

RURAL ECONOMIC DEVELOPMENT: THE IMPACT OF INFORMATION AND COMMUNICATIONS TECHNOLOGY

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ABSTRACT

Current literature focuses upon the importance of deploying advanced telecommunications in rural communities to achieve various objectives, including economic development. Once advanced ICTs are present, this literature argues that communities will be better prepared to participate fully in the “information economy” and attract or engender new business development. This literature neglects two points that are essential to successful economic development; one—adequate social infrastructure (among local organizations, institutions, and businesses) must exist in order for the community to capture the capacity of new ICTs, and two—the specific manner in which ICTs are deployed may have some effect on the outcomes related to improvements in the local economic sector. After reviewing how these points are operationalized in actual practice, we turn to Flora’s E.S.I. framework to discuss how it may be used as a framework for understanding how ICT infrastructure and social organization are related regarding the achievement of economic development outcomes in two rural communities that have deployed ICTs expressly for achieving these objectives.

INTRODUCTION

Rural communities may be at risk of falling behind in their quality of life and their economic status if they are unable or unwilling to use information technology effectively (Civille et al. 2001). The concept known as the “digital divide” has pointed mainly to the lack of financial resources for technological deployment in low-income metropolitan and rural communities. The digital divide in rural areas may also refer to a divide between those towns that possess social infrastructure necessary to insure that ICTs and applications for this technology are made available effectively to local businesses, organizations, and institutions (Sullivan et al. 2002).

There is a generally-accepted axiom for economic development that argues that, without the presence of modern information and communications technology (ICT) infrastructure in the community, the ability to attract or develop new business in the community or to improve the efficiencies and productivity of existing businesses is limited. This axiom is

derived from the rhetorical and practical pronouncements of many economists and economic development gurus who argue that, in the information economy, the ability to access and manage information quickly and efficiently - a function of modern telecommunications technologies - a commercial firm is unlikely to be successful.

Local efforts to improve the economy of the community generally focus on one or more of several general strategies: attracting companies to locate new facilities in the community, improving the profitability of existing businesses, entrepreneurship—the creation of new local business firms—and attracting tourists and new residents to the community to increase local business activity. These strategies have been adopted as historically rural economic endeavors based on natural resource extraction and conversion and agriculture have become less effective in generating adequate wealth to support community populations.

The function of ICTs in this strategy is similar to that of other infrastructure elements like electricity, water or waste disposal: each business operation requires a certain capacity of the local infrastructure in order to operate the way they wish to and local communities generally do all they can to make sure this capacity is available for new businesses or for business expansion. So, there is a general understanding at this level that, if the capacity is put in place to accommodate (perceived or actual) business needs, these business will choose to operate in the community—other things being equal.

This research investigates the impact of the deployment of information and communications technologies (ICTs) in rural communities that have based their local economic development strategy on the availability of ICTs. We ask whether or not the objectives desired have been accomplished, whether there were any specific obstacles faced by the community in deploying ICTs or in implementing their economic development strategy, what kind of approach they used for deployment, and what has been learned in the process.

BACKGROUND

Pigg and Bradshaw (2002), argue that rural community development takes place today in an increasingly complex environment. Many factors govern business and local government decision making related to development issues. Many more interests have to be taken into account than thirty years ago when mineral extraction, forestry, and agriculture dominated the rural economy. Often, individual communities are not very successfully trying to implement development strategies in isolation from other rural places and join regional partnerships (forming “rural-plexes”) as an alternative, thus further increasing the complexities to be addressed (Pigg and Bradshaw, 2002). Rapusingha, et al (2000) discuss the importance of information as a critical resource in dealing with complex situations. Without open access to information of various types, community capacity to self-organize is limited. In order to be empowered

and enact the capacity communities possess in leadership and organization resources, they need access to technical and innovational information about external resources available to assist development activities, examples of successful and unsuccessful change efforts, national and international trends and changes that might provide opportunities for niche strategies to be established, and other forms of information such as the activities of nearby jurisdictions that can support and/or leverage community development action between/among communities (Pigg and Bradshaw, 2002). Thus, it is clear that the role of ICTs can be more than just another component of the (static) infrastructure necessary for economic development; ICTs can play a more active role in the management of information and its access for decision making by a wide range of business and community leaders.

It is important that the community feels that their local leaders are receptive to their concerns and interests for technology and also that these are accommodated through the creation and implementation of technology policy. Civile et al. (2001) found that there is a need to measure community capacity for technology, to not just emphasize deployment of technology, since the market strategy “if you build it, they will come” does not address the actual local capacity to use technology. Civile et al. (2001) state that education and community capacity are usually ignored by government technology policies in which there is a great need to study the use, and the perceived and actual value of information technology in rural communities.

Community capacity to successfully capture the advantages engendered via the deployment of ICTs is not particularly unique to the technology. Key agents of change must work together with local residents to actively support and engender an atmosphere for collective action towards improvement in their rural communities. One example of how local residents can collectively work towards improving their community and engage in improving the capacity for civic engagement is through the establishment of a local foundation(s) in which residents donate smaller

contributions which raises awareness, creates a new community culture for giving, and most importantly, community development is enhanced with local financial support (Flora 1998:492).

Thus, collaboration, civic engagement, knowledge of the community and how it works and a vision for the future are all necessary attributes of this capacity (Pigg 2000).

More specific capacity indicators might include the presence of an organized community information network (CIN). Community networks include activities in which a group of residents organize themselves to provide access, training, and services that are community focused via electronic networks. Community networks provide a mechanism to transmit and communicate information that allows most persons to maintain relationships as well as develop new relationships (or virtual communities). Wellman (1996) states, "Computer-supported social networks sustain strong, intermediate, and weak ties that provide information and social support in both specialized and broadly based relationships. Computer-mediated communication accelerates the ways in which people operate at the centers of partial, personal communities, switching rapidly and frequently between groups of ties."

