

Rural Telecommunications Bibliography

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Abel, J. R. & Clements, M. E. (2001). Entry under asymmetric regulation. *Review of Industrial Organization*, 19(2), 227-242.

In recent years, the local telephone industry has evolved from a traditionally regulated structure of natural monopoly to one characterized as having a dominant firm and competitive fringe. Yet, legacy regulation from the monopoly era still remains in this new environment, and is often applied solely to the dominant firm. Economic theory suggests that asymmetric regulation of this sort will induce competitive entry. We find support for this theory by demonstrating that the amount of entry into local telephone markets is significantly higher when asymmetric quality-of-service standards are present.

ABIZ completes 1,000 miles of fiber optics contract. (2002, June 11). *Adelphia Bankruptcy News*, 7. Retrieved December 5, 2003, from <http://bankrupt.com/adelphia/adelphia7.txt>

Adler, R. P. (1999). *Information literacy: Advancing opportunities for learning in the Digital Age*. Washington, DC: The Aspen Institute. Retrieved from http://aspeninstitute.org/publications1/bookstore_communications_literacy.html

The report explores the barriers that impede acquisition of the knowledge and skills needed to effectively manage information in its myriad forms, especially digital. It explores six concrete initiatives that individuals and institutions might develop to remedy this problem. The report includes a background paper on information literacy by Patricia Senn Breivik, dean of Libraries at Wayne State University and chair of the National Forum on Information Literacy.

Aldrich, D. (Ed.). (2002). Symposium issue: Exploring E-government: Consideration, issues, and strategies. *Government Information Quarterly*, 19(4), 349-424.

Alleman, J., Hunt, C., Michaels, D., Mueller, M., Rappoport, P., & Taylor, L. (1999). *Telecommunications and Economic Development: Empirical Evidence from Southern Africa*. Sydney, Australia: International Telecommunications Society. Retrieved from http://www.colorado.edu/engineering/alleman/print_files/soafrica_paper.pdf

The objective of this paper is designed to provide a framework to analyze the potential impact of telecommunications investment on the SADC (The Southern African Development Countries) and RSA (the Republic of South Africa) region's economic development. The paper includes a review of the methodology, models and data requirements utilized in similar studies on the relationship between economic development and telecommunications in other regions of the world. Economic techniques make possible a more precise definition of the relationship between telecommunications and economic development by using both quantitative and qualitative indicators to analyze the impact of equipment cost, calling price, tariff levels, and other factors. The available procedures will be reviewed to determine their potential applications to the SADC and RSA, and suggest the most appropriate methodology for further analysis of each country within the region. This paper critiques and analyzes data on telecommunications services in the SADC and RSA; and estimates the evidence for, and consequences of, the inadequacy of these services. The object is to provide an overview of the telecommunications effects on the economies of SADC and RSA. Policy alternatives and options will be explored in the conclusions.

Allen, J. C., & Dillman, D. A. (1994). *Against all odds: Rural community in the Information Age*. Boulder, CO: Westview Press.

Allen, J. C., & Johnson, B. B. (1995). Telecommunications and economic development: A study of 20 rural communities. *Rural Telecommunications*, 14(4), 28-34.

In an attempt to understand the influence telecommunications might have on rural economic growth and its effects on rural Americans' quality of life, a survey of 20 rural communities in 6 states was conducted. The study examined 2 questions: 1) To what degree are telecommunications technologies currently involved in the economic and social fabric of rural communities? 2) What do rural residents think government should do to advance the diffusion and adaptation of new technologies in their communities? The results of the survey show that most rural residents and businesses are now extensive users of telecommunications technology, and they believe it is critical to the future of their communities. They see the ability to use these new technologies as key to the future growth of their economies, as well as the delivery of community services considered integral to the quality of life.

Allen, J. C., Johnson, B. B., & Leistritz, F. L. (1993). Rural economic development using information age technology: Some directions for practitioners. *Economic Development Review*, 11(4), 30-33.

During the past 10 years, many economic development strategies have identified telecommunication technology as a potential barrier to economic development in rural areas. An additional potential barrier to using information technology to facilitate economic development is examined. Thirty-two managers representing 43 telecommunication providers in Nebraska and 18 managers or owners representing 21 North Dakota telecommunication providers were surveyed in late 1991 and 1992 using a combination of personal interviews and mail questionnaires. It is found that the sophistication of telecommunications technology is not significantly different in rural areas. Digital switching technology is being used by all providers. The findings of the 2-state study indicate that practitioners may have a very important role in organizing coalitions between business users and telecommunication providers which have the potential to increase job creation in rural areas by utilizing telecommunication technologies.

Allen, J. C., Johnson, B. B., Leistritz, F. L., Olsen, D., & Sell, R. (1998). Telecommunications and rural business. *Economic Development Review*, 15(4), 53-59.

There is a great deal of telecommunications technology use among rural businesses. These businesses are even using highly sophisticated technologies with some frequency. It appears that rural communities are relying on Information Age technologies to achieve economic viability more heavily than many of their urban counterparts. Rural businesses of all types are using new technologies to negate their relative isolation. Rural communities view telecommunications technology's potential for connectivity as critical, so they advocate universal access to and the competitive pricing of this technology. These rural firms believe that telecommunications technology use does not necessarily infer a capital/labor substitution.

