degree.

Of course, distance learning programs are of no use to the person who lacks affordable and convenient access to information technology. A 30-minute time slot at the town library is a poor fit with online learning. This is why computer purchase and lending programs, community technology centers and other public access sites are essential companions to online education and training.

This chapter describes how three communities (Ashley, North Dakota; Meadville, Pennsylvania; and, Watford City, North Dakota) are increasing business productivity, and enhancing labor skills, through information technology. The three cities vary in size—from 882 to 14,000 residents—and in approach, but they share the common goal of aiding local economic development.

Tiny Ashley, North Dakota boasts technology-related business services unseen in most rural communities. In 1997, the city launched TechLink, Inc., a publicly owned technology business and data processing center.

Ashley, North Dakota [10] (pop. 863)

County: McIntosh
County Unemployment: 1.9 %
County Per Capita Income/State Per Capita Income: $21,188/ $23,313
Percentage of Older Population: 63.1%
Project Timeframe: 1997 to present

Economic Development Strategy:

Marshal diverse public and private resources to bring technology assistance and telecommunications infrastructure to benefit rural businesses.

Project Summary:

Ashley is a small prairie community located in south central North Dakota. Named after Milwaukee Railroad executive Ashley Morrow, the community has held tightly to its German-Russian roots for over 100 years. Local leaders pride themselves on the city's hospitality, low crime rate, medical services, educational facilities, outdoor recreational opportunities, and quality labor force. But like much of rural North Dakota, Ashley suffers from out-migration, a high death rate due to the elderly population, and a distressed agricultural economy.

Despite (or because of) these handicaps, Ashley's leaders have led a dedicated campaign to revitalize the local economy. As a result, more young people have been running for elected office and managing the town's small businesses. In 2001, Ashley boasts technology resources unseen in most rural communities. It employs a full-time economic development coordinator (finances through a one percent local sales tax) and a part-time information technology coordinator (supported by the Job Development Authority and the Ashley Lions Club). Together, they have rallied local citizens, community service clubs, state technology policy makers, rural telephone cooperative managers, and regional development authorities to champion Ashley into the 21st century.

In 1997, the city launched TechLink, Inc., a publicly owned technology business and data processing center, of which the majority owner is the City of Ashley. Simultaneously, the city's economic development coordinator and IT coordinator established Introduction to Computer classes for Ashley citizens, especially people 55 years and older. They also began a relentless lobbying effort directed to the rural telephone cooperative (local provider) and state authorities, to bring affordable, high-speed telecommunications services to Ashley.

Today, Ashley citizens have access to high-speed DSL and wireless service. TechLink into a full-service technology assistance operation, growing from 15 to 45 employees. The business operates a Web Media division, offering Web design and software development solutions to local businesses. TechLink also serves as a local incubator and business recruiter, inspiring new business start-ups and attracting employers to Ashley.

[10]See footnote explanation on page 15.

Ashley, North Dakota (cont.)

Benefits:

- Engineered and marketed an affordable Web presence and other Web and e-commerce applications for Ashley local businesses. Introduced local companies to the practice of using technology to increase productivity and expand the customer base.
- Instituted a diverse technology assistance business that makes Ashley attractive to homegrown entrepreneurs and incoming companies.
- Installed the required telecommunications infrastructure to suit telecommuters and other technology-dependent individuals. A few former city dwellers have already relocated to rural Ashley, some in response to the events of September 11, 2001.
- Trained over 65 people at Introduction to Computer classes. Imparted basic computer and Internet skills, and educated a potential work force for a future call center or other technology-related business.
- Credentialed 10 students as LPNs, partially filling the area's need for critical nursing care.
- Encouraged more young adults to run for elected office and manage local businesses. Of the 50 Ashley companies that keep regular business hours, one-third are managed by 20-to-39-year-olds.

Keys to Success:

- Widespread citizen participation and endorsement of a strategic planning process, resulting in concrete goals and community action teams.
- Ashley's financial investment in technology-led economic development (e.g., majority shareholder of TechLink, Inc., one percent sales tax for community and economic development).
- Diligence and dogged persistence in pursing high-speed telecommunications services. Networking and advocacy on Ashley's behalf at numerous regional technology meetings and forums. Not taking the rural telephone cooperative's "no" for a final answer.
- Action of engaging the Chief Information Officer of the State of North Dakota's Information Technology Department on Ashley's behalf. The CIO played a crucial role in discussions with Dickey Rural Communications.
- Unusual and lasting partnerships among several public and private organizations and agencies. For example, the information technology coordinator's salary is jointly financed by the JDA and the Ashley Lions Club, a service club not generally known for innovation or technology.

Obstacles to Success:

- Generating support for technology and other 21st century investments in a population dominated by senior citizens (average age of 64).
- Leveraging local funds in a community of just 882 citizens. An exception is the Ashley Community Foundation, now capitalized at $308,000. Five percent annually is drawn off through Opportunities, Inc., providing small grants to local businesses.
- Ashley is working to recruit telecommuters and information-intensive businesses to town, but most technology workers are not interested in moving to North Dakota. Also, with the economy slowing, fewer companies are establishing call centers.

Ashley, North Dakota (cont.)

Sources of Funds:

City of Ashley; Job Development Authority; Ashley Lions Club; McIntosh County; South Central Dakota Regional Council; Opportunities, Inc.; USDA/Rural Development

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www.techlink-nd.com
www.ashley-nd.com

TechLink is a full-service technology assistance operation, growing from 15 to 45 employees. The business operates a Web Media division, offering Web design and software development solutions to local businesses. It also serves as a local incubator and business recruiter, inspiring new business start-ups and attracting employers to Ashley.

Meadville, Pennsylvania [11] (pop. 13,900)

County: Crawford
County Unemployment: 7.2%
County Per Capita Income/State Per Capita Income: $21,318/ $28,605
Percentage of Older Population: 20%
Project Timeframe: 1991 to present

Economic Development Strategy:

Impart technology and e-commerce skills to regional businesses, upgrade the technology capabilities of the regional work force, and build the necessary telecommunications infrastructure to accommodate new business development.