Even as most research has recognized that community networks are building the pathway for the communication of those users of the network with others, there has been very little actual content provided by community networks that supports the actions necessary to economic development, much less civic engagement of local citizens and leaders (Pigg, 2001). Fullinwider (1999) referred to "civic" as those pieces of knowledge that relate to accomplishing things locally that are for the improvement of the "public good" of the whole community. As relevant knowledge is collected through involvement in civic activities, the community is able to engage in a process in which issues that are of highest importance to them are discussed and solved using the technology represented by a community network. Through this "civic sphere," strong healthy social networks will be

created and maintained which may act to harness other resources for the improvement of economic and social conditions (Pigg, 2001).

In our study we are seeking to identify successful pathways toward the deployment and application of technology for the purpose of economic development and improving quality of life. Community collective action creates, maintains, and builds social relationships that create social networks. We believe that the presence or absence of Entrepreneurial Social Infrastructure facilitates collective action in the community with, and among, agents of change to reach practical and locally-specific objectives (Flora and Flora, 1993). Presently, interviews with key informants about community economic development have been conducted in four rural towns. As we expand this study, we will determine the utility of using the ESI framework broadly to test a set of indicators of successful economic development via community building activities that utilize ICTs.

Entrepreneurial Social Infrastructure

Flora and Flora (1993) developed the Entrepreneurial Social Infrastructure (E.S.I) as a framework of components, structure, and process indicators that encourage collective action to achieve tangible goals in which social capital is a necessary, but not a complete prerequisite. Communities that engage in collective action to better the community are "entrepreneurial" (Flora 1998). Flora (1998) discusses the relationship between collective action within the community and the social infrastructure. Wilkinson (1991) differentiates between different types of collective action through the "social field" (development in the community) and "community field" (development of the community) which demonstrate that collective action of the social fields does not necessarily lead to the development of the community field. Flora (1998) suggests keeping collective action separate from E.S.I. in order to assess which types of community development are necessary and able to be maintained (1998). Flora (1997a) examined the relationship between the social and community field by comparing a

Midwestern community which is characterized by a dominating powerful religious community and a youthful group of mostly male civic leaders with another community from Sharp's (1998) study of three Midwestern communities. Flora (1997a) found that communities with high amounts of social capital, such as "strong social networks, strong norms based on a dominant religion, intergenerational continuity of leadership and high level of trust," the greatest density of organizational interlocks, and projects implemented in the last five years which promoted collective action within the community field led to the development of the strongest community field.

Flora et al. (1993) had found that those communities with a recent locally generated economic development project were more likely to possess the presence of the E.S.I. main components (see Figure 1). The following components encompass the E.S.I. framework: legitimacy of alternatives (there is access to the involvement of diverse range of residents and a

diversity of information), the mobilization of diverse resources, (donors will invest in community projects and local residents will support local taxes to contribute to the overall bettering of the community), and the presence of network qualities (social networks, both internal and external to the community, that are discussing, planning, and contributing to community projects are essential to the establishment of a strong social infrastructure) (Flora 1998: 490-493).

In order to empirically test the components of E.S.I., Flora et al. (1997b) used a random sample of key informant surveys of non-metropolitan towns. Flora et al. (1997b) found that communities with successful economic development projects are best carried out when the community possesses the presence of the following (examples of structural indicators):

Larger number of horizontal/vertical linkages within and outside the community (Network Qualities)

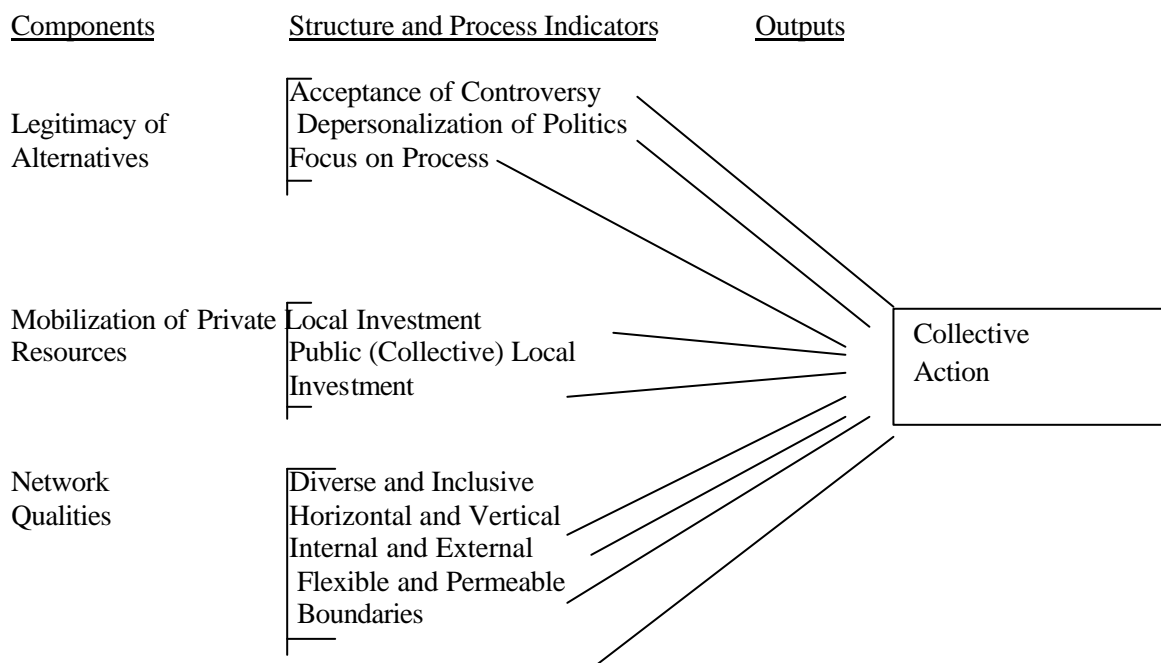


Figure 1. The entrepreneurial social infrastructure model (Flora 1998: 491)