Allen, J., Johnson, B., Olsen, D., & Leistritz, F. L. (1996). Telecommunications in rural communities: Patterns, perceptions and changes. Columbia, MO: Rural Policy Research Institute.

Allen, J. C. and Koffler, E. (1999). *The Telecommunications Act of 1996: Its implementation in the U.S. South*. Mississippi State, MS: Southern Rural Development Center (SRDC Publication 211-D). Retrieved February 25, 2003, from srdc.msstate.edu/publications/allen.pdf

With the passage of the Telecommunications Act of 1996, the pace of regulatory change increased exponentially. The impact on rural areas is significant; the issues specific to Southern states and communities are unique. This report provides a brief history of telecommunications regulation and an overview of the key elements of the Telecommunications Act of 1996. Innovations in state telecommunications regulations, as well as a summary of actions taken by Southern states since the 1996 Act was adopted, are discussed. After that whirlwind tour of telecommunications regulation, the report examines the evidence for the importance of telecommunications technology in rural areas and reviews key technology innovations that hold promise for rural areas. Finally, a checklist of items that state and local decision makers need to consider when defining *Telecommunications Policy* for their regions is presented.

Analysys, Ltd. (1989). *A Study of the economic implications of stimulating applications of IT&T in rural areas. Final report prepared for the Commission of the European Communities*. Cambridge, UK: ORA Programme.

Andrew, T. N., & Petkov, D. (2003). The need for a systems thinking approach to the planning of rural Telecommunications infrastructure. *Telecommunications Policy*, 27(1), 75-93.

The *Rural Telecommunications System* is not just a technological system but a complex system of people and technology interdependent on other systems/subsystems. Therefore, the issues involved in the deployment of *Rural Telecommunications* infrastructure, if all its stakeholders are to benefit, are not always technological, but are often complex and 'messy', cutting across various aspects of the rural society, especially in developing countries. Consequently, the planning of *Rural Telecommunications* infrastructure requires an approach that addresses such complexities. It is proposed that a systems thinking approach to the planning of *Rural Telecommunications* infrastructure will yield far more value than is possible from current approaches, for all of its stakeholders.

Angelides, M. C., & Agius, H. W. (2000). Eight scenarios of national information superhighway development. *Journal of Information Technology*, 15(1), 53-67.

Appendix A: An historical analysis relating causes to effects. In *Global communications: Opportunities for trade and aid* (pp. 159-172).

AOL Time Warner Foundation, Cisco Systems, & Yahoo! (2002). *Network for good* [Web site]. Retrieved December 21, 2003, from <http://www.networkforgood.org/>

"Network for Good is a nonprofit organization dedicated to using the Web to help people get more involved in their communities -from volunteering and donating money, to speaking out on issues..."--Home page.

Armstrong, T. O., & Fuhr, J. P. Jr. (1993). Cost considerations for rural telephone service. *Telecommunications Policy*, 17(1), 80-83.

This study estimates the relationship between density and fixed costs for rural telephone companies, together with several other cost factors, to determine the costs of providing telephone

service to different areas. It is found that not all rural companies are high-cost companies; rural cooperatives, for instance, have the lowest operating costs and lowest total expenses per access line. Yet low-interest loans, long-distance settlements and disbursements from the universal service fund are made available to these companies on the basis of only a portion of their costs.

Arnheim, L. (1988). Telecommunications infrastructure and economic development in the Northeast-Midwest region. Washington, DC: Northeast-Midwest Institute.

Arunachalam, S. (1999). Information and knowledge in the age of electronic communication: A developing country perspective. *Journal of Information Science*, 25(6), 465-476.

The current digital revolution, the fourth information revolution in history after the invention of writing, the book and printing, has serious potential to exacerbate the gulf between the North and the South. As has been observed in the USA, even within an affluent country, with inadequate policy interventions, information technology not only widens the digital divide but also deepens the racial ravine. The implications of the new information and communication technologies (ICTs) for science and scholarship and for development are examined. The maldistribution of access to ICTs - telephones, computers, networks, Internet, bandwidth and electronic journals - is bound to make it even more difficult for the developing countries to contribute to, and take advantage of, knowledge in the sciences. These countries will get further marginalized, As suggested by Brace Alberts, President of the National Academy of Sciences, USA, knowledge dissemination structures need to be put in place which are not entirely based on commerce. Innovative models, such as the community access model of the M.S. Swaminathan Research Foundation, which attempts to transform the otherwise divisive information technologies into allies in the equity movement, can make a difference to the life of the rural poor. The Swaminathan model emphasizes delivering locale-specific knowledge that the people actually need and can use to improve their lot. The model follows a bottom-up approach, involving the user community as partners right from the beginning, emphasizes knowledge delivery and uses technology - a hybrid wired and wireless network - only when it is necessary to achieve its major goal of knowledge delivery.

Aspen Institute. (2003). *Aspen Institute Community Strategies Group* [Home page]. Washington, D.C.: The Author. Retrieved February 25, 2003, from www.aspeninst.org/csg/

"The Community Strategies Group (CSG) structures and contributes to focused learning that supports the innovation of organizations and funders working to achieve more widely shared and lasting prosperity in communities" -- CSG home page.