Project Summary:

Thirty years ago, the City of Meadville and surrounding Crawford County, located in northwestern Pennsylvania, boasted a total labor force of at least 35,000 and several large-scale employers (e.g., Avtex Fibers, with 3,500 workers). But the downward economic spiral of the 1970s and early 1980s brought widespread plant closings and a parade of empty commercial and retail storefronts.

By the late 1980s, the Crawford County Development Corporation (CCDC) and its sister agency, the Redevelopment Authority of the City of Meadville (MRA), became the lead organizations in a network of public agencies and nonprofit corporations committed to reversing the region's economic debacle. They purchased the former Avtex site and began redeveloping it as the Crawford County Industrial Park, renovating the buildings and preparing them for multitenant occupancy.

But as the work progressed, CCDC, MRA and others realized that refurbishing the industrial site wasn't enough. The future of Meadville and greater Crawford County rested on creating technology training programs and building the necessary telecommunications infrastructure. Fortunately, around the same time a Meadville technology enthusiast and a local attorney led a volunteer task force in creating the Greater Meadville Area Local Access Network (GREMLAN). This electronic community bulletin board offered local, dial-up Internet access in 1991, well before most rural residents even heard of the Internet.

With GREMLAN in place, and a new focus on technology issues, CCDC launched a new nonprofit entity in 1997 to spearhead and support technology development: the Crawford County Regional Alliance. CCDA/CCRA purchased GREMLAN and transferred the system to the Crawford County Industrial Park where it received two upgrades. In 1998, CCRA opened the Regional Link-to-Learn Training Center at the industrial park site and gradually evolved the project into a full-service Regional Conference & Training Center during 2000.

The Regional Conference & Training Center consists of three centers that can be employed independently or integrated collaboratively. The Link-to-Learn (L2L) Computer Training Center is particularly suited for distance learning and computer training classes. The Presentation Center is geared to large groups that want to interact with others at remote locations and utilize training via satellite downlink.

[11] See footnote explanation on page 15.

Meadville, Pennsylvania (cont.)

The Conference Center is targeted to conferences, interactive meetings, training on laptop computers, and distance learning.

The RCTC's high-end technology systems feature 21 networked computer work stations, 6 stand alone PCs and more than 50 associated technologies. For numerous Crawford County businesses and organizations, the RCTC is the channel for in-house training and interactive communications. Nonprofit organizations such as the Manufacturers' Association and The Learning Center provide software program instruction to individuals through advertised classes and to companies which request trainers. Area accounting firms impart bookkeeping skills to small business owners. Nearby colleges and universities offer distance learning classes. The Penn State Cooperative Extension Office trains agricultural producers in using software programs for crop and dairy herd management and farm financial management.

The Ben Franklin Transformation Business Service and Gannon University's Small Business Development Center offer small business development assistance to budding entrepreneurs. Area firms administer in-service training programs for their staff stretched across the region, especially sales staff. Companies considering a move to Crawford County, especially to the CCIP itself, are impressed with the RCTC's facilities.

Benefits:

- Substantially reduced the complexity and cost of in-service training and education programs conducted by area businesses and nonprofit organizations.
- Increased the global reach of local businesses by furnishing videoconferencing facilities and other communication technologies. Managers are able to hold virtual meetings with distant companies rather than waste precious travel time and expense.
- Lowered the transactional costs of design improvements by permitting business engineers to jointly view engineering drawings using a document camera. Engineers stationed at remote locations can collaboratively troubleshoot design improvements. Also, businesses having trouble using new equipment or materials can use the document camera to demonstrate their difficulty, and receive hands-on technical support from the manufacturer.
- Expanded the reach of small business and agricultural producer assistance programs, by providing an alternative venue for delivering services. The Gannon University Small Business Development Center has placed two counselors in the corporate offices of the CCDC to provide business management training to new entrepreneurs in Crawford County.
- Gently introduced e-commerce applications and other information technologies to area Mom-and-Pop operations. The Northwest Pennsylvania Regional Planning and Development Commission and other providers host RCTC seminars on such tasks as creating Web sites and processing credit card orders. Not all small business owners are receptive, but many are drawn in by the RCTC's facilities.
- Enticing new technology-focused companies to locate their operations in Crawford County, perhaps in the CCIP.

Keys to Success:

- Early leadership on telecommunications issues (e.g., GREMLAN), spearheaded by a local technology enthusiast and a diverse task force of volunteers, including representatives of competing companies.

Meadville, Pennsylvania (cont.)

- Significant capital investments from competing telecommunications providers, including the local telephone company (ALLTEL Communications) and the local cable company (Armstrong Cable Services). Cooperation among rival companies is very rare.
- Breadth and financial solvency of the Crawford County Development Corporation. CCDC owns or controls approximately 2.2 million square feet of industrial and commercial space in the Greater Meadville area, and hundreds of acres of industrial-use land. Also, the Corporation is supported by income generated through its services and programs for tenants, as well as through state and federal grant programs to support economic development efforts.
- Effective fundraising resulting in more than 1.6 million dollars in grants and internal investments committed to the RCTC.

Obstacles to Success:

- Imparting the benefits of technology (e.g., e-commerce) to old-style Mom-and-Pop businesses. Reaching out to small businesses requires one-to-one or small group meetings and other resource-intensive marketing activities.
- Marketing the RCTC beyond the current group of early adopters (nonprofit organizations and companies). Few rural businesses understand how video conferencing and other communication technologies can save them time and money. Spreading this knowledge is a gradual, long-term process.

Sources of Funds:

Crawford County Development Corporation/ Crawford County Regional Alliance; ALLTEL Communications; Armstrong Cable Services; Economic Development Administration; Pennsylvania Link-to-Learn Technology Test Bed Program; Ben Franklin Technology Center; USDA, Rural Development; Appalachian Regional Commission; Pennsylvania Department of Community and Economic Development.