A newspaper that initiated the flow of information about local issues. This provided a way that controversial issues could be exposed and discussed by the community in an unbiased fashion in which the diversity of opinions of the community could be included. (Legitimacy of Alternatives)

Financial institutions which play a financial role to community projects by providing commercial loans at a low-interest; Grants, donations, foundations or other contributions of service on a financial committee (Resource Mobilization) In our study, we believe that the E.S.I. framework of Flora et al. (1993; 1997a; 1997b; 1998) demonstrates a practical way of determining the strength of the “community field” within rural communities. According to Flora (1998), the presence of E.S.I. indicators are first dependent upon the presence of social capital, the broadness of community participation in local projects, and the ability to create and participate in local community economic development projects. These factors will significantly enhance the likelihood of a greater amount of Entrepreneurial Social Infrastructure (E.S.I.). We are utilizing the E.S.I. framework to study the relationship between ICT infrastructure and social organization regarding the achievement of economic development outcomes in two rural communities that have deployed ICTs expressly for achieving local economic development. Our study will be carried out like Flora et al.’s (1997a) study of Riverview. First, we will note the demographics, location, economic base, and governance structures of the community. Key informants or as we refer to them, “key agents” are chosen using a snowball approach based upon reputation for leadership, knowledge of the city’s economic structure, and those who play a role in the deployment and application of ICTs in the town¹ Again, very similarly to Flora et al.’s (1997a) study of Riverview, interview questions are based upon leadership patterns, personal and community-oriented networking patterns, indicators of E.S.I., and collective action. Now, we turn to a discussion of the

operationalization of the components of E.S.I. in our study of four rural communities, Sunnyville, Mountainspring, Greenhills, and Heatherfalls.

Legitimacy of Alternatives

Flora (1998) views the legitimacy of alternatives as the presence of the acceptance of diverse symbols by the community. The legitimacy of alternatives is an important aspect of the social infrastructure that affects community decisions that successfully impact overall development (Wilkinson 1991). In the rural towns that are included in our study, we seek to identify the three structural and process indicators of the legitimacy of alternatives: (1) the presence of controversy that indicates the acceptance of diverse ideas, (2) the depersonalization of community politics, and (3) a focus upon the process of local issues resolution in light of technological change.

We are operationalizing the indicators of the legitimacy of alternatives from the responses of interview questions for each “key informant,” and from secondary sources such as the local newspapers and the city information from the official city website online. In our study, the presence of controversy is actually an interview question that asks the key agent from the local newspaper about the presence of diverse ideas, suggestions, and opinions printed in the local newspaper in the opinion column regarding editorials or local issues in the community. If this key agent believes that controversy is explicit and accepted in the community based upon the reactions to newspaper articles and columns that discuss local issues, then we conclude the acceptance of controversy is present in the community.

Depersonalization of community politics is operationalized through two sources: from the key agents about their comfort level in openly discussing their diverse views and opinions of community related issues and from referring to local newspaper stories which discuss the key agents engaged in local collective action. If key agents openly discuss their suggestions for present and future applications of technology in the community and key agents are engaged in collective action, even in the light of

¹ In both towns, representatives (key informants) from the main telecommunications providers, the local library, the chamber of commerce, the economic development agency, the newspaper, and the school system were interviewed.

controversy, then the depersonalization of community politics is present.

Lastly, the process of how local issues are framed and solved represents a great deal about the approaches of the community to collective action. Through interview responses from both the local newspaper and city employee key informants, we are able to assess the local process for action through the awareness of local issues, and the presence or absence of local town hall meetings and meetings regarding special issues sponsored by the local newspaper.

Mobilization of Diverse Resources

Flora (1998) believes that ESI is enhanced when both resources inside and outside the community are accessed and channeled towards overall development, such as the willingness to “invest in community projects, a willingness of citizens to commit local taxes to community betterment, and the development of innovative mechanisms for channeling resources to community endeavors” (492). Flora (1998:492) discusses how private trusts such as local foundations, in which citizens can donate gifts for local improvement, have been used to fund various community projects which represents the establishment of a local norm for giving back to the community. The indicators of the mobilization of diverse resources are the existence of private local investment and public (collective) local investment.

We are operationalizing these indicators empirically through interview data from the responses of all key agents regarding internal and external funding sources of their agency or organization. The chamber of commerce and the economic development agency were both asked about the economic organization of the community and the funding structure of local community projects. With regard to the measurement of this component and its indicators, if the community possesses both external and internal channels of funding, private, and public local investment for local projects, then the mobilization of diverse resources is present. Whereas, if the community has mostly internal funding and it seems more of a self-developed community (see Flora 1998: 498-499), it is not likely to

possess a diversity of resources. If a community is lacking vital information from external sources, it may not be as successful in economic development endeavors.

Network Qualities

According to Flora (1998: 492), networks are “the mechanism through which trust is developed and legitimacy established.” Networks are most effective for the whole community when they are diverse, inclusive, flexible, horizontal (connecting those of similar status) and vertical (linking those of different status). Flora (1998) found that there were differences in the networking structures between towns with different approaches to economic development, i.e., self-developed and industrial recruitment, although communities with self development projects were had greater diversity of leadership from those within the community, while towns with industrial recruitment projects place more emphasis upon both horizontal and vertical external linkages which allows for the ability to access more relevant knowledge and additional and diverse resources for community projects.

We seek to identify characteristic qualities of networks: diverse and inclusive; horizontal and vertical; internal and external; and flexible, permeable boundaries through interview questions that asks each of the key agents about the person(s) and/or partnership with others that originally initiated the process to deploy and apply advanced ICTs in their institution, organization, or agency. We evaluate the social networks that are engaged in community economic development projects according to these characteristics. If all characteristics are present, then we conclude the community does possess the network qualities necessary for an effective social infrastructure.

COMMUNITY CASE STUDIES

Communities Under Investigation

Currently², the four communities under investigation are Sunnyville, Mountainspring,

² All together, there will be approximately 25-30 total United States communities studied in our project. These names are fictitious.