Aspen Institute. *Community Strategies Group Rural Development Philanthropy Learning Network* [Home page]. (2002). Washington, DC: The Author. Retrieved February 25, 2003, from <http://www.aspencsg.org/rdp/index.html>

"Rural development philanthropy (RDP) is the process and practice of creating locally controlled endowment and grantmaking programs to improve rural livelihoods, economies, and community vitality" -- RDP Overview (<http://www.aspencsg.org/rdp/framesets/philant.html>). Association of Telecommunications Professionals in State Government. (2000). *Networks: 2000-2001 state reports*. Lexington, KY: The Council of State Governments.

Audirac, I. (Ed.). (1997). *Rural sustainable development in America*. New York: John Wiley & Sons.

Contents: Rural sustainable development: a postmodern alternative / Ivonne Audirac -- A tradition of rural sustainability: the Amish portrayed / Mark B. Lapping -- Ecological footprints and the imperative of rural sustainability / William E. Rees -- Sustainability and rural revitalization: two alternative visions / Richard M. Clugston -- Exploration of a framework for evaluating sustainable development in a rural agricultural context / Erik Davies and George Penfold -- Sustainable community development : a systems approach / Daniel D. Chiras and Julie Herman -- Moving from principles to policy : a framework for rural sustainable community development in the United States / Owen J. Furuseth and Deborah S.K. Thomas -- Still life on the plains : strategies for sustainable communities / Joseph Luther -- Self-development as a strategy for rural sustainability / Gary P. Green -- Strengthening social capital : the challenge for rural community sustainability / Lionel J. Beaulieu and Glenn D. Israel -- Rural public administration and sustainability : reasserting governance over government / James Seroka -- Community-based workshops : building a partnership for community vitality / James A. Segedy -- Rural sustainable development : a new regionalism? / Michael Boswell and Ivonne Audirac -- Agriculture adaptation to urbanization: farm types and agricultural sustainability in U.S. metropolitan areas / Ralph E. Heimlich and Charles H. Barnard -- Greenways, trails, and rural sustainability / Earl M. Starnes, Mark Benedict, and Matthew S. Sexton -- SURE (Sustainable Urban/Rural Enterprise): a partnership for economy and environment / James A. Segedy and Thomas S. Lyons -- Solid waste management in rural areas: lessons from Florida / Raymond A. Shapek -- Economic analysis of Leaf Management Alternatives for Local Government / Donn A. Derr and Pritam S. Dhillon -- Regenerating a regional economy from within : some preliminary lessons from Central Appalachia / Anthony Flaccavento -- Equity and sustainable development : community self-empowerment in three indigenous communities / Nola-Kate Seymoar.

Australian Communications Authority. (1993). *Rural and Remote Telecommunications. Final report to the Minister for Transport and Communications on the extent of unmet needs in rural and remote areas for the standard telephone service*. Melbourne: The Author.

Australian Communications Authority. (March, 2000). *The universal service obligation-- payphones* (Special report No. 5).

Retrieved from http://www.aca.gov.au/aca_home/publications/reports/payphones_report.pdf

This report examines Telstra's compliance with its obligation with respect to payphones, an area that has been an important feature of telecommunications legislation for a number of years. This report also identifies areas where additional work is required to more closely examine Telstra's compliance with its USO in relation to payphones. Given the relatively small number of payphones included in the ACA's survey, the importance of payphone availability and the results of the survey, the ACA intends to commission a follow up study during 2000 focusing on the reliability of Telstra's payphone service.

Bar, F., & Riis, A. M. (2000). Tapping user-driven innovation: A new rationale for universal service. *The Information Society*, 16(2), 99-108.

The current transformation of communication policies, as governments turn to the marketplace as the driver of network evolution, requires a redefinition of universal service. The debate so far has focused primarily on the elaboration of new funding mechanisms and the

definition of which services should be covered. We argue that a more fundamental, third area demands attention: the articulation of a new rationale for universal service itself. Without articulating a clear justification for universal service, designing its scope and funding mechanisms is problematic at best. Past justifications rested on welfare (make telephony affordable to all) and network externalities (increase the network's value by widening its reach). Increasingly, these need to be complemented by a new rationale based on the innovative potential of universal service. This article explores how universal service can fuel innovation-driven economic growth.

Barnett, A. H., & Kaserman, D. L. (1998). The simple welfare economics of network externalities and the uneasy case for subscribership subsidies. *Journal of Regulatory Economics*, 13(3), 245-254.

The goal of universal service has dominated the *Telecommunications Policy* landscape for at least the past half century. This policy objective has been promoted with cross subsidies from long-distance telecommunications services to subscribers to local telecommunications service. The economic rationale for these cross subsidies is network externalities. In this paper, we show that: (1) the presence of network externalities, even if substantial in overall magnitude, does not generally justify a subscribership subsidy, even a well-designed one; and (2) the empirical realities of telecommunications markets make it unlikely that subscribership subsidies of any kind will increase social welfare.

Barros, P. P., & Seabra, M. C. (1999). Universal service: does competition help or hurt? *Information Economics and Policy*, 11(1), 45-60.