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Web Sites:

www.gremlan.org
(Greater Meadville Area Local Access Network)
www.gremlan.org/ccra
(Crawford County Regional Alliance/ Regional Conference & Training Center)
www.gremlan.org/crawfordcountydevelopment.org
(Crawford County Development Corporation)

Watford City, North Dakota [12] (pop. 1,494)

County Unemployment: 2.2%
County Per Capita Income/State Per Capita Income: $19,955/ $23,313
Percentage of Older Population: 40.6 %
Project Timeframe: 1996 to present

Economic Development Strategy:

Create a virtual community technology center, served by high-speed telecommunications, where local citizens upgrade technology skills and local businesses increase productivity. The combination of advanced telecommunications, a skilled work force, and quality of life amenities attract new employers to the community.

Project Summary:

Watford City is the seat of McKenzie County, a sprawling, geographically isolated region of northwestern North Dakota. Approximately 17 percent of the county's 5,373 residents fall under the federal poverty level, making McKenzie County among the poorest counties in the state. Factors contributing to the area's challenges are the nationwide decline in the value of farm production and the boom-bust nature of the energy industry.

Watford City's forays into advanced technology represent the county's proactive response to the bumpy economic ride of the past 15 years. Much of the activity began in 1995, when a local planning committee identified information technology as one of the community's key economic development strategies. McKenzie County, together with the local Economic Development Corporation and the Fort Berthhold Reservation, generated community support to bring broadband access to the edge of the North Dakota Badlands. Through a cooperative effort with the local electric cooperative and a private telecommunications firm, a leased T-1 line and a wireless network furnished high-speed service to key sites throughout Watford City.

But local leaders realized that investing in bells and whistles wouldn't do much good if the people of Watford City didn't know how to use and capitalize on this new technology. Therefore, along with wiring buildings and equipping labs, the community created a virtual McKenzie County Community Technology Center (CTC) to impart comprehensive technology skill training to students and adults. The CTC is a "virtual center" that uses existing community facilities—three high school computer labs, the local library, the court house—and the technical training expertise of local residents to offer a variety of courses at a modest cost.

The Center offers a variety of technology courses on a rotating basis. Local high school students learn how to refurnish donated computers in the CTC's ExplorNet Program, and put their computer skills to practical use by furnishing free Web page design services to local businesses.

Approximately 70 percent of current participants in the CTC program are adult learners who are upgrading their skills for use in a current job or business. The Center helps companies considering a relocation or expansion in Watford City, by preparing local workers to be hired by the new employer. Many of the remaining 30 percent of CTC enrollees are looking to tap into new job opportunities, perhaps

[12]See footnote explanation on page 15.

Watford City, North Dakota (cont.)

as telecommuting programmers. Tuition is kept low ($500 a course, on average) and includes books and materials.

One of the CTC's most popular and cost-effective courses is the Master Internet Volunteer (MIV) Program, operated jointly with North Dakota State University. MIV students receive specialized training at a reduced fee, so long as they agree to volunteer 30 hours transferring their computer skills to fellow community members. Similar programs, also known as the Internet Master Program or Master Navigator, operate in other locations. All curricula may be copied and distributed for noncommercial purposes.

Benefits:

- Attracted three technology-based companies to town, producing 80 jobs. Although none of the three businesses currently has plans to expand further.
- Elevated approximately 75 percent of CTC participants into higher-paying and more advanced positions. Approximately 125 adults have completed technical training courses, gaining a foundation of new skills.
- Extended high-speed telecommunications services even further. In 2001, McKenzie Consolidated Telecommunications (a new limited liability corporation) completed an overbuild of the city's telecommunications infrastructure. The original wireless network was replaced with a fiber ring. By 2003, every resident and business in Watford City will have access to high-speed DSL directly or through last-mile wireless connectivity.

Keys to Success:

- Cost-efficient use of existing community facilities, especially school computer labs, and local technical talent. The CTC is comanaged by the county technology director and the school district technology director, and assisted by the local economic development director.
- Use of a skills survey to assess the existing level of technical before launching the CTC program.
- Development of a comprehensive technology curriculum, spanning from basic skill-building to advanced technical training based on industry and company needs.
- Commitment to containing tuition fees by reinvesting proceeds into the program and soliciting outside support for scholarships.
- Tenacity. When Watford City's federal grant application to establish a community technology center was turned down, the community moved ahead anyway. Watford City's technology enthusiasts understood the potential of technology and shared their vision with other community leaders.

Obstacles to Success:

- Current regional 1.2 percent unemployment rate that inhibits expansion. Impact, a tele-marketing company located in Watford City, would expand tomorrow, but cannot locate enough qualified workers.
- Most existing technology jobs are low-end ($7/hour), especially call center positions. The great challenge is in incubating or recruiting higher wage jobs.
- County Job Development Authority has experimented in generating a database of worker skills

Watford City, North Dakota (cont.)

to help market the region to employers. It drafted an IT Labor Skills Survey Form in conjunction with the Economic Development Association of ND. But the technology industry changes so rapidly that it is nearly impossible to keep this information current and relevant. Several state agencies are now working collaboratively to develop a statewide database of IT skills to address worker recruitment issues.

Sources of Funds:

McKenzie County; McKenzie County School District; Watford City; ExplorNet.

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Web Sites:

www.4eyes.net
(McKenzie County)
www.ext.nodak.edu/miv
(Master Internet Volunteer Program)
www.outreach.missouri.edu/imaster
(Internet Master Program)
www.cari.unl.edu/navigator/mnprog.htm
(Master Navigator Program)
www.explorenet.org
(Technology-based learning in America's schools, particularly in traditionally underserved areas)

Portions of this case study were excerpted from *Economic Development & Technology: A Guidebook,* published by the Economic Development Association of North Dakota, October 2000.

The McKenzie County Community Technology Center is a "virtual center" that uses existing facilities (three high school computer labs, the local library, and the court house) to impart comprehensive technology skill training to students and adults.

Chapter 6

Assisting Local Entrepreneurs

J.B. Say coined the term "entrepreneur" in the late 18th century to describe a person who "shifts resources out of an area of lower [productivity] and into an area of high productivity and greater yield." An entrepreneur is often described in current terms as a self-starter, a risk-taker, an ambitious and independent individual who pursues opportunity regardless of his or her resources. We presume that he or she is born to be entrepreneurial, that it's a personal trait and the community has little impact on entrepreneurship.