Greenhills, and Heatherfalls. All of these rural communities were chosen due to their successful deployment of ICTs. Based upon Flora's methodology in his 1998 study of a Midwestern town called Riverside, we believe that it is important to identify the demographics, economic base, the governance structure, and we add the history of deployment to each of the two communities in order to assess the preconditions of the capacity for the development of the "community field" before conducting qualitative analysis to explore the presence or absence of E.S.I. in Sunnyville, Mountspring, Greenhills, and Heatherfalls.

Sunnyville

Demographics: Sunnyville is a midwestern town with a population of 4,225 that is located approximately 70 miles from a large University town. At the county level, the high school graduation rate is 99% and, in 1998-1999, 80% of all area graduates proceeded into higher education. The median income level for the county in which Sunnyville is situated in is \$38,914. There are advanced medical services available at the local hospital that has 25 beds and a surgery unit, as well as extensive senior services.

Economic base: Health, education, telecommunications and agriculture are the highest ranking employment sectors in the area and, in the past 5 years, 11 businesses have either moved to Sunnyville or expanded their existing businesses and five of these are in the areas of manufacturing and construction. In Sunnyville, there are numerous non-profit organizations and fourteen local private foundations that have been established in the past 30 years with combined assets of \$28,845,000. Numerous community projects have been funded through these foundations. Incoming business establishments and its employees have an opportunity to take advantage of the city services and physical infrastructure improvements that have been provided through these donations. Sunnyville assesses a property tax, but they do not have a city tax.

Governance structure: In Sunnyville, a government municipal system is present which includes a local mayor with many city offices in different areas to delegate responsibilities. The economic development

agency is located in a separate physical space from the City of Sunnyville offices. The economic development agency is hierarchically placed under the umbrella and ultimately controlled by the mayor of the city of Sunnyville. Fleischmann and Green (1991) found that centralizing the economic development activities in a separate department lead to greater efforts at community growth. The position of the economic development director was recently created as a separate position to oversee the Chamber of Commerce and the economic development of the city. A young and enthusiastic person who is working with other older, experienced, and knowledgeable key agents of change in Sunnyville recently filled the position.

In Sunnyville, plans for the deployment of ICTs were first initiated in the 1980's by a group of visionary business leaders that encompassed the local telephone company, local retailers, and manufacturers. This group of aware and civic-minded leaders was meeting often for the sole purpose of improving their "community field," instead of purely building upon diverse "social fields". This core set of business leaders possessed the foresight that new technologies would significantly benefit their community in a variety of ways. Advanced ICTs were actually deployed in Sunnyville in the early 1990's by the local telephone company that is the main telecommunications provider for numerous other communities in the region. In the initial stages of development activity the current Vice President of the telecommunications company was approached by the President to oversee the company's role in economic development. Today, this individual meets regularly with other key agents to create new pathways for successful economic development.

	Sunnyville		Mountainspring		Greenhills		Heatherfalls	
Development Indicators	1990	2000	1990	2000	1990	2000	1990	2000
Population, county	8,862	9,403	34,001	38,033	19,050	20,419	45,887	51,103
Population, city/town	3,810	4,225	12,351	13,019	8,597	8,607	7,003	7,780
Median Household Income, county	\$25,026	\$38,914	\$13,105	\$40,277	\$25,625	\$30,021	\$19,594	\$32,742
Unemployment rate, county	1%	1.7%	3%	0.4%	9.8%	4.4%	6.0%	4.2%
Number of employees, county	2,000	2,595	11,126	13,871	8,000	9,225	20,932	23,803
Ave. Wage/employee	\$15,099	\$22,824	\$17,730	\$23,340	\$16,154	\$21,649	\$17,948	\$24,216

Table 1. Trends for Selected Indicators of Development, 1990-2000 for Places Deploying ICTs

Mountainspring

Demographics: Mountainspring is the county seat and it has a population of about 15,000 (2001 estimate). It is located about 95 miles from two large metropolitan cities. The percent of Mountainspring high school graduates that go to college is 66%, whereas it is only 36% for the county schools. Also, there is a vocational school and a state university campus located in Mountainspring. Based on 1997 figures, the median household income in the county was \$29,580 and in 1998, the city per capita personal income was \$21,515. An 196-bed acute care facility that includes over 60 physicians and over 700 hospital employees.

Economic base: According to 2000 County Business Pattern data in Table 2, the largest employers in the county area by the number of establishments are in the following areas: services (353), retail trade (204), construction (89), and manufacturing (53). Mountainspring is considered the economic, medical, and social center for other cities. A number of financing programs are available to businesses looking to move to Mountainspring: the city revolving loan fund, the industrial development leaseback program, and industrial revenue bonds. Job training is also available through state and local programs, such as the area county technology center. In 2001, the community of Mountainspring received a revitalization grant from a state program for \$350,000 in which \$250,000 was used to renovate a historic music hall for the new home of the parks and recreation department. The rest of the money funded a local library feasibility study and a downtown revitalization booklet to assist building owners with information about renovation projects. Also, an old high school building has been designated for senior housing to include about 20 one-bedroom apartments that will be funded by tax credits, private financing, and state funds especially for seniors. The City Council recently approved establishment of a new position that is dedicated to grant writing, vital statistics, and community projects coordination.

Governance structure: There is municipal system with a mayor, city administrator, and city attorney. The economic

development agency is located separately from the city offices, although it is supervised and directed by the mayor. Economic development strategy is focused on industrial recruitment in Mountainspring.

The deployment of technology in Mountainspring was spearheaded by a city civic agency, the municipally-operated electricity and cable company, instead of the local economic development agency. Over 30 years ago, a group of persons in Mountainspring created a board that was composed of local residents, business owners, and members of organizations and institutions who were concerned that electric rates were too high with the private large electric company. So, they created a municipal utility. The board of the municipal electric company had a very futuristic approach to offering their services, as the cable wire would provide the broadband necessary to deploy advanced information telecommunications. This municipal electric company is responsible for all aspects of the technology infrastructure in Mountainspring, as the local government does not intervene at all with their efforts, but applauds them for their of their achievements in the community.