In a general environment of increasing deregulation and promotion of competition in telecommunications markets, the effects of these changes upon the attainment of universal service objectives are coming under close scrutiny. In a rough way, 'universal service objectives' means that economic authorities would like to promote high telephone densities at affordable prices. Thus, empirical analysis of the effect of competition should evaluate both telephone density and price effects. We show that, when we look at aggregate data, the effects of the introduction of competition on telephone density depend on the econometric approach followed, and that, in the short run, no clear downward pressure on prices results from competition. Hence, the aggregate, country level, effects do not provide a clear answer to the posed question. There is a need for further research that reconciles the findings of microeconomic studies with aggregate data evolution.

Barsh, R. L., & Gale, J. (1981, December). U. S. Economic Development Policy-The Urban-Rural Dimension. *The Policy Studies Journal*, 10(2), 248-271

US economic development on the federal level is reviewed, with emphasis on the Ur-Ru dimension. Economic development is discussed & defined, & appropriate intervention into free market processes is considered. US economic development policy history is reviewed in its broader form of subsidy & risk reallocation to show constituencies, complexity, Ur-Ru emphasis, & biases toward industrialization. Various sociopolitical scenarios are introduced to explain these patterns. The relationship between economic policy & federalism is explored. A conception of Ru development is developed & reconceptualization of development along a systemic perspective is urged (Social Services Abstracts).

Descriptors: United States; Economic; Economics; Economical; Development; Developments
Policy; Policies; Urban; Rural

Identifiers: US economic development policy, urban-rural dimension

Barthold, J. (2001). Satellite player dishes up big pipe dream. *Telephony*, 241(19), 18-19.

EchoStar Communications Founder, Chairman and CEO Charlie Ergen wants to achieve broadband supremacy so badly that he is willing to gamble half his personal fortune in a \$25.8 billion bid to take Hughes Electronics and its DirecTV satellite business off the willing hands of General Motors. Ergen's bet is that the nationwide two-way satellite assets of a bolstered EchoStar will make the company part of a troika of broadband players - along with DSL providers and cable modem operators - and appeal to regulators as a way to close the so-called digital divide in underserved rural areas.

Bauer, J. M. (1999). Universal service in the European Union. *Government Information Quarterly*, 16(4), 329-343.

Since the late 1980s, the European Union (EU) has pursued a program of comprehensive telecommunications liberalization. The increased reliance on competition necessitated the establishment of explicit universal service policies. European universal service policies define the scope and cost of universal service as well as permissible funding mechanisms. Emphasizing competition over social goals, the EU has adopted a rather narrow version of universal service. Future revisions may provide an opportunity to adopt a more ambitious universal service model.

Baumol, W. J., & Merrill, T. W. (1998). Does the constitution require that we kill the competitive goose? Pricing local phone services to rivals. *New York University Law Review*, 73(4), 1122-1148.

This article concludes a series by these authors and Professors J. Gregory Sidak and Daniel F. Spulber, published last year in this journal. Here, Professors Baumol and Merrill address the issues surrounding the pricing of local phone services to long distance rivals, clarifying their points of agreement and disagreement with Sidak and Spulber. In their previous articles, Sidak and Spulber argued that the movement toward competition in local telephone service should be accompanied by substantial compensation to existing local telephone carriers, a view that Baumol and Merrill do not share. Rather, they note three points of disagreement between Sidak and Spulber and themselves. First, they maintain that Sidak and Spulber use an incorrect formula to determine whether the transition from regulated monopoly to competition requires compensation. Second, they argue that neither the Compensation Clause nor the regulatory contract requires compensation to take place ex ante. Finally, they do not believe that the magnitude of fixed and common costs will be significant in local telephony.

Bayha, B. (1998). *The Internet: An inclusive magnet for teaching all students*. World Institute on Disability. Retrieved from <http://www.wid.org/archives/handbook.pdf>

Provides tips to help teachers assist all of their students, (including disabled students, auditory and visual learners, students from rural areas, and students whose first language is not English) in mining the Internet's resources; common access strategies and ways students can benefit from them, practical models from teachers, and success stories.

Belinfante, A. *Telephone subscribership in the United States* (Data through [month year]). Washington, DC: Federal Communications Commission. Retrieved from <http://www.fcc.gov/scb/iatd/stats.html>

The Federal Communications Commission's (FCC's) report--published three times per year--on telephone subscribership in the United States, presenting subscribership statistics based on the Current Population Survey (CPS) conducted by the Census Bureau.

Belinfante, A. *Telephone penetration by income by state*. Washington, DC: Federal Communications Commission. Retrieved from <http://www.fcc.gov/ccb/stats>

Annual report presenting "... data on telephone penetration levels on a state-by-state basis for various income categories"-- Executive summary, p. 1.

Bell, D., & Evert, K. (1997). Effective strategies for the future of rural communities. *Economic Development Review*, 15(1), 59-62.

"Local leaders in smaller rural communities are concluding that if community and economic development are to occur they will need to make it happen. Strategies that they could employ include public education and job training, utilization of technology, creation of revolving loan funds, implementation of interlocal cooperation agreements, networking with state and regional agencies, establishment of community foundations, provision of health care, stimulation of leadership and commitment, and strategic planning itself" (ProQuest abstract).