But, our presumptions are inaccurate. "Entrepreneurship (or the entrepreneur) is not something mystical nor is it confined to some anointed group of people," explain small business researchers Norris Krueger and Deborah Brazeal. Entrepreneurial ventures sprout and grow when and where the conditions are most favorable—in environments, or systems, that deliberately encourage and nurture entrepreneurship.

Entrepreneurs are not simply gutsy people who seize on any opportunity for gain. They are individuals who assume the risk and management of a business with the intent of positive wealth generation and employment. In fact, many owners and managers of small firms do not choose entrepreneurship. They become entrepreneurs after being laid off from larger companies, downsized into contract consultants as firms reorganize, relocated due to a spouse's change of employment, or transformed due to some other life-changing event (e.g., inheritance of wealth, declining health, or need to care for a homebound family member).

The Women's Rural Entrepreneurial Network (WREN), located in Bethlehem, New Hampshire, operates a friendly, well-equipped technology center offering technology-related instruction and hands-on assistance to low-income women entrepreneurs.

WREN's online marketplace (www.shopthewrens.com) showcases the products and services of more than two dozen rural vendors. The online store mirrors WREN's retail shop in Bethlehem, which sells high quality, handmade products to visiting tourists.

How Computers, Internet Advance Entrepreneurs

What part does information technology play in encouraging and nurturing entrepreneurship? There are at least three possible roles. First, budding entrepreneurs learn and use computer and Internet skills to develop and market their product or service. Hands-on instruction is provided at community technology centers, small business outreach offices, and business incubators, and furthered by computer purchase programs.

Second, entrepreneurs go online to accomplish many tasks, such as to get guidance on specific business development topics (e.g., business planning, marketing, insurance); network with other small business owners and resource providers (via message boards, online forums and mentoring arrangements); and comarket their product or service with other entrepreneurs (via electronic mini-malls, business directories).

Third, the luckiest of entrepreneurs locate their start-up in a business and technology incubator, where they profit from business assistance services and state-of-the-art technology. Equally important, entrepreneurs gain the advantage of networking with other area entrepreneurs.

This chapter showcases three very different experiences in technology-led entrepreneurial assistance, arising from three small cities (Bethlehem, New Hampshire: Maddock, North Dakota; and, Waushara County, Wisconsin). Two of the case studies target specific groups of entrepreneurs: low-income individuals and women. All three experiences reinforce the importance of coupling online learning with real-time technology training. No matter how much value the novice entrepreneur derives from Web-based programs, he or she also needs hands-on instruction and support.

Bethlehem, New Hampshire [13] (pop. 2,135)

County: Grafton
(UE and PCI data provided for Coos County, which borders Bethlehem and most accurately reflects its economic conditions)
County Unemployment: 5.7%
County Per Capita Income/State Per Capita Income: $24,303/ $31,114
Percentage of Older Population: 21%
Project Timeframe: 1994 to present

Economic Development Strategy:

Spur and support entrepreneurship among low-income rural women through hands-on computer training, peer-to-peer networking and community-building, and Internet-based market development.

Project Summary:

Bethlehem and the surrounding small, rural towns of northern New Hampshire are home to few economic opportunities, even during buoyant economic times. Per capita incomes in the North Country are significantly lower than the state and national averages. Only 18 percent of North Country residents are college graduates, and 72 percent are high school graduates. Bethlehem's location is a further obstacle for opportunity. The town is situated between four mountain notches, with the closest small city (the state capital) 90 miles away. There is no public transportation and 88 percent of the town's residents work elsewhere.

The entrepreneurial path is especially onerous for individuals with limited skills and education, particularly rural women. The Women's Rural Entrepreneurial Network (WREN), located in Bethlehem, was founded in 1994 to provide entrepreneurial support and training to this target group. WREN creates and supports skill-building and networking opportunities, provides resources for personal and business development, enables access to markets, and leads other initiatives that result in greater economic sustainability for the region's rural women.

Today, WREN boasts over 630 members, including 451 individuals who own their own enterprises. The organization's holistic approach to championing women-owned enterprises through a range of technical assistance services—classes, networking, access to capital through peer lending groups and Individual Development Accounts (IDAs), and technology access—has changed the economic culture of the region. WREN's success stems from its long-standing experience and wisdom in bringing rural women together, known as "community building."

WREN operates a friendly, well-equipped technology center offering a range of technology-related instruction (several levels) and hands-on assistance. It manages an interactive, online community, at www.wrencommunity.org, that encourages members to share events, experiences, and resources through message boards, online forums, and community calendars. WREN also coordinates an online "mini-mall", at www.shopthewrens.com, that features a 200-member business directory and jointly markets the products and services of 30 rural vendors;

[13]See footnote explanation on page 15.

Bethlehem, New Hampshire (cont.)

Benefits:

- Trained more than 540 participants in 152 workshops (of various types and levels) since opening the WREN Technology Center in July 2000. Approximately 350 individuals use Tech Center resources on a regular basis.
- Assisted approximately 450 WREN members in owning their own enterprises.
- Brought about concrete economic changes in the lives of low-income women. For example, a former waitress (grandmother, age 45) was employed at WREN as a VISTA volunteer, took a variety of technology-based classes at WREN as part of her employee benefits, and was then hired by the organization as a part-time IT manager. She now serves as an advanced IT manager and is getting an Associates Degree at the local community college. She shares her story with others who come to the Tech Center, insecure in their ability to gain technological skills.
- Stretched WREN's expertise beyond its geographic borders through its Web site, averaging 1,100 visitors per month.
- Draws new people to WREN and its many programs by offering the Center's free access to the wider community as the point of entry into the organization.

