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ABSTRACT

Rural communities have long experienced an outmigration of talented people to urban areas for better employment opportunities. The traditional rural economic model, especially prevalent in Appalachia and the rural South, involves outside capital promoting industrial development separated from community needs and culture. This, at worst, is exploitative and, at best, keeps the local economy less diverse and dependent on those outside the community. Globalization has resulted in low-wage, low-skill industrial jobs going abroad, further hurting rural economies. Access to telecommunications technologies and the Internet affords a variety of alternatives to traditional employment situations in geographically rural and minimally populated regions. The least distributed solution to employment opportunities in rural areas is the establishment of local technology centers, to which groups of workers telecommute to perform contracted work for companies located elsewhere. Individual telecommuting is more widespread--companies realize tremendous cost reductions through employee telecommuting, and telecommunications is also an advantage to self-employed rural artisans. For telework to succeed in rural areas, companies must provide training and a supportive climate in which to undertake such radical change. Several examples are given of initiatives for stimulating job growth in rural communities in Europe, Kentucky, Tennessee, Virginia, West Virginia, and Pennsylvania. These examples demonstrate that efforts to develop rural economies cannot be successful without involving community development as well. (Contains 33 references.) (TD)

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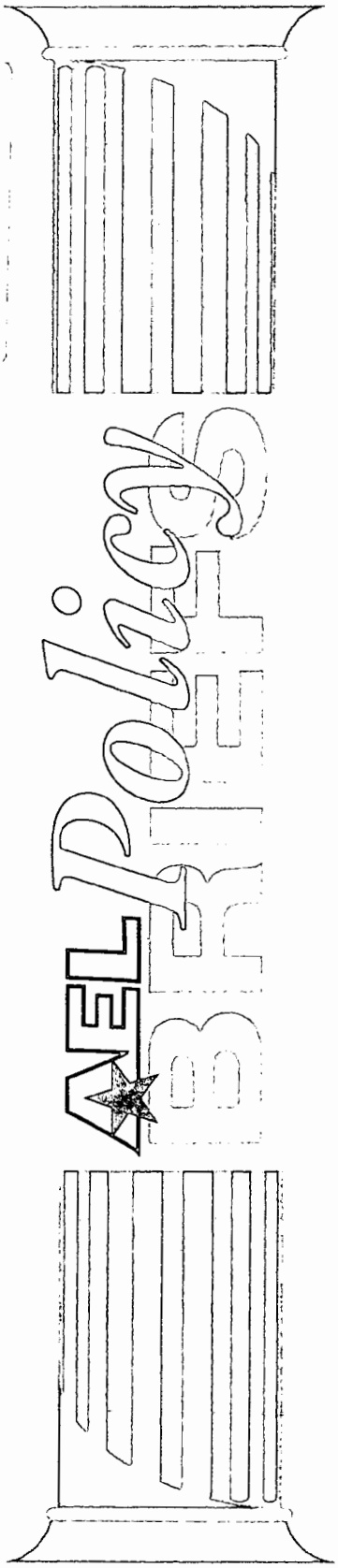

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Information Technologies

Do They Have the Potential to Bring Change to U.S. Rural Areas?

Rural America, particularly the rural South, has been misunderstood, drained of critical human resources, and largely excluded from America's prosperity. One of the biggest misunderstandings is the notion of rural America as an agricultural region. In fact, as of 1991, of the 25 million households classified as rural, only 1.6 million of these were actually farming households. An estimated 93 percent of rural American households are *not* employed in farming (Lindsey, 1995) and moreover, most rural Americans do not even *live* on farms. The trend has been for rural populations to increase as farm households have plummeted. While the number of people living on farms has decreased by 20 million persons over the last century, rural populations, like the national population, have increased by a factor of four (Meyer, 1993). America's farmers have moved to small towns. For most of those who remain in farming, the majority of their income comes from employment off the farm.

At the beginning of the 1990s, 23 percent of all rural counties reported high levels of poverty compared to 4 percent of metropolitan counties. That rural poverty was "less event specific" (like death or illness of the primary earner) and "more related to long established factors such as limited employment opportunities in the local economy" (Beale, 1993). The generally stagnant quality to most work in rural areas was apparent whether talking about the Rio Grande Valley or rural Georgian counties (Falk & Lyson, 1989, p. xiii).