Subjects: Rural development; Poverty; Economic development; Economic planning

Benchmarking The Information Society: e-Europe indicators for European Regions. (2002). e-Europe Regions Development Model. Workpackage 1. Project funded by the European Community under the "Information Society Technology" Programme. Retrieved from <http://www.biser-eu.com/resultsdoc/C - Biser D1-3.pdf>

This is the third deliverable of the BISER project and the last of three from workpackage 1 (e-Europe Regions Development Model). As such, it represents the culmination of the first phase of BISER by presenting the project's e-Europe Regions Development Framework. The deliverable reviews the main research concepts and trends of regions in an Information Society / Knowledge Economy context, and this, taken together with the review of policy in deliverable D1.1, provides the basis for specifying BISER's e-Europe Regions Development Framework. Annexes include the results of scanning which are not directly included in the main part of the deliverable but which have nevertheless been important in determining the scope and form of the framework. The annexes are included in this deliverable in order to: 1) demonstrate the wide ranging scanning exercise undertaken by BISER in order to ensure that the current state-of-the-art of e-Europe regions has been captured and represented in detail, 2) to facilitate the subsequent work of BISER by providing a data bank of resources and information.

Benton Foundation. (2002). *Digital Divide Network: DDN home* [Home page]. Benton Foundation. Retrieved June 26, 2002, from <http://www.digitaldividenetwork.org/content/sections/index.cfm>

This site, sponsored by the Benton Foundation, includes a wide array of links to information resources related to the Digital Divide.

Benton Foundation. (1997). *Public interest advocates, universal service, and the Telecommunications Act of 1996*. Retrieved June 29, 2001, from <http://www.benton.org/Library/Advocates/advocates.html>

Examines obstacles to widely available, affordable digital communications (universal access); in light of 1996 communications legislation; US. Discusses defining "universal access," funding federal subsidies for some users, maintaining service quality, rates, access for schools, libraries, and health care institutions, rural rates, low-income customers, accounting and regulation, and other issues.

Berkeley, N., Clark, D., Ilbery, B. (1996). Regional variations in business use of information and communication technologies and their implications for policy: Case study evidence from rural England. *Geoforum*, 27(1), 75-86.

This paper compares the awareness, take-up and use of information and communication technologies in an 'accessible' rural region with that in a 'remote' rural region and assesses the implications for policy. Data are drawn from a survey of small businesses in south Warwickshire and north Lancashire. The findings reveal the overall adoption of information and communication technologies, both basic and advanced, to be low, but especially low in north Lancashire compared with south Warwickshire. The reasons for these patterns are explored. In general, the low take-up rates are a function of a combination of factors: infrastructure; business size; the cost, complexity and relevance of the technology; awareness and training; whilst the observed differences between the two regions reflect differences in business culture. The policy implications of these findings are discussed. It is advocated that local policy intervention is necessary to take account of the differences that exist between rural areas.

Berra, M. (2003). Information communication technology and local development. *Telematics and Informatics*, 20(3), 215-234.

This paper takes into consideration the existing links between local, economic development and the communications potential embedded in civic networks and local information systems. Through a thorough empirical survey of services (comprising administrative and social care services, possibility of access, IT literacy, discussion forums and equality of access) set up in Italy, and carried out using qualitative and quantitative methods, civic networks have been analyzed as a way of improving administrative services and public communication and also as an opportunity to create new forms of communication between citizens, administration, economic actors and non-profit associations. What is highlighted here is how the confrontation and cooperation of social interests may not only improve the potential of local government, but also promote a process of socialization, which could lead to the revitalization of declining civil and political participation. In particular, my analysis concerns the experiences of three Italian regions (Piedmont, Emilia Romagna and Lombardy) which offer different models of economic, social and political development. Civic networks, here, have evolved along different lines and served different purposes, determined by social and administrative regional environments.

Bertot, J. C. (2003, May). The multiple dimensions of the Digital Divide: More than the technology 'haves' and 'have nots'. *Government Information Quarterly*, 22(2), 185-191.

Discusses the complex and multiple dimensions of the Digital Divide. (MAT abstract).

Bertot, J. C., & McClure, C. R. (1999). U.S. public library outlet Internet connectivity: Progress issues and strategies. *Library & Information Science Research*, 21(3), 281-298.

The 1998 Public Library Outlet Internet Connectivity study (Bertot & McClure, 1998) sponsored by the American Library Association (ALA) and the National Commission on Libraries and Information Science (NCLIS) collected public library outlet Internet connectivity data by outlet metropolitan status, poverty, and region strata. Based on a national survey, the results show that there are disparities in public library outlet Internet connectivity, public access provision, and speed of public access Internet services. Such disparities have implications for future connectivity policy development such as the e-rate, state library-based connectivity programs, and library-initiated connectivity initiatives that this article identifies and explores. Community Access Points (CAPS), in addition to public libraries, may be necessary to reach national goals related to universal service and equality of access to the Internet.

Bertot, J. C., McClure, C. R., & Owens, K.A. (1999). Universal service in a global networked environment: Selected issues and possible approaches. *Government Information Quarterly*, 16(4), 309-327.

This article provides an overview and summary of selected issues related to the development of universal service to networked information resources and services in a global networked environment. Complex issues have yet to be addressed regarding basic concerns such as defining the term "universal service" as it suggests a range of meanings and uses given different societal contexts. The model for universal service being developed in the United States offers some lessons and concerns for other nations attempting to promote universal service as a national policy. The article concludes with a number of recommendations that address selected policy issues related to universal service in a global networked environment.