In the mid-1980's the current superintendent of the electric company was employed and he became part of this core group of those working towards technology for a better quality of living in Mountainspring. This key agent has secured an impressive number of both residential and business customers and is constantly reflecting upon new ideas to improve the community.

Greenhills

Demographics: Greenhills has a population of 9,000 persons. It is located about 90 minutes or about 70 miles south of a major metropolitan city, and 20 minutes west of a state border. The percent of high school graduates was 83.3% in 1999, compared to 77.8% for the state. The percentage of these graduates in Greenhills that continue on for a 4 year college degree are 37.7%.. The household median income in Greenhills was \$19,641 in 1990 and is \$30,021 in 2000, a 34% increase.

Economic base: According to 2000 County Business Pattern data in Table 2, the largest employers in the county area by the number of establishments are in the following areas:

Information services (211), Retail trade (86), Construction (47), and Finance, Insurance, real estate, rental, and leasing (45). Two main city trusts fund proposals for new services and physical infrastructure improvements.

The loss of a large-scale medical facility prompted discussion about the introduction of a new center to increase job skills for persons in the community. Greenhills is home to a Telecommunity project that serves to “capitalize on home-based businesses dependent on modern telecommunication technologies” in which they seek telemarketing groups, “back office” operations, reservation centers, and catalog centers.

The local school district, the state University system, state and local economic development directors, and smaller area community colleges both 60 miles and 115 miles away initiated the Telecommunity project. Also, a local poultry farm, a manufacturer, a local trust, and the local telephone company all contributed generous amounts to help jump start the Telecenter. Telecenter with computer facilities and technologically advanced classrooms and computer instructors; a Higher Education and Career Development Center, an office building, a new YMCA; the founding of NTDC, and the Telecommunity Development Corporation which has sponsored job training programs to encourage business growth.

Greenhills also has a vocational school that provides many new skills for high school students, as well as, adults in the community. This vocational school is in partnership with a One-stop career center in which persons can walk in, get training, and receive any information on employment and training, such as hiring information and requirements

Governance structure: There is also a municipal system with a mayor, city council, city administrator, and other branches of the city government. The economic development agency is located separately from the city offices, although it is supervised and directed by the mayor. Economic development strategy is focused on industrial recruitment in Greenhills.

Although Greenhills has not deployed broadband community-wide, the main institutions: school systems, libraries, technology center, regional tech center, and city offices have a broadband connection. The school system and the tech center have advanced telecommunications either through the T1 and T2 lines, while the library is part of statewide system, and residences and businesses are connected through a telephone bell company.

Heatherfalls

Demographics: This community, established prior to the American Revolution, is located in Appalachia. It has a long history of successful accommodation to change while, at the same time, preserving those elements of its local history that make it an attractive place to live for many people. The community has a vibrant retail sector as it lies on an interstate highway in a rather remote part of the region. This community of about 8,000 people is on the fringe of a major regional center for employment. It has a small, but modern hospital and new public library. It is the location for a recently-built higher education technology center that provides college courses via satellite TV, computer, and face-to-face instruction from several universities in the state. Household income averages over \$32,000 annually and the community has seen an in-migration of retirees as well as professional people who were looking for a high quality of life.

Economic Base: On the fringe of the Appalachian coal fields that are on the decline and located in a county with a large agricultural base invested in tobacco, this town has been relying recently on historical tourism and a growing retail and manufacturing base to support its economy. The town board has passed ordinances mandating new commercial construction that conforms to specified historical standards (regarding facades) to maintain the historical ambience that they feel attracts the tourism visitor. The town hosts many tour groups in the local theatre and historical hotel connected to the wife of a U.S. President. There are a large number of historical homes converted to bed and breakfast businesses to cater to tourists. The impact of this tourism is seen in the large amount of sales tax collected by the town that

has financed many local improvements and a new town hall, while producing a large surplus that has permitted local officials to reduce the property tax rate several times in the past decade. Many well-known and highly publicized festivals are organized in the town each year to attract more visitors to the area and a growing “environmental tourism” is evident that caters to the outdoor amenities of the area.

The manufacturing base, while not located in the town proper, is located on its fringes. The economic development efforts underway to attract this investment is supported by county government. County officials have responded to rural agricultural concerns by making sure this conversion of agricultural lands is restricted to areas already undergoing development and along the interstate, so the town is benefiting by the location decisions and land management practices of the county. Several new industrial parks have been developed along the interstate near interchanges that serve the town. This development encourages more housing development and retail development soon follows. While it is reported that all the industrial park developments have included access to high bandwidth capability, only about half the investment decisions in these locations involved a communications capacity factor.

This county benefits also from a large investment in telecommunications infrastructure. Two national “communications backbones” and the state network is available in the county. The state network, connecting public universities, libraries, hospitals, and other public agencies, serves the local school system with very high bandwidth. The commercial backbones have permitted local POPs to get lots of bandwidth and good connectivity for the “electronic village” being established in the town. This electronic village is being built around a fiber optic loop installed down main street and providing connections to the retail sector in this loop. This loop is constantly expanding as new businesses are acquiring service. Thusfar, the loop serves only a limited residential base, but adequate and high bandwidth services are available commercially. A number of local businesses are actively transforming transaction processes to make use of this

capability although the Chamber of Commerce director indicates that this process is very slow. Over half the local commercial sector does not use the network facility at all and many use their connectivity for communication purposes only. The director distributes Chamber board meeting minutes and a newsletter electronically along with legislative updates coming from the state capital she feels will interest members. Most commercial users are tourism and travel related, with bed and breakfast businesses having active web sites for reservations and the local theatre and festival groups putting their calendar of events on-line, taking reservations and selling tickets electronically. The local hospital is on-line via the state network but using their capability in only limited ways. The higher education technical center is also using the state network.