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What then, do people in rural areas—particularly rural Southern areas—do to earn a living? As the South developed in the 1960s and 70s, the answer to the question of employment (and development) was manufacturing jobs, particularly low-wage, labor-intensive jobs such as textiles, wood products, leather goods, shoes, etc., which comprised 40 percent of the rural employment in 1983 compared to 19 percent for the United States as a whole (U.S. Bureau of Economic Analysis, 1985 as cited in Brown & Deavers, 1989). These industries put the rural South in the forefront of the national trend: Exposure to the larger world economy. Rural jobs have become to a large extent dependent upon export sales (Lindsey, 1995). As these low-wage, labor-intensive jobs have moved abroad, the rural South has suffered disproportionately. Worse, the rate of loss of such blue collar jobs to foreign competition appears to be accelerating (Barfield & Beaulieu, 1999), and recent trade agreements can be expected to accelerate the loss of such jobs even more. The loss of these jobs, combined with the well documented financial stress from foreign trade and large agribusiness on the remaining small family farms that do exist in rural areas, results in the outward migration of many of the best and brightest—a "brain drain."

The term first surfaced among economists at the University of Chicago during the early 1960s, particularly by Harry G. Johnson (1965), and it was grounded in the earlier work of Thomas (1958). The concept is relatively simple: Certain factors cause many of the most capable individuals to migrate from certain geographic areas towards others. A large brain drain occurred from western Europe toward the United States in several waves beginning in the late 1930s with an increase wave in the mid-1960s, when the United States had active, large-scale programs in space and weapons as well as increased funding for basic research in physics, chemistry, and medicine (Adams, 1968).

The exact effects or costs of brain drain are difficult to measure but as Grubel and Scott (1977) put it:

> Whenever a country loses a productive inhabitant through emigration the total value of the nation's output, its military and economic powers are reduced. Any person, therefore, who considers these magnitudes to be relevant targets of social and economic policies, judges the emigration of highly skilled and productive persons to be an unmitigated loss. (p. 27)

It has been argued that, at the state level, brain drain effects can be overestimated, but even the most optimistic scenarios concede losses from some states. Raymond, for example, in his 1972 work *The Myth of the Appalachian Brain Drain* showed that many of the economic costs attributed to a brain drain were actually a financial "wash" (although by no means all). He demonstrated that in one state more than half of the students with the highest SAT scores and the highest college grade-point averages stayed in the state. However, students remaining in a state does not mean that once they graduate they return to their home counties; in fact, it is likely that many of those from rural counties resettle into more urban areas. This intrastate brain drain is well documented in some places and research indicates that, when urban areas offer better returns for education, recent graduates migrate to such areas. This within-state migration is particularly acute during local economic downturns (Renkow, 1995a). This notion of receiving better "returns" for educational investment (and achievement) in metropolitan areas implicates the education system in the brain drain problem. The belief is that students who are better prepared by their local schools are more likely to leave rural areas for increased opportunity, particularly when the economy is down. Interestingly, the education system is again implicated in the goal of preparing students to go away from home to college. In the past, one of the key factors that kept people from leaving their home

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to migrate to another country, state, or region was the "psychic cost" of relocating to a different culture (Grubel & Scott, 1977). Going away to college often shows many young people that moving to a new culture is far from traumatic, that is, the psychic cost is not so high.

Traditional Solutions

Rural Economic Development

"For many rural localities in the United States, the best answer to economic deficits is industrial development, as it has been over the past several decades, although there is good reason to believe manufacturing will not be the type of industry to support rural development in the future" (Summers, 1986).