Bertot, J. C., & McClure, C. R. (2000). *Public Libraries and the Internet 2000: Summary findings and data tables*. National Commission on Libraries and Information Science.

Summary report on public library access to and use of the Internet, 2000. Data are from a survey of representatives of 1,108 library outlets. Survey covered library outlets Internet connection status; connection speed; funding sources; library computer equipment types, database subscription services, and public availability; use of filtering software and presence of acceptable use policy; availability of specialized equipment for disabled users; and provision of Internet training services.

Bettelheim, A. (2000). Debate over Internet regulation rekindled by AOL mega-merger. *CQ Weekly*, 58(3), 85-6.

The debate over Internet regulation has been rekindled by the announcement on January 10, 2000, by America Online Inc. that it plans to acquire Time Warner Inc. in a deal valued in excess of \$150 billion. Some lawmakers have voiced their concern that the merger could limit consumer choice in choosing Internet providers. Lawmakers in the House forecast that the deal will intensify calls for legislation to stimulate competition among Internet service providers. Representative Robert W. Goodlatte, R-Va., and Senator Sam Brownback, R-Kans., have warned that a "digital divide" is occurring between rural and urban America: They fear that telecommunications companies will rush to put high-speed fiber-optic communications systems in lucrative urban areas while ignoring rural areas. They argue that there is a need for some government-mandated "open access" policy. However, there are powerful lawmakers who

oppose the sponsors of Internet access legislation and who believe that it is too early to levy regulations on a still-maturing industry.

Bettelheim, A. (2000). New corporate incentives bills compete with regulatory relief as a way to spur Internet access. *CQ Weekly*, 58(14).

Three new Senate proposals to narrow the so-called digital divide highlight the policy differences separating legislators as Congress attempts to draft Internet access legislation. Each proposal would utilize low-interest government loans or tax credits to deliver "broadband," or high speed, Internet service to underserved areas, many of them rural. S 2307, introduced by Byron L. Dorgan, D-N.Dak., would establish a \$3-billion revolving loan fund to finance deployment of high-speed Internet systems in rural areas. S 2321, by John D. Rockefeller IV, D-W.Va., and Olympia J. Snowe, R-Maine, would offer tax credits to firms that expand broadband Internet service to rural areas. Legislation by John Kerry, D-Mass., and Daniel Patrick Moynihan, D-N.Y., would likely offer a five-year tax credit to firms that provide next-generation Internet services to residential areas. However, these new proposals are competing with at least four rival measures in both chambers of Congress that propose various forms of regulatory relief for telecommunications firms that expand service.

Beynon, R. (2000). The FCC's implementation of the 1996 Act: Agency litigation strategies and delay. *Federal Communications Law Journal*, 53(1), 27-48.

Since it began promulgating rules to implement the local competition provisions of the Telecommunications Act of 1996, the FCC has been under attack in the courts. The FCC has regularly accused its opponents in these legal battles of using litigation to impede the implementation of the 1996 Act's local competition provisions. If litigation has in fact slowed the introduction of competition in the local exchange markets, the FCC itself must share some of the blame. The FCC might have encouraged more effectively the introduction of competition in the local markets had it taken an approach that was less antagonistic toward parties affected by its local competition rules and more defensible in light of the statute's provisions.

Biddle, L. J., & Biddle, W. W. (1962). *Community dynamics processes: Two community case studies of people in development*. Privately published.

Birdsell, D. S., & Muzzio, D. A. (1999). *Government programs involving citizen access to Internet services*. Markle Foundation. Retrieved from <http://www.markle.org>.

BJK Associates. (2001, January 20). *Broadband Internet access for rural small businesses*. Retrieved January 11, 2004, from <http://www.nfib.com/PDFs/broadband.pdf>

"... The purposes of this report are two. One purpose is to examine the technological problems that may cause a difference between urban and rural installations of high-speed Internet access. The other purpose is to assess whether rural/urban differences are serious enough to require public policy initiatives to avoid the digital divide that could cause the decline of small and rural small businesses. If so, what public policies might be implemented to assure that appropriate mechanisms, either market or public actions, to provide equal Internet access to rural America?" (p. iii).

Blanks-Hindman, D. (2000). The Rural-urban digital divide. *Journalism & Mass Communication Quarterly*, 77(3), 549-560.

Block, C. B. (1985). Satellite linkages and rural development. In H. E. Hudson (Ed.), *New directions in satellite communications: Challenges for North and South*. Norwood, MA: Artech.

Boekema, F., Morgan, K., Bakkers, S., & Rutten, R. (Eds.). (2000). *Knowledge, innovation and economic growth: The theory and practice of learning regions*. Northampton, MA: Edward Elgar.

The learning region offers a new perspective on the dynamics of change which shape the economy. This book examines the transformation of the modern economy into one in which knowledge is the most important resource and learning the most important process for economic growth. In the modern economy, successful firms, as well as governments, are those which have control over and access to flows of information and knowledge of technologies, markets, and organizational and managerial practices. In order to examine this, the authors apply innovation, industrial network and institutional theories to the many factors which together constitute learning regions: regional innovation policy, geographical clusters of collaborating firms and the role of research centers in the innovative potential of regions.