Keys to Success:

- Emphasis on "community" and "exchange" as the core of WREN's work, resulting in empowering experiences and cross-learning among women of differing economic classes, educational experiences, age, and technology and business know-how. WREN is not so much a provider of services, but a network builder that pools resources, expertise, and connections. WREN's Technology Affinity Group, a half dozen women working in the technology field, offer one another support, expertise, and networking opportunities. Many barter services with one another as a way to reduce their costs of operation.
- Use of inventive cost-sharing and networking strategies, such as the www.shopthewrens.com online "mini-mall."
- Individual technology training classes are limited to five students, so that non-threatening, hands-on learning and followup support are readily available.
- Outcomes-driven approach to training, so that participants conclude each class with three tangible outcomes: (1) a concrete product, such as a business card; (2) a new skill; and (3) a network established with other similarly situated women. All classes are evaluated by participants and WREN solicits other feedback via e-mail.
- Sharing the "lessons learned" from WREN's retail store operation and on-line store helps members who might operate their own retail establishments.
- Willingness to rethink how entrepreneurs can best learn online. When WREN launched its Online Forums in 2000, there was just one Forum for all. No one participated, probably because the topic was overly broad. Now WREN is organizing targeted Forums around specific needs, populations, types of products or services, etc., and coordinating the Forums with other WREN services (e.g., Tech Center classes and newsletter articles).
- Integrating technology into the overall workings of the organization has been critical to WREN's

Bethlehem, New Hampshire (cont.)

rapid growth in membership, which more than doubled in 2001. Staff have developed and use a variety of technology skills in their work.

Obstacles to Success:

- Lack of high-speed telecommunications services to serve the Tech Center and area businesses and households. WREN is part of the Access to Technology (ACT) Taskforce, working with North Country Connect (an arm of the regional economic development council) to aggregate demand for high-speed services. A contract for services recently secured with Global Crossing (GX, telecommunications carrier) is now in jeopardy because GX filed for Chapter 11 bankruptcy protection in late January 2002. This action is forcing ACT to reassess its strategy for bringing affordable high-speed connectivity to the state's underserved northern three counties and the greater Concord region.
- Less than half of WREN members access online information, and most low-income residents have little access to computer and the Internet. ACT's goal is to set up 12 remote locations throughout northern New Hampshire (libraries, schools, nonprofit organizations, community tech centers) where citizens can use high-speed Internet, receive computer training, etc., much like southern New Hampshire.
- Initial opposition and discomfort with technology experienced by would-be entrepreneurs. Women want help with their businesses, but are frightened by computers and new technology. Forming bonds with other women helps to reduce their anxiety.
- Cost of purchasing and maintaining computers and other technology equipment. Trying to gradually build tech maintenance skills among WREN staff to avoid the high expense of contractual technical support.

Sources of Funds:

U.S. Department of Housing and Urban Development; Ms. Foundation; New Hampshire State Council on the Arts; Northern New Hampshire Foundation; AOL Foundation; Verizon; PC Connection; USDA Rural Development, New Hampshire; The Aspen Institute (FIELD Program); Lafayette Arts Council; Citizens Bank; Mary M. Dumais Memorial Fund; Garnet Hill, Inc.

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Web Sites:

www.wrencommunity.org
www.shopthewrens.com
www.wrencommunity.org/act
(Access to Technology Taskforce)
www.techlinknh.org

Maddock, North Dakota [14] (pop. 526)

County: Benson
County Unemployment: 6.5%
County Per Capita Income/State Per Capita Income: $13,846/ $23,313
Percentage of Older Population: 13.5%
Project Timeframe: 1997 to present

Economic Development Strategy:

Create a multipurpose, shared telecommunications facility for the delivery of business development, childcare, and computer training and education.

Project Summary:

In the words of a Mercury News reporter (October 2000), tiny Maddock sits in "America's Great Forgotten Middle," a region getting more desolate all the time, as one farming town after another fades away. Maddock seemed well on its way to extinction in 1989, when out-migration reduced the community from 750 residents to just 559.

But now Maddock is charting a different course. The energy for Maddock's new direction comes from the Maddock Economic Development Corporation (MEDC), a volunteer, nonprofit organization of 10 to 15 civic-minded individuals. In the winter of 1997, when it became possible to access the Internet via a local phone call, MEDC pro bono head Bruce Terpening and other cheerleaders started thinking out of the box. Terpening envisioned a multipurpose technology center that would gather all of Maddock's economic development efforts under one roof—a high-technology facility in the downtown to serve local schools, businesses, and health care providers.

The Maddock Business and Technology Center (MBTC) opened in May 1999, bringing a new ray of hope and opportunity to town. The 12,000-square-foot Center is owned by the city and managed by the MEDC. It is a shared telecommunications facility for the delivery of business development, childcare, and computer training and education to Benson County and area residents, including the Spirit Lake Indian Reservation.

Among the services and facilities provided by the Center are high-speed telecommunications with data and voice connections; fax, copier and high-speed color laser printer; computer lab (also open to the public); and administrative support. The MBTC was built with over $750,000 in local, regional, state, and federal funds, from public and private sources, plus countless hours of in-kind volunteer time. It is now self-sufficient, drawing enough rent from its tenants to pay $2,350 in debt service each month, plus $1,650 in operating expenses.

To establish the Business and Technology Center, the MEDC spent months and months directing many efforts: (1) hosted an extended series of Saturday morning "coffee meetings," getting input from Maddock residents of all ages and experiences; (2) established several citizen committees to plan various aspects of the Center; and (3) explained the MBTC concept to the local telecommunications provider, area business owners, and prospective funders (state and federal).

[14]See footnote explanation on page 15.

Maddock, North Dakota (cont.)

Today, five businesses new to Maddock, or new entirely, operate out of the Center's business incubator. Two high-tech businesses include Agri ImaGIS, a leading provider of Web-based satellite imagery products for agriculture in North America, and Homelink Televoice, a provider of high-speed wireless service that began serving the Maddock area in July 2001. It is expected that all five companies will transfer out the incubator into commercial space when they no longer need discounted rental and business assistance services.

Maddock's thirst for technology has even engaged the local pharmacist, who is crafting a virtual pharmacy service for outlying towns. He recently received a $50,000 grant from Blue Cross Blue Shield and is partnering with Rolette, a tiny town north of Maddock that cannot independently support a pharmacy.