Since the 1930s, Southern states have competed vigorously for industrial development. In her study of one Southern state, Georgia, Colclough (1989) found a success story in terms of industrial growth (Georgia ranked fourth in this regard out of 13 Southern states between 1969 and 1976), but demonstrated an unevenness in job quality between rural and metropolitan areas. From the Civil War until the 1970s, the South experienced a steady stream of out migration peaking around World War II particularly among minorities. During the 70s, due to economic growth, this trend reversed (Bluestone & Harrison, 1982). (Although some have argued [see for example Malizia, 1978] that part of the reason that economic disparity was reduced between the South and the rest of the United States was the out-migration of the poor and the in migration of wealthier, better educated citizens.) In urban areas of Georgia, such as Atlanta and Columbus, Colclough found diversified manufacturing industry including metal and metal fabricating; food processing; and the manufacture and fabrication of rubber, plastics, clay, stone, glass, and concrete products. In rural counties, she found that manufacturers tended to focus on single, low-wage industries such as textiles (with mostly a female workforce), paper, and food processing (largely poultry operations). She found several rural counties that had actually de-industrialized, largely as a result of textile closings brought about by foreign competition (see also, Barfield & Beaulieu, 1999). Overall, Colclough found large inequities between the average wages in the rural versus urban industry, as well as less diverse and less environmentally friendly industries (e.g., poultry processing, "hog bogs", etc.) in nonmetro areas.

Such efforts at industrial development have worked in the past but likely won't in the future (Summers, 1986). In fact, they have never really worked for very long. The industries attracted to rural areas have tended to be low wage (Horan & Tolbert, 1984), slow growth, and one dimensional. Because they are low wage and labor intensive, they are vulnerable to foreign competition. Because they are slow growth, they tend to require replacement workers only, and because rural industry tends to be less diverse, a down turn in a single industry (such as textiles or shoes) can devastate a local, rural economy (Renkow, 1995a). From a more radical perspective, ties to the larger economy can be perceived as a means of exploitation of rural labor forces and as sources of community dependency (Howes & Markasen, 1981).

Such efforts at [rural] industrial development have worked in the past but likely won't in the future.

The latest efforts at economic development promise little more. A recent study for the Department of Agriculture (Barfield & Beaulieu, 1999) predicts that over the next 25 years, the top 20 new jobs in the rural South will be low-wage: Four of these—waiters/waitresses, child care workers, cashiers, and food preparation workers—will pay less than $15,000 per year, and half the new jobs will pay under $20,000 per year (yearly income averages are based on 1997 data). Only three of the top 20 will average more than $30,000 per year. Worse, three-fourths of the top 20 will likely not be full time, so even these low-wage projections are likely high.

Moreover, more than half of the top 20 new jobs are in areas where the unemployment rates are rated as either high or very high. Most of the new jobs will require only short, on-the-job training. It is anticipated that "the occupations which are expected to realize the largest number of job openings in the South are those that require skills that can be captured in less than a single month of on-the-job training" (Barfield & Beaulieu, 1999, p. 12). Relatively new industries to the rural South, once again fiercely sought after and ultimately attracted by rural areas, have been low-wage services such as jobs in large retail; prisons; and telephone-based services such as telemarketing, debt collection, and customer service.

Many of the new jobs will rely on what Lindsey (1995) sees as the backbone of Southern rural economy, the three R's of residence, retirement, and recreation. These three sectors have been a factor in rural economic development and will continue to be important in the foreseeable future. The link between the three R's and many of the low-wage jobs expecting growth in the future of the rural South is clear: cashiers, retail salespersons, waiters and waitresses, janitors and cleaners (including housekeeping), nursing aides (including orderlies and attendants), guards, child-care workers, home health aides, receptionists and information clerks, food preparation workers and teachers' aides (Barfield & Beaulieu, 1999).

In summary, given where the largest numerical gains in jobs are expected to occur, many Southerners, by 2005, will be engaged in work that requires little education, pays poorly, is part time, and places the individual at risk of frequent unemployment spells. In fact, most of the "top 20" occupations will not provide job holders with the necessary means to easily support themselves or their family (Barfield & Beaulieu, 1999, p. 13).

The South's metropolitan areas are projected to continue their "boom" (MDC, Inc., 1996). Urban areas are attracting employers who are seeking highly skilled and educated workers (Barfield & Beaulieu, 1999). With its historical reliance on low-skill employment however, the rural South has been severely hurt by declines in goods-producing industries (MDC, Inc., 1996).