They find that the learning region paradigm opens new possibilities for research and policy and use case studies in Germany, Holland and Belgium to illustrate these possibilities. The authors also examine European Union and regional government policy on innovation and regional development. Finally, they examine inter-firm and intra-firm collaboration and regional business and innovation systems. This innovative new book will prove invaluable to regional scientists, economic geographers and regional planners.

Boerner, G. L. (2002, October 1). The brave new world of wireless technologies: A primer for educators. *Syllabus Magazine*. Retrieved September 26, 2003, from <http://www.syllabus.com/article.asp?id=6771>.

Note: Article printed out.

Bohland, J., Papadakis, M., et al. (2002). *Creating the CyberSouth*. Retrieved from <http://www.southern.org/pubs/stc/cybersouth.PDF>

Bonnen, J. T. (1992). Why is there no coherent U.S. rural policy? *Policy Studies Journal*, 20(2), 190-201.

The reasons the US has never developed a coherent, successful rural policy and the obstacles to such a policy are discussed. Federal programs, responsive to agricultural interests, do not serve the cause of rural development.

Bonnett, T. W. (2001). Is ISP-bound traffic local or interstate? *Federal Communications Law Journal*, 53(2), 239-280.

The shape of communications policy has been influenced by the jurisdictional tension between federal and state agencies and by the interplay between rival telecommunication providers. From the outset, the publicly switched telephone network ("PSTN") was monopolistic and dually regulated by federal and state agencies. In recent years, facilitated by the Telecommunications Act of 1996, vast competition in the local exchange market has developed

between incumbent carriers and competitive carriers. This Article provides an overview of this competition and analyzes the dual regulation of the PSTN. In addition, this Article discusses the dispute between incumbents and competitive carriers as to whether calls to Internet service providers should be deemed local or interstate, and provides a summary of the differing views of this dilemma. This Article concludes by contending that, although Internet access is essentially interstate in nature, state commissions can best define the shape that communications policy should take in the digital age.

Borodkin, F. M., & Alfiorov, V. M. (1982, October). A demoeconomic model of the rural sector. *Quality and Quantity*, 16(5), 403-431

Socioproductive & demosocial models in a prediction procedure for Ru SE development are outlined. Elements discussed in the models' formulation include: (1) the objective of determining number & composition of Ru sector jobs, where labor demand, normative population, & net migration rates are determined; (2) use of differential equations or classical linear programming; & (3) the demosocial model for labor supply, including age-, sex-, & education-specific cohorts for several skill groups. Uses of the model in interpreting regional growth phenomena are reviewed for both productive & demographic behavior; predictions made for development in the West Siberian countryside are also noted. 5 Figures. Modified HA. (Sociological Abstracts).

Descriptors: Rural; Development; Developments; Economic; Economics; Economical

Identifiers: Demoeconomic model; Prediction procedure; Rural development

Classification: Methodology and research technology; Models: Mathematical & other

Bortnick, J. (1983). Information technology and developing world: Opportunities and obstacles. *The Information Society*, 2(2), 157-170.

Information technology can give significant aid to less developed countries (LDC) in their development efforts. Telecommunications satellites can provide communications capabilities to areas that lack or are unable to establish ground communications facilities, and microcomputers and packaged software offer substantial computational capacity at relatively low cost. These technologies can allow LDCs to assess development needs, resource requirements, and alternative development strategies. While LDCs recognize the importance of information technology, several barriers to its implementation exist, including: 1. lack of available capital, 2. lack of trained personnel and technical support facilities, 3. an unwillingness to rely on foreign technology, and 4. lack of cooperation from developed nations. Overcoming these barriers will require that developed nations give financial and technical assistance to LDCs in applying information technology and in developing communications capabilities.

Bowman, W. M. (2001). *Advanced services for rural Texas*. Austin, TX: University of Texas at Austin.

Bowser, B. (1998). Getting on the information country road. *American City and County*, 113(3), 44-46, 51-52, 54, 56.

When the U.S. Congress passed the Telecommunications Act of 1996, it assumed that the act would affect all rural communities in the very near future. However, while the act specifically mandated that telecommunications service providers furnish all schools with affordable Internet access, it did not make the same provision for local governments. Now low-

income, high-cost rural areas are finding themselves being bypassed on the information superhighway due to a lack of funds. However, some local governments are taking matters into their own hands and becoming wired to the Internet.

Boyle, M. (2002, November 25). Wi-Fi U.S.A. *Fortune*, 146(11), 205-. Retrieved September 23, 2003, from the EBSCOhost Academic Search Premier database.

Note: Article printed out.

"Discusses the growing popularity of wireless fidelity (Wi-Fi), the trademarked name given by the Wireless Ethernet Compatibility Alliance, which provides wireless Internet access. How companies such as software supplier Novell in Utah launched a wireless local area network (LAN); Development of Wi-Fi and how it operates; Increase in efficiency and productivity of businesses who use Wi-Fi such as Microsoft; Popularity of Wi-Fi among college students and the need for companies to adopt Wi-Fi as a standard technology of the future"--EBSCOhost Academic Search Premier abstract.