Benefits:

- Spurred business growth producing 53 jobs for Maddock area residents.
- Ignited and spread a new sense of hope. Soon after the Center opened in May 1999, Hometown Grocery, the community's only food store, closed shop. When it reopened under new ownership several months later, most people credited the Center. Had it not been for this new energy, probably no one would have purchased the grocery and Maddock itself might have disappeared, along with so many North Dakota towns.
- Established the town's first licensed private childcare center, along with two federally subsidized Head Start programs.
- Received a $202,000 Economic Development Administration grant for technology infrastructure. Maddock purchased 10 high-speed modems to conduct a test bed wireless operation with 10 local businesses.
- The EDA grant stirred Homelink Televoice to bring a high-speed wireless telecommunications to Maddock. Homelink will compete with the local telephone company, a recent provider of DSL service. Local leaders strongly believe that none of these innovations would have transpired without the Center.
- Inspired the local pharmacist to explore e-commerce applications in his own business. In fact, the pharmacist, a newcomer to town, opened his shop in Maddock only after construction began on the Business and Technology Center. Seeing the community's commitment to build a new economic future convinced him to purchase the closed pharmacy and make a personal investment in Maddock.

Keys to Success:

- Willingness to think out of the box and take risks. Despite continued out-migration and a declining agricultural economy, Maddock's leaders took a bold stand and tried something entirely different.
- Resourceful and collaborative approach to designing, financing, and operating the Business and Technology Center, so that a multitude of individuals, organizations, and agencies had a stake in the Center's success.
- Unrelenting focus on building community support for the project, even if that meant explaining the

Maddock, North Dakota (cont.)

concept over and over again.
- Strategic discussions with prospective funders who referred Maddock to additional financing sources.

Obstacles to Success:
- Nagging work force issues, including the large number of underemployed people in the Maddock area. Also, a "chicken or the egg" problem: the region needs people with strong technical skills in order to attract businesses paying decent wages, but workers will not train for and develop those skills without the likely prospect of more advanced employment.
- Maddock's plans for implementing telemedicine applications (so needed in a remote rural area) are hampered by the complexity of multiple users and providers. The local telecommunications infrastructure is in place, but connecting points at the other end (the medical institutions) are not well established. Also, there must be sufficient critical mass to generate an income stream.

Sources of Funds:

City of Maddock; Maddock Economic Development Corporation; USDA Rural Development; State of North Dakota

Local Contacts:

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lauraevery@hotmail.com

Web Sites:

www.maddock.org
www.satshot.com (Agri ImaGIS)
www.conac.org

One of Maddock Business and Technology Center's most technologically-advanced tenants is Agri ImaGIS, a leading provider of Web-based satellite imagery data for agriculture in North America. Farmers use this data to customize their fertilization, pesticide spraying and irrigation methods.

Waushara County, Wisconsin [15] (pop. 21,824)

County Unemployment: 5.2%
County Per Capita Income/State Per Capita Income: $19,309/ $27,390
Percentage of Older Population: 31.5%
Project Timeframe: 1999 to present

Economic Development Strategy:

Deliver affordable, state-of-the-art business technical assistance to low-income, rural entrepreneurs through a combination of in-person and innovative electronic-based programs. These online resources are designed to jump-start and enhance business assistance services provided one-on-one.

Project Summary:

Located in rural central Wisconsin, Waushara County is characterized by persistent poverty, economic stagnation, and high seasonal unemployment. While the region has good recreational amenities, there is only one private business with a work force in excess of 200. The largest community has only 1,300 people and there is no hospital anywhere in the county. Until recently, individuals seeking technical assistance to start or expand a business had to travel 40–60 miles to the closest Small Business Development Center. These deficiencies hinder the county's growth potential

CAP Services, Inc. is the locally designated nonprofit community action agency (CAA) and community development corporation (CDC), with offices in Wautoma, the county seat. Since 1988 CAP Services' Job and Business Development Department has provided pre- and post-start-up technical assistance to low-income entrepreneurs in Waushara and four other central rural Wisconsin counties. As the county's only provider of free, one-on-one small business technical assistance, CAP became a victim of its own success as more entrepreneurs have returned for post-start-up technical assistance every year. Since 1997, CAP's entrepreneurial assistance staff has been overwhelmed with requests.

To address this issue, CAP developed an Internet-based service designed to supplement the organization's one-on-one support by addressing the questions most frequently asked by low-income entrepreneurs. In November 1999, CAP launched the CAP Virtual Business Incubator (VBI) Project, a Web-based free, innovative on-line technical assistance service that operates in tandem with CAP's one-on-one assistance programs. In 2000, the VBI Project was named recipient of the Governor's Award for Outstanding Community Action Program. The Project's electronic resources are now used throughout the state by other agencies that operate low-income self-employment programs and are available on-line through every Job Center in Wisconsin .

The **VBI Site**, at www.virtualincubate.com, is a one-stop Web resource offering free, comprehensive business start-up and expansion information 24 hours a day. Potential entrepreneurs can find up-to-date guidance on accounting (business expenses, financial statements, method of accounting, tax liabilities); banking (banking tips, glossary of banking terms); business tools (business plan, marketing plan, common sales mistakes, home office guidelines, insurance calculator); insurance (managing risk, identifying loss exposure, insurance options); and legal issues (business structures, contracts and collections, employment

[15] See footnote explanation on page 15.

Waushara County, Wisconsin (cont.)

issues). The VBI Site also includes a search function, stories of successful entrepreneurs (assisted by VBI), a help menu, links to a myriad of helpful organizations and agencies, and e-mail to the VBI webmaster.

The **Entrepreneur's Exchange**, located at www.capbizchat.com, is a Web-based chat function that facilitates information exchange among entrepreneurs and small business experts. Chats are organized around such topics as credit (with advice from the Wisconsin Department of Financial Institutions), taxes (with electronic filing info from the IRS), business planning (with help from the University of Stevens Point Small Business Development Center), and state resources for small businesses (with guidance from the Wisconsin Department of Commerce). Any interested person can actively participate in the online discussion. A related effort, the **Business Mentoring Program** pairs experienced business owners with new entrepreneurs, and spreads personalized business advice via electronic communication.