Recently a collaboration was worked out between the higher education technical center, the town, the county and a city located in the county to build and operate a high technology incubator in the town in a facility adjacent to the technical center. There are high hopes for this large amount of capacity to be attractive to entrepreneurs for creating new businesses. The technical center will operate the incubator and provide entrepreneurial and technical applications education support.

Governance structure: There is a town Board of five people, one of whom is elected as Mayor. The Vice-Mayor has been on the Board for thirty-five years and also (informally) chairs the electronic village committee. The Board employs a Town Manager and has its own Technology department in which the electronic village hardware is housed and maintained.

The electronic village committee was initiated in 1998 following a community-based process in which a large number of town people interested in acquiring advanced communications access had been meeting with commercial firms and state officials to discuss their options. The committee formed to implement the option considered most viable and beneficial for the town—developing its own fiber optic system. Membership was and remains “open” to anyone who shows up for the monthly meetings where operations of the

system are discussed and agreed upon. However, it appears that, in the minds of some town residents, the project has become a “town government” project and is not really intended to “build community” in any active way. Several informants observed this in a number of ways. There is no “community web site” that attempts to bring together many sites representing different community interests and activities (e.g., Chamber, town government, festival organizations, convention and visitors bureau, commercial interests, etc.) into a shared presence on the Internet. The electronic village committee appears to devote its energies to operating the hardware of the system rather than paying attention to leveraging its information functionality to build community.

Locally, leadership appears to be largely in the hands of people who have lived in the town for a long time and, while newcomers are welcomed for the investment and skills they bring to the community, these newcomers do not appear to be integrated into leadership structures very well. Several recent controversies continue to cause concern; these involve the nature and scope of future commercial development and how this may affect the cultural aspects of the community and its future identity. For example, a decision pending before the town Board on a commercial development was the target of a petition drive led by a number of people who have recently migrated to the area, attracted by its quality of life. Some members of the Board have (privately) rejected the position of the petitioners because many of those signing the document are “not from this town.” It appears many of the newcomers are “preservationists” and some of the “old guard” in leadership positions are leading efforts for further development and are perceived to be without regard for its impact on the town’s identity.

PRESENTATION AND DISCUSSION OF FINDINGS OF ESI INDICATORS

1. Legitimacy of Alternatives

Sunnyville

In Sunnyville, controversy is presented by the opinion page and the letters to the editor in the local newspaper. The newspaper prints the diverse ideas and opinions about issues that

were important to the community. There was a recent transition in the ownership of the newspaper that has introduced the discussion of various issues and the diversity of opinions openly. Most of the controversial issues have focused upon the amount and direction of city revenue and foundation spending. Key agents are very open about expressing their views and opinions regarding the importance for the deployment of ICTs in Sunnyville. The local newspaper had supported local meeting events regarding the school bond and has reported weekly news series regarding cultural/historical/political global issues, such as one that focused upon different religious affiliations.

Mountainspring

In Mountainspring, there is an acceptance of controversy and diverse ideas on most fronts. Controversy seems to be recognized, although neither the town newspaper, nor the town’s key agents seem to feel that a place or space for discussion of this controversy is particularly necessary. Even so, key agents feel comfortable speaking freely about diverse strategies for economic development. These agents of technological change for successful economic development are not concerned about their reputations. For example, the supervisor of the municipal electric company is not afraid of others’ opinions of his ideas, suggestions, and decisions. A focus upon the process of carrying out solutions to local issues is present. Town meetings are held to discuss issues that effect the widespread community—the residents, the retailers, business and industry, property owners, and the local government, such as the Renaissance Main street program in Mountainspring.

Greenhills

In Greenhills, there is an acceptance of controversy and diverse ideas accepted in the community. It seems that controversy can be discussed, as well as, put aside to mend larger problems. There seems to be a disconnect present in whether just community leaders are becoming involved or actual residents are participating as well. One possibility might be that residents are not being engaged to participate in community projects that contribute to a lack of evidence for focusing on the community process.

Local leaders seem to feel comfortable discussing their unique viewpoints regarding more controversial issues, such as the community's impending issue about an advanced technological connection and the past failure of the telecommunity (a 560 acre televillage with homes linked to "state of the art" telecommunications for home-based and entrepreneur business ventures.)

In the local newspapers, most issues are centered upon local activities, especially those involving the local schools and the more controversial issues involve the actions and decisions of the City of Greenhills. The columns represented different angles or viewpoints of youth and elderly. The online newspaper has an online poll for citizens to give their opinion about local and national issues, although there is not any other way for citizens to provide feedback about local issues facing their community.

Heatherfalls

In Heatherfalls it appears that controversy is frequent and focused on development issues regarding the future identity of the community. Further, controversy appears to pit old-timers against new comers and some of these proposals continue to simmer and cause discomfort and disruption. These issues attract some degree of citizen participation. Formal decision processes seem to be perceived as "closed" to participatory input and involvement.

On the other hand, local leaders seem very comfortable acknowledging these differences and continuing to voice their own perspectives on future development. Unfortunately, the local newspaper is a weekly and mostly focused on community activity and historical events shaping the culture of the area more than civic affairs.

2. Mobilization of Diverse Resources

Sunnyville

By the nature of the state governmental organization, cities receive very little funding for community economic development projects from the state level. In Sunnyville, fourteen private foundations provide the

monies to fund community projects which are all quite civic in nature--- the community library, the development corporation, the chamber of commerce building, part of the funding for the Economic development position and the leading chamber of commerce position of the area chamber and development corporation, a local science museum, and improvements or advancements in the local system school system. Individuals, businesses, organizations, and institutions contribute financial donations to private partnerships. Sunnyville does not possess a city sales tax, and has chosen to act, instead, with a great amount of support from private local foundations. Although, the city is considering adding a city sales tax to improve Sunnyville's economic development through tourism strategies that utilize the community's close proximity to an interstate highway. Although the main focus is upon local resources in Sunnyville, financial support from outside of the community is channeled through county institutions, such as the county information technology group.