Community Development

While the exodus of young professionals to metropolitan areas is prompted by the necessity of employment and career development, the desire to inhabit more remote areas remains strong. Urban lifestyles with congested traffic, higher taxes, and rising crime rates offer a less-than-appealing environment for living, especially for citizens who originate from rural regions. While the depletion of jobs in rural areas and the migration of educated professionals to urban centers may present a grim economic and social environment for nonmetro communities, solutions to these trends are possible through strategic and innovative community development efforts. Probably the "poster town" for community and economic development in the rural South is Tupelo, Mississippi. Arguably more widely known as the birthplace of Elvis, Tupelo was a poor town in a poor state in 1936 when a devastating tornado destroyed 48 city blocks and killed 200 of its 7,000 citizens (350 were injured). As documented by Grisham (1999), the publisher of the *Tupelo Daily Journal*, George McLean, led a group of local leaders in rebuilding not only the town, but the surrounding 15 counties as well. Realizing that something more than agriculture was needed to ensure economic strength and stability, the group formulated the Tupelo Plan that led to the formation of the Community Development Foundation. The foundation relied on community involvement and a series of 10-year plans that built (and owned) industrial parks with diversified businesses. More than 50 of the Fortune 500 companies have facilities in the region and generate over 1,000 new jobs each year. The

Probably the "poster town" for community and economic development in the rural South is Tupelo, Mississippi.

success of this effort is a direct result of community buy-in and strategic decision making in the interest of the local region.

Wilkinson (1989) states that "community development requires that at least a minimum threshold be attained in the ability of a local population to meet its daily needs within a local territory" (p. 249). While Wilkinson goes on to emphasize that local labor markets must be developed in rural areas, Kaufman (1970) warns that rural development that does not start with jobs and income *does not start*, but rural development that stops with jobs and income *stops*. Efforts to facilitate new jobs in rural areas must do so in a way that is environmentally unobtrusive and socially ethical. Traditional rural development activities focused on the establishment of businesses that built local dependencies on production that was inevitably affected by cheaper labor in other countries. The major loss of low-skilled industrial positions, combined with the absence of jobs for more highly-trained, better-educated individuals, has left a void in rural communities. Fortunately, however, a source of local capacity-building and new opportunities for rural development can be found in the power of information-age technologies.

Access to [telecommunications] services affords a variety of alternatives to traditional employment situations . . .

Expanded Opportunities

Telecommunications

While using advanced telecommunications to address long-entrenched economic and social issues in remote regions may seem like a new trend, the concept has really been explored for more than a decade. The first attempts at technology-mediated work programs originated in Scandanavia in the mid-1980s through the establishment of "telecottages," which offered educational experiences for local residents, as well as access to telecommuting employment opportunities. Programs in Western Australia, England, and Finland successfully experimented with similar telecenters that provided geographically removed areas access to networked computing equipment and training programs, so that local citizens could acquire new skills and explore a variety of alternative career possibilities (Crellin, 1994; Huws, 1997).

Telecommunications technologies are revolutionizing the way Americans work (Wolff, 1998). Lindsey (1995) states that the impact of telecommunications on rural communities will offer positive, powerful, and long-reaching opportunities. West Virginia serves as a primary example of the benefits of investing in telecommunications technologies. Its state-of-the-art networking infrastructure has allowed major corporations to move "back office" operations to nonmetropolitan regions, dissolving geographic barriers through the provision of employment opportunities across a variety of skill levels (Casto, 1992).

The recent proliferation of the Internet has made connectivity a standard component of everyday life in America (and globally). Although data communications can occur at reasonable speeds over existing phone lines, technologies are rapidly advancing to offer higher speed connections that allow for faster data transfer directly to the home. Access to such services affords a variety of alternatives to traditional employment situations, not to mention the opportunities it presents to geographically rural and minimally populated regions.

Localized Centers

The least distributed solution toward facilitating employment opportunities in rural areas is the establishment of local technology centers, much like those cited in the international community. Such centers could be based on a variety of sponsoring agencies. One approach would be the creation of a branch office of a singular corporate entity. Additionally, a technology center could be founded by a local town or region. County or state governments could appropriate funding at fairly minimal costs to provide equipment, connectivity, and coordinating

personnel for such an endeavor. Another possibility would be a combined public-private partnership that would establish a community technology center with computer access and job preparation for "telework" from a central location or from an individual's home. Local workforce development would be targeted through the provision of a regionally-based technology center, to which groups of workers telecommute to perform contracted work for technology companies geographically located elsewhere. Training to prepare local citizens to engage in networked employment would be provided by the partnership. It would seem that this combined effort of public and private investments would offer the most advantages for both groups of participants—rural communities gain employment opportunities for local citizens, while metropolitan companies acquire a dedicated workforce at probably a lesser expense than expansion in urban areas.