The **TechSource Center**, opened in CAP's Wautoma office in 2001 is a full-service technology and resource center for entrepreneurs. It offers four computer work stations with high-speed, T-1 Internet access (rarely available elsewhere in the county) and the most up-to-date software programs. Entrepreneurs receive hands-on instruction in using computers and the Internet for research, e-commerce, and other business information.

The **Computer Purchase Program** offers low-income entrepreneurs no-interest loans to purchase computer hardware and software, along with free hands-on training. To qualify for the Program, entrepreneurs must (1) be within CAP's five-county service area; (2) have an approved business plan; and (3) receive Temporary Aid to Needy Families (TANF) benefits or be earning below 150 percent of the federal poverty guidelines.

Benefits:

- During 2001, CAP facilitated the development of 22 new businesses and the creation of 37 new jobs within CAP's five-county service area. All of the jobs created provided living wages ($8 per hour) with an average hourly rate of $9.92. Twenty percent of the new jobs offered health benefits. Nearly all of the new positions were made available to individuals previously earning below 150 percent of the federal poverty guidelines.
- Jump-started the business start-up process of would-be entrepreneurs by providing a free, constantly accessible, value-added enhancement to CAP's one-on-one technical assistance.
- Produced dramatic changes in the lives of low-income individuals. Among the many stories of successful entrepreneurs are Scott Langer, a former welder (disabled on the job) started his own health care transportation company, a service very much in demand in a rural area, and recently opened two group homes for disabled individuals, and Allyce Lees, who worked for other people all her life, but now owns her own paint store and was recently asked to serve on the manufacturer's national advisory committee. Her Web site has been cited in company newsletters for its inventive use of her dog (with a paint brush in his mouth) to announce new products and sales.
- Responding to a renewed interest in entrepreneurship, in response to the events of September 11 and the overall economic downturn, CAP is seeing an influx in semi-skilled workers who recently lost their jobs and don't want to be reliant on declining industries. The last big push for entrepreneurship was in the mid-1980s during the slow postrecession recovery.

Waushara County, Wisconsin (cont.)

Keys to Success:

- Incremental (two year) approach to developing the VBI with annual evaluation of site and revision as appropriate. CAP took a series of incremental steps in analyzing entrepreneurs' needs, identifying resources, finding a firm that could design the VBI Site, etc. A "go slow" approach also allowed CAP to develop other program options as needs were identified. For example, the Computer Purchase Program was started after several entrepreneurs identified a lack of access to computers. CAP seeks regular feedback from practitioners (resource providers) and clients (low-income entrepreneurs) through an annual questionnaire. The questionnaire identifies problems, needed revisions, etc. and has resulted in retooling portions of the Site.
- Involvement, commitment, feedback, and quality control from a key group of government and corporate partners specializing in small business and entrepreneurship issues. Each partner agreed to apply their in-house resources to support the VBI Project on a long-term basis by providing high-quality content, quarterly updates, expert hosts for Bizchats, and more. One example was the development of a list of Frequently Asked Accounting Questions, working with a certified public accountant to draft answers, and adding them to the VBI.
- Designing the project with replicability in mind, so the VBI can be easily adapted to other states. The "skeletons" of both the VBI Site and Entrepreneur's Exchange, including all nonproprietary programming and content, can be purchased from CAP on a cost-recovery basis.
- Developing the TechSource Center when a number of entrepreneurs identified a need for hands-on assistance in learning how to use a computer and how to incorporate it into their business operations.

Obstacles to Success:

- CAP Services had strong know-how in job and business development, but technology (e.g., Web site development) was uncharted territory. The organization had to hire a technology specialist to build its technical capacity.
- Many low-income entrepreneurs are uncomfortable with new technology. That is why the TechSource Center became an integral component of the VBI Project.
- Securing funds to continually update and maintain the VBI. The Project's partners (especially corporate sponsors) have provided tremendous pro bono assistance. The Site's technical maintenance is expensive, but CAP has been able to secure funding for this from the state.
- Recruiting experienced mentors for the Business Mentoring Program. CAP had hoped to assemble 30 mentor/beginner pairs, but while sufficient mentors have been found, there has been some difficulty in finding enough willing proteges. The matches established thus far have been very successful.
- Generating sufficient participation in the Entrepreneur's Exchange chats. Most chats average seven participants, which is disappointing. In an effort to recruit more participants, the VBI has set up a Q&A bulletin board and is marketing the service more extensively.

Sources of Funds:

U.S. Office of Community Services; Wisconsin Department of Workforce Development.

Waushara County, Wisconsin (cont.)