Sunnyville also possesses both private local investment and public (collective) local investment channels which are directed related to the establishment and local contributions to the 14 private local community foundations of Sunnyville. Even more Sunnyville has created and maintained itself as a self-sufficient community through the establishment of its various private foundations. This is an indicator that Sunnyville is working toward successful collective action. Sunnyville is also instituting an important social norm for giving back to the community is established through these local foundations (Flora 1998).

Mountainspring

Mountainspring is a community that is supported by the commitment of citizens to local taxes for community betterment. The local deployment of advanced technology is partially supported by local private or public investment. State contributions cover half of the total cost of technology in the school systems in Mountainspring and city tax dollars match the amount given by the state to provide advanced telecommunications. The Technology Coordinator in the Mountainspring school system feels that the attitude and support for technology of the

recent Governor has benefited the schools. The city utility board is the city Internet service provider as it uses its cable to provide high speed Internet access to the community. As we have noted earlier, city renovations are mostly completed through the ability to receive state grants.

Greenhills

In 1995, key leaders from Greenhills decided upon the need for the capacity of a T1 line which linked the school district to a large university approximately 90 minutes away. The local phone company does provide DSL services for businesses for a very high price, but dial-up is still the prominent source of Internet access for Greenhills. There is recent talk about the town possibly initiating its city managed DSL and wireless.

Greenhills has both collective private and public local investment. The Greenhills community does work together to collect funds for local community projects. One current project was the County/Community fund campaign to raise \$115,000 for local organizations and societies through business donations. The following organizations or councils are the recipients: American Red Cross, University Extension, County Cancer Relief, Girl and Boy Scouts, The Council on Families and Crisis, County Child Advocacy Council, Ministerial Alliance, Community Outreach, Special Olympics, Neighbor and Senior centers, Pregnancy Help, and the local boxing club. One of the two local trusts most recently funded a battered woman's shelter. Both of these trusts have also helped to enhance the technological infrastructure in the local school systems.

Heatherfalls

This community does a good job of mobilizing resources. The multitude of festivals and events held in the community are nearly all the result of volunteer effort and local organizational activity. Many less formal examples are also apparent. For example, several individuals from the local historical society assembled a comprehensive data base of genealogical information that is placed on file in the society's office. The collaborative effort of town Board, city, county and higher education technology center in the incubator

project is a good example of bringing internal and external resources to bear on a task. Such efforts make extensive use of local resources; as one informant noted, "local taxes are low, but every organization in town is always looking for donations and this is not a 'cheap place to live'." External resources, especially for large-scale projects in economic development, education and health care, are also mobilized for support as available.

3. Network Qualities

Sunnyville

In Sunnyville, there seems to be a growing, diverse vertical and horizontal network of those involved in community organizations, such as civic and charter organizations. Most of these network ties are internal within the community and not external ties. Although, there are flexible and permeable boundaries present as Sunnyville partners with many persons and organizations outside of their community, especially those that are active in county-level and regional institutions.

Network ties are constantly being built with a multitude of organizational, civic, religious, and volunteer organizations in the community. There is a diversity of religious affiliations with more than 25 churches in a small community. There is a local Optimist Club and other professional and business organizations. Current active leaders are working alongside those that have recently moved into Sunnyville within the last 6 years, which indicates that outsiders are welcomed into key positions of organizations by established locals. These leaders had mostly moved to Sunnyville from rural Midwestern towns which shared similar obstacles to rural development. Women, younger adults, and those who have recently moved to the community have the opportunity to assume positions of leadership in Sunnyville.

Most of the characteristics of network qualities are present in Sunnyville: diverse and inclusive, horizontal and vertical linkages, internal linkages, and flexible, permeable boundaries. External linkages are present, although they seem more horizontal than vertical.

Mountainspring

In Mountainspring, main social networks are more horizontal than vertical, less diverse and flexible, and collective action is very sparsely scattered among certain organizations. Network ties are expanded through the county's approximately 100 churches of diverse dominations. There are more than 40 clubs, organizations, and community groups that include Little League, Lions, Rotary, Kiwanis, the YMCA, and various business and professional women's clubs. However, as noted above, there are both internal and external ties between internal (city) and external (state) organizations and institutions. Unfortunately, collective action is a little fragmented in weakening information flow and creating obstacles in overall community economic development. The boundaries are more rigid than permeable as the historic nature of the state has drawn physical boundaries that, for example, deny access and relationship building between different communities and counties. For example, most people in leadership positions and those who we interviewed as key agents in the community are men in their middle ages who were either born in Mountainspring or have lived in the community for a number of years. This situation reflects a lack of diversity in leadership roles.

Greenhills

In Greenhills, social network ties are inclusive, since the key leadership group encompasses mostly community members from Greenhills. The networks could be more diverse. The community leadership is very strong and represents memberships in different professional, civic, and service groups. Most leaders are white males in their late 30's to late 50's, I only met three women who were known as key leaders and regarded quite highly by other men. Almost all of the men (all but one) and the women are originally from Greenhills or the surrounding area. Some may have left Greenhills to attain a higher education or entered military services and returned to the area within the last 10 years when their children were grown or attending college. The networks are mostly vertical, but they have the potential to become more horizontal. The key service and community leaders do not act as gatekeepers to

community positions and boards; they encourage non-natives of Greenhills, or the state, to participate in community projects and organizations.

Although internal network ties are very strong, external ties are very strong, as well. As I mentioned earlier, the leaders are a quite homogeneous group, but they quite dependent upon communicating with outside ties from other educational institutions, members of the state government and affiliations in the state university system. The boundaries of the social networks are flexible and permeable if a newcomer can establish a direct tie with someone well known in the key leader network.