Telecommuting has the potential to address out-migration of students from rural communities.

Individual Telework

Individualized telecommuting is representative of the most distributed type of employment environment. Telework is possible from literally anywhere one has access to a computer, a modem, and a telephone line (real or virtual, through wireless communications). Telecommuting has been embraced by a broad spectrum of organizations, from large to small corporations, and both public and private sectors. Apgar (1998) and Hequet (1994) identify companies from few employees, such as Steelcase, Inc., seller of home office furnishings for telecommuters, to large Fortune 500 companies such as AT&T, IBM, and Lucent Technologies, that have made the commitment to distributed work models. Additionally, Hequet provides an example of local government endorsement in Oakland, California, in an effort to reduce air pollution through the reduction of commuter traffic. Not only can this form of work accommodate a never-ending array of job types and skill requirements, telecommuting has demonstrated advantages in terms of increased productivity over 16 percent greater than office-based employees (Hequet, 1994, Piskurich, 1996). Companies incur tremendous cost reductions when allowing employees to telecommute (Apgar, 1998). Larger companies have saved hundreds of millions of dollars in location-based employment expenses through the implementation of telecommuting programs.

Telecommuting has the potential to address out-migration of students from rural communities. Virtual internships would allow college students (undergraduate or graduate) to work from rural communities while gaining valuable work experience with employers of unlimited type or location. Such arrangements would allow prospective employers to evaluate the performance of a potential hire while acquiring skilled assistance at a reduced expense. For example, students seek experience in working with real clients to manage authentic projects. They can communicate real-time with their faculty contacts across the state by using low-cost solutions like Internet-based videoconferencing, and also asynchronously through e-mail or threaded discussions organized by topic. This cooperative endeavor not only provides much-needed training for the students, but also opens the door for future employment opportunities with internship organizations.

Telecommuting also has the power to create job opportunities for individuals who have lost employment to international competition. Through retraining efforts, this group of potential employees can undertake a broad range of tasks and services. Piskurich (1996) contends that telecommuting can be conducted in almost any imaginable area. The key to success in developing a rural workforce to engage in alternative work environments such as telecommuting is a well-designed training effort (Apgar, 1998), either conducted by the employing organization or commissioned by the local community or region. Huws (1997) describes telework as an

integral approach to rural job development in Finland. Such international programs could serve as models for U.S. community development efforts.

Sales and Marketing of Local Goods

Telecommunications can also be an advantage to rural citizens who are self-employed in the production of artistic products that are representative of local culture. For example, Appalachian-area hand-made quilts reach new markets through Web-based advertising and purchasing. Instead of relying on business from occasional travelers or craft shows, quilters display their products and take orders online (Renkow, 1995b). The creation of Web-based promotional tools can be relatively simple and inexpensive, and the popularity of shopping on the Internet can be easily leveraged, regardless of geographic location of the goods producer.

Challenges

The technological aspects of creating and implementing distributed work environments are likely the least challenging part of such an approach to employment and community development. Truly the greatest barrier to the adoption of innovative telecommuting strategies are the long-standing cultural norms of the American workplace. For telework to succeed in rural areas, several factors must coincide. First, not everyone is well-suited to work in largely unsupervised situations. The successful telecommuter must be self-motivated, committed, organized, a good planner, work well without direction, flexible, and have strong communication skills (Piskurich, 1996). Individuals must assess whether or not they would be suitable candidates for engaging in employment through telecommunications.

Workforce development training may range from very context specific (i.e., how to be a good distributed worker), to a complete job-skills overhaul, especially for workers who have lost positions that were low wage and labor intensive. To contend that those with limited skill sets and little to no experience with information technologies would succeed as teleworkers may sound like a grandiose assumption. However, previously cited international programs offer strong proof-of-concept. For example, in Finland, a program has provided computing and communications skills specifically for farmers' wives to encourage within-family diversification of skills (Huws, 1997). Because agriculture has suffered the same fate in other countries that it has in the U.S., this re-training opportunity has helped to subsidize rural households that have long depended on farming for income.