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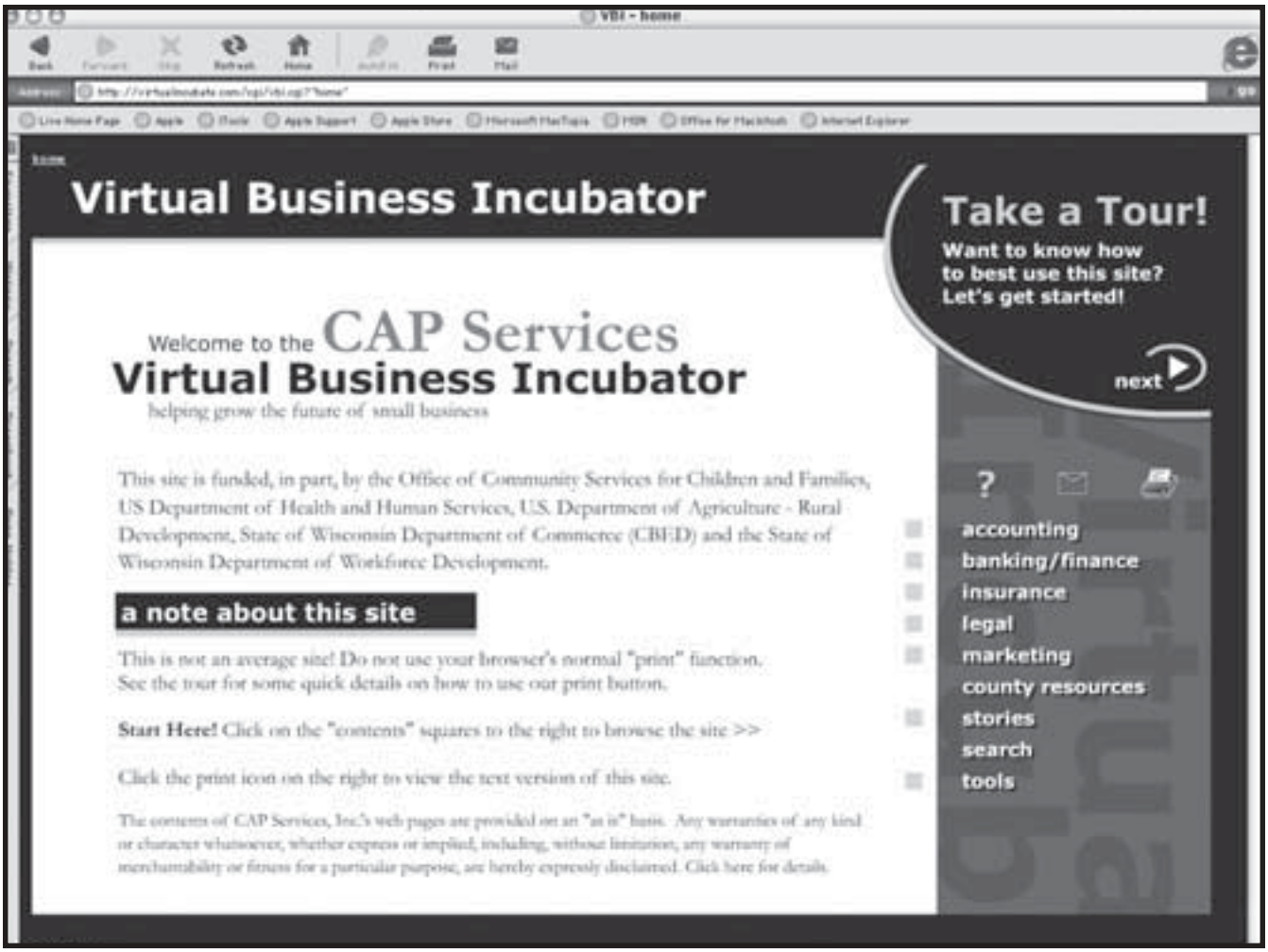
Web Sites:

www.virtualincubate.com
(VBI Site)
www.capbizchat.com
(Entrepreneur's Exchange, Links to other small business development resources)
www.capserv.org
(CAP Services, Inc.)



The CAP Virtual Business Incubator (www.virtualincubate.com) is a one-stop Web resource offering free, comprehensive business start-up and expansion information 24 hours a day. Potential entrepreneurs can find up-to-date guidance on accounting, banking, business tools, insurance, and legal issues. The site also includes a search function, stories of successful entrepreneurs, a help menu, links to a myriad of helpful organizations and agencies, and e-mail to the VBI webmaster.

Appendix

Technology and Economic Development-Related Web Sites

Presented below is a selected listing of Web sites of government agencies and nonprofit organizations engaged in technology and economic development. These sites are portals to a wealth of data and resources, usually at no cost to the user. Visit these sites to access demographic data, notices of funding availability, research reports, conference proceedings (often including Powerpoint presentations), case-study databases (e.g., NCSC's *Thriving Hometowns Network*), and other practical tools. Many of the 14 case-study communities received funding or technical support from these agencies and organizations.

Use a search engine to locate the Web sites of agencies and organizations not listed below. Examples of popular search engines are www.yahoo.com, www.lycos, and www.google.com

Federal Government

Appalachian Regional Commission
http://www.arc.gov

Center for Study of Rural America, Federal Reserve Bank of Kansas City
http://www.kc.frb.org

Federal Communications Commission
http://www.fcc.gov

U.S. Department of Agriculture (USDA), Rural Development Programs
http://www.rurdev.usda.gov

USDA, Rural Information Center
http://www.nal.usda.gov/ric

U.S. Department of Commerce, U.S. Census Bureau
http://www.census.gov

U.S. Department of Commerce, Economic Development Administration
http://www.doc.gov/eda

U.S. Department of Commerce, National Telecommunications and Information Administration
http://www.ntia.doc.gov

U.S. Small Business Administration
http://www.sba.gov

Organizations and Associations

Alliance for Public Technology
http://www.apt.org

American Telemedicine Association
http://www.atmeda.org

Computer Systems Policy Project
http://www.cspp.org

Digital Divide Network
http://www.digitaldividenetwork.org

International Economic Development Council (formerly CUED and AEDC)
http://www.iedconline.org

National Association of Counties
http://www.naco.org

National Association of Development Organizations
http://www.nado.org

National Association of Regional Councils
http://www.narc.org

National Association of Towns and Townships
http://www.natat.org

National Business Incubation Association
http://www.nbia.org

National Center for Small Communities
http://www.smallcommunities.org

National Commission on Entrepreneurship
http://www.ncoe.org

National League of Cities
http://www.nlc.org

National Rural Electric Cooperative Association
http://www.nreca.org

National Telecommunications Cooperative Association
http://www.ntca.org

National Main Street Center
http://www.mainst.org

Public Technology Incorporated
http://pti.nw.dc.us

Rural School and Community Trust
http://www.ruraledu.org

Thriving Hometowns Network
http://www.smallcommunities.org
(click on NCSC)

"Serving Small Town America for Over a Decade"

The National Center for Small Communities (NCSC) is the only national, non-profit research and technical assistance organization devoted exclusively to serving the leaders of America's small communities. The mission of the National Center for Small Communities (NCSC) is to provide the elected and appointed public officials of America's small communities with tools to govern effectively. The Center envisions a future where public officials of small communities have the skills and resources to

- draw upon strengths and talents of the diverse members of their communities to solve local problems;
- expand local economies while preserving community character;
- protect local natural resources for future generations; and
- protect the health and welfare of their citizens.

The National Center for Small Communities, 444 North Capitol Street, NW, Suite 397, Washington, DC 20001
phone: (202) 624-3550 fax: (202) 624-3554 (fax) www.smallcommunities.org