Heatherfalls

In this town the social networks, at least as they relate to civic issues, are under some stress. While it is comparatively easy to mobilize people around some kinds of activities, like festivals and other events that benefit the public, more formal civic decision making that addresses the future of the community on a long term basis often divides the community. Further, the school system, independent of the town, does not coordinate its technological development with the town and the electronic village; neither does the hospital or higher education technology center. The steady in-migration of young professional residents who are attracted to the local area's natural amenities and history may be disrupting the traditional networks of long term residents or establishing new networks of civic opposition.

External networks appear very strong. The U.S. Congressman has an office in the town and is actively engaged in efforts that bring technology-based development to his district. A state legislator from the area is also a strong link to external resources. These links were actively engaged when the electronic village project got underway in order to change a state statute prohibiting municipalities from owning and operating a communications system.

DISCUSSION

The desired effect of ICT deployment does not appear to have been realized in either Sunnyville, Mountainspring, Greenhills, or Heatherfalls. On the one hand, compared to many rural communities, these four are relatively prosperous economically with locally active institutions and civic organizations hard at work improving aspects of their communities. Median family income is relatively high and there are job opportunities for most that want to work. The economic base is relatively diverse in both communities, providing lots of opportunities for a diverse workforce. However, it does not appear that any commercial enterprise exists in either location primarily because of their deployment of ICTs. One could say, that in the normal course of business formation and dissolution, those that are gone could not adjust to the information economy and those that now exist could and the net effect is that the community economy remains healthy. In hard times, “holding your own” is sometimes considered being successful. The fact that few businesses are integrating ICTs into their operations or have located there because of community investments in this infrastructure seems to deny success to this element of the local strategy alone. This is true even though the comparative rankings on the ESI are fairly equal.

Although the results are not conclusive at this time, based upon our findings of the study of the presence or absence of Entrepreneurial Social Infrastructure in the four rural communities, Sunnyville, Mountainspring, Greenhills, and Heatherfalls, we believe that all communities are increasingly involved in attempting to build their social infrastructure. Based upon our findings of the presence or absence of indicators, both communities would possess different “levels” or “ratings” of each components of the E.S.I. framework. We would like to argue that these indicators of the Entrepreneurial Social Infrastructure include some structural and process indicators that are necessary for successful economic development, but we cannot at this time simply rate or evaluate the success or failure of a community by the ESI indicators. This difficulty may reflect a “time lapse effect,” in that it takes more time than has elapsed for

ESI factors to “work” and make their presence effective in community action.

It is also true, however, that the ESI framework may be a problematic approach in attempting to measure the capacity for rural towns to deploy ICTs and apply this new technology to successful economic development strategies. There may be other factors or indicators that are not included in the ESI framework that we found existing in our two case studies. We call these “qualities of collective action strategies” that predicate economic success, but must be activated in the presence of ESI components. A community characterized by a self-development approach to economic development projects or an industrial-recruitment approach will most likely possess diverse, but possibly both successful, strategies of collective action towards successful economic development.

Flora (1998) differentiates between communities with two different types of economic development projects: self-development and industrial recruitment. Self-development communities are characterized by the following: having a friendly rivalry with another community, focusing upon inclusion, open discussion about community projects, being more likely to include women, persons under 40, and farmers in leadership than industrial recruitment communities. An industrial-recruitment community possesses external linkages that are both vertical and horizontal. Based upon the demographics, the economic base, the governmental structure and the initial assessment of the presence or absence of E.S.I. indicators in Sunnyville, Mountainspring, Greenhills, and Heatherfalls; it seems that Sunnyville’s approach is closer to a “self development” community, while Mountainspring and Greenhills is an industrial-recruitment community. Heatherfalls appears to be following both tracks to some extent. While Sunnyville may seem to have greater internal capacity for successful economic development, Heatherfalls, Mountainspring and Greenhills may possess external linkages to outside links that may provide critical information for economic development projects.

Another process indicator of community collective action for economic success that

was not included in the ESI framework was the presence of intergenerational leadership in both Sunnyville and Mountainspring (Flora 1998). Early on, business and organizational leaders created strong friendly and professional relationships that aided in the development of both towns today. A wise, experienced group of leaders were at forefront of creating successful local development, and were insightful about future technology advancements. Most importantly, those leaders who were most active in creating and engaging the community in technological change mentored current key agents. We will need to conduct further investigation into leadership, mentoring, and intergenerational leadership as we continue our study.

Finally, while the rural communities are highly involved trying to attract technology related businesses, and others that utilize the technology, there still seems to be an absence of community-building applications that are taking advantage of recently deployed ICTs such as community information networks (CINs). These networks, representing the mobilization of community assets to promote and support applications and uses of ICTs, have been touted by their advocates as engines for economic development (Pigg, 2000). These networks have also been considered focal points for engaging citizens in activities that increase social capital, civic dialogue, and civic engagement (Pigg, 2001). However, the leaders in Sunnyville, Mountainspring, Greenhills, and Heatherfalls have not seen any use for this approach and haven't had demand for it. Perhaps, with access to prevalent in the community, they don't think people would use it. However, the presence of a CIN may send an important "signal" to other residents in the community, increasing awareness and building the kind of capacity Civile, et al (2001) argued was central to the success of deployment efforts. CINs may help increase "demand" for ICT use in the community by demonstrating the kinds of applications available and providing opportunities to build expertise in their use. CINs, as community organizations, also may provide important services to the community (Schuler 1996). Such services may help businesses with the technology adoption process and help build workforce skills among citizens for the information economy (Crellin and Fesenmeier 2002). In sum, it is our intent

to expand our sample to include communities who have not only adopted ICT-based economic development strategies but who have also chosen to establish CINs as a part of that approach.

The study is exploratory at the current time. We do not have conclusive results of any kind at this stage of our study. As fieldwork is completed and analyzed, we will continue to view the indicators of the ESI framework as qualifying effects for successful economic development in rural communities. After gathering all of our fieldwork from the towns that have recently deployed and applied advanced ICTs, we plan to create a list of indicators for effective economic development. Although most of our rural towns in our study do not possess community networks yet, we also plan to investigate whether community networks act as mechanism that leads to successful community economic development.

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