Truly the greatest barrier to the adoption of innovative telecommuting strategies are the long-standing cultural norms of the American workplace.

Additionally, if rural workers are to work at a distance, then it is the company's obligation to provide not only training to the prospective employee, but a supportive climate in which to undertake such a radical change in the way that work is conducted (Apgar, 1998; Huws, 1997). A high degree of organizational change may mean training for influential groups, such as the organization's policymakers, top level administrators, and, at the very least, the managers of telecommuters (Apgar, 1998; Hequet, 1994; Piskurich, 1996). While a strong support system is mentioned as the last necessary component of distributed work environments, it is arguably the most important factor to ensure the success of innovations in rural community development through the use of communications technologies.

Regional Look at Innovative Approaches

There is much activity in the Appalachian region in terms of experimenting with information technologies for job growth in rural communities. Several major initiatives are detailed as follows.

The Center for Rural Development

A nonprofit organization funded by federal and state grants, as well as private and, in some cases, individual donations, the center serves a 40-county area of Southern and Eastern Kentucky. Its purpose is to move the region forward by offering a variety of programs including planning, training, cultural events, and telecommunications technology (including teleconferencing and meeting/convention space). The center envisions itself as a high-tech economic catalyst that can be a national model for how rural America can invigorate itself by reversing the decade-old dilemma of brain drain.

In existence for three-and-a-half years, it has delivered 44 training programs to 439 out-of-work coal miners using satellite, ITV, mobile labs, instructor-led video, and traditional classroom study; delivered workforce computer training to 846 classes for 10,153 participants; delivered 57 computer classes to 908 participants in the past year; and conducted computer training for more than 450 youth in areas such as software basics and Web page development. For additional information on the center, visit its web site at http://www.centertech.com.

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Technology 2020

What began as a 17-county area in Eastern Tennessee, Technology 2020 has grown to serve the area extending from Chattanooga to the Tri-Cities, sometimes called the East Tennessee Technology Corridor. Technology 2020 was initiated in 1993 to capitalize on the unique resources of the East Tennessee region: the presence of the Oak Ridge National Laboratory, the University of Tennessee, the headquarters of the Tennessee Valley Authority, and a significant number of both large and small information technology companies. While the regional economy has historically been highly dependent on the federal government, forecasted declines in federal funding and employment in the region prompted regional leaders to develop Technology 2020 as one of several regional economic development strategies designed to lessen the region's dependence on government spending and to create a strong and vibrant private-sector driven information technology industry. Its primary goals are to (1) create an entrepreneurial environment, (2) develop a high-speed information infrastructure, and (3) establish a pipeline of qualified information technology professionals.

The center has been funded primarily by donations from private sources, and partners with the U.S. Department of Energy, BellSouth, Lockheed Martin, the State of Tennessee, the Appalachian Regional Commission, Motorola, U.S. Internet, and Brooks Fiber.

Technology 2020 has established the Technology Business Alliance, which promotes the growth of technology in the region, and the Appalachian Corridor Technology Fund, which provides seed money to start up businesses in the area of technology. Members and grantees of these entities can be from Southwest Virginia, Tennessee, or Northern Alabama. More information can be found at http://www.tech2020.org.

Virginia Economic Bridge

The Virginia Economic Bridge is an example of a nonprofit moving from the past notions of rural economic development to the present day. Begun in the late 1980s as a nonprofit venture, the organization has as its mission the promotion of "the economic vitality and external competitiveness of the Commonwealth through business, industry, and educational partnerships between Southwest Virginia, Northern Virginia and other areas of the Commonwealth" (Virginia Economic Bridge, 2000). Initially focused on connecting the diverse industry, educated labor force, and capital of northern Virginia to the rural Southwestern portion the state, the group began by selling the cheap labor, land, and taxes of Southwest Virginia coupled with its relatively good transportation infrastructure in terms of interstates

and railroads. These virtues were sold through organizing informational tours of Southwest Virginia for senior business executives from Northern Virginia, as well as tours by Southwest Virginia economic developers to Northern Virginia. This strategy also involved facilitating Southwest Virginia business participation in Northern Virginia tradeshows. Additionally, trade linkages were established with the Peoples Republic of China, specifically targeted at the Southwest Virginia coal industry.

The group sought to address inequities between the education systems in Northern Virginia and those in Southwest Virginia. In one example, the Thomas Jefferson High School for Science and Technology in Fairfax was partnered for certain activities with several Southwest Virginia schools.

Other efforts involved attempts to sell Southwest Virginia's goods through the development and distribution of the Virginia Procurement Pipeline. This disk-based program eventually became a relational database accessed through the Internet for items marketed throughout the entire Commonwealth, and was spun off once it was up and running.

Probably the best example of using telecommunications to create distributed jobs involves the Bidwell Training Center in Pittsburgh.

The most promising efforts represent a new way of thinking about rural economic development. The Virginia Economic Bridge has partnered with Walcoff, Inc. to develop a "workport" model of telecommunicating, clearly a departure from the notion of development based on a low-wage, low-skill workforce. In this model, local workers are trained for jobs in Northern Virginia, which they perform from locations in Southwest Virginia.

The development of the Western Virginia Public Education Consortium promotes a regional decision-making approach that considers local needs and culture. The consortium will look to promote cooperation across district borders and to seek monies for regional projects. Additional information on the Virginia Economic Bridge can be found at http://www.virginiaeconomicbridge.org.

The Four County ECD Authority

The Four County ECD Authority focuses on economic development in four West Virginia counties—Fayette, Nicholas, Raleigh, and Summers. The authority is interested in moving from a coal mining-based economy to one that embraces industry that has benefited from technological advances. Working with Verizon (Bell Atlantic), the initiative has developed some fiber-wired industrial parks and recruited several new industries. It sees as its major charge "to assist with the expansion and diversification of the economic base, thereby improving the quality of life for all of the citizens." The Web site for the Four County ECD Authority presents additional information (http://www.4ceda.org/).

Conclusion

While these regional initiatives are innovative in terms of providing local citizens with new job skills, they largely fall short in leveraging the true power of information technology (IT) as a change agent for economic growth. Their collective strategy for retraining is to focus on IT as an end job skill (such as server management, data warehousing, programming, etc.), instead of as a means to an end. We see the strength of IT in its ability to support a variety of employment opportunities in distributed settings, therefore more effectively meeting the needs and interests of a broader population base. Probably the best example (although as yet unpublished) of using telecommunications to create distributed jobs involves the Bidwell Training Center in Pittsburgh. The Bidwell Training Center is part of the vision of William Strickland and a companion to his earlier, and very successful, Manchester Guild which has focused on the arts as a path to individual and community (as well as economic) development. The Bidwell Center began largely as a mechanism to train local individuals to meet local needs. One of the first of these efforts was to train members of the community (one of Pittsburgh's poorest with the highest incidence of

crime in the city) to process medical transcriptions for the University of Pittsburgh Medical Center. Bidwell now provides training in 10 areas ranging from culinary arts to business travel counselor to chemical lab technician. Recently, Bidwell took its medical transcription program to Hawaii where it trained stay-at-home housewives. The University of Pittsburgh Medical Center supplied computers and connections (from local vendors who also support them) and now routinely sends taped transcripts to Hawaii where they are immediately transcribed and returned electronically to the appropriate nursing station. Transcribers are paid by line of transcription (calculated by a computer, which also cuts and addresses the paycheck) in a "piecework" fashion. The Hawaiian housewives are essentially contract employees who are able to make more money when they produce more transcriptions. No administration or additional technical infrastructure is necessary on the Hawaii end. This example clearly demonstrates the ability of telecommunications to support a distributed workforce of retrained employees, allowing them to engage in a new career literally without leaving their home.

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Keane (2000) offers another positive example in the geographically remote village of Limerick, Ireland. A software translation company located a "workport" in the town and trained local residents, in addition to language translators from around the world, to work with globally dispersed software vendors. The organization demonstrated a very dynamic structure and conducted much of its training though networked communications, bringing the necessary work skills directly to the employee. That initial seed business began the makings of a financially prosperous rural community whose economy is currently based on Information Age processes and products.

Finally, it is clear from the literature that no amount of effort to develop rural economies can be successful without involving community development as well. In a real sense, outside capital that results in industrial development separate from community needs and culture is, at worst, exploitative and, at best, tends to keep the local economy less diverse and dependant on those outside the community and the community interests.

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