Braden, J. W. (2001). *Factors that influence rural community college faculty to employ Web-based instruction*. Florida State University.

Bradshaw, T. K. (1990, October). *Rural development and telecommunications potential and policy* (Working Paper No. 524). Berkeley: Institute of Urban and Regional Development, University of California.

Breeding, M. (2002, Summer). A hard look at wireless networks. *netconnect*, 14-17.

Bresnahan, T. F., & Greenstein, S. (2001). The economic contribution of information technology: Towards comparative and user studies. *Journal of Evolutionary Economics*, 11(1), 95-118.

By what process does technical change in information technology (IT) increase economic welfare? How does this process result in increases in welfare at different rates in different countries and regions? This paper considers existing literature on measuring the economic benefits from information technology, emphasizing comparative issues and user studies. Following Bresnahan and Trajtenberg (1995), we call the invention associated with customizing the technological frontier to the unique needs of users in particular regions "co-invention", placing emphasis on understanding how its determinants vary across users in different regions. We develop a framework for understanding the processes behind value-creation, demand-side heterogeneity and co-inventive activity. Then we discuss why these processes make measuring the welfare benefits from advances in information technology particularly difficult. We highlight the metrics currently available for measuring the economic pay-out of the IT revolution and identify which of these vary meaningfully in a comparative regional context. Finally, we finish with observations about further areas of research.

Bretz, R. G. (1995). *Telecommunications for rural America: Lessons from Nebraska*.

As a new form of infrastructure is being developed across the vast prairie of Nebraska, electronic pioneers are leading the way to the information age. This paper describes some of those pioneers and their work. The University of Nebraska has been among the leaders in developing the Internet and applications for it. The university established one of the first regional

computer networks in the Midwest and developed a network of extension educators that now has Internet connections in 81 of the 93 Nebraska counties. The Nebraska State Department of Education has also been a pioneer, providing Internet training to teachers and funding for Internet access in schools. Today, about half of Nebraska school districts have direct Internet connections, with the remainder using modems for access. Nebraska Educational Telecommunications, which has provided educational television and radio for over 40 years, has created NebraskaNet, bringing together the electronic activities of state agencies, the University, schools, colleges, and communities in an Internet service that is easy to locate and navigate. In addition, three partner communities are working with NebraskaNet to pilot models of community connection to and "presence" on the Internet. An initiative of the Nebraska Department of Economic Development offers rural communities an organizational model and a basic strategic planning process that enable them to accelerate and capitalize on expanded access to information. A description of the experiences of three Nebraska communities provides a perspective on activities related to information technology occurring across the state. (SV)

Briefly noted: Telephone lines and line upgrade cost, for customers in isolated areas and customers within 18,000 feet of a central office (CO) or digital loop carrier (DLC). (2000). *Telephony*, 239, 34-35.

Reports on telecommunications access in rural areas.

Broadband access in rural areas: Hearing before the Subcommittee on Regulatory Reform and Oversight and Subcommittee on Rural Enterprises, Agriculture, and Technology of the Committee on Small Business, House of Representatives, One Hundred Seventh Congress, first session, Washington, DC, May 17 & 24, 2001. (2001). Committee on Small Business. Subcommittee on Regulatory Reform and Oversight. Washington, DC, U.S. G.P.O. : [Congressional Sales Office, Supt. of Docs., U.S. G.P.O., distributor]: iii, 185 p.

Examines the issue of broadband access in rural areas of the United States.

Broadway, M. J. (2000, January). Planning for change in small towns or trying to avoid the slaughterhouse blues. *Journal of Rural Studies*, 16(1), 37-46.

"Rural farming communities throughout the North American Prairies & Great Plains have sought to reverse decades of slow economic decline by attracting value-added processing of agricultural products as a means of economic development. The meatpacking industry has been attracted to the region by the availability of fed cattle. It has created thousands of low-paying jobs & boosted local agricultural economics by increasing the demand for animals & feed, while impairing water quality & bringing a host of social problems to packinghouse communities. Examined here is how the town of Brooks, Alberta, prepared & dealt with these challenges over a 2-year period following expansion of a beefpacking plant. Despite the advance warning of the social changes that would accompany the hiring of additional workers, the town failed to meet the housing needs of newcomers recruited to work at the plant & experienced a significant increase in a variety of social disorders. It is concluded that preparing for change begins with the recognition that social & environmental impacts are inevitable with the arrival of a new industry. A proactive response to protecting the environment & ensuring that basic human needs are met is better for a community & its workforce than having changes thrust on it by an industry whose only interest is in maximizing profits. 1 Table, 46 References" (Sociological Abstracts).

Descriptors: Economic Change; Community Change; Community Development; Economic Development; Rural Communities; Food Industry; Agricultural Production; Social Planning; Social Response; Agricultural Economics; Environmental Protection; Alberta

Brock, G. W., & Katz, M. L. (1997). Regulation to promote competition: A first look at the FCC's implementation of the local competition provisions of the telecommunications act of 1996. *Information Economics and Policy*, 9(2), 103-117.

The US policy framework for promoting competition in the provision of local telephone services is analyzed. The local competition provisions of the Telecommunications Act of 1996, the FCC's order implementing those provisions and the court review of that order, is reviewed. An economic analysis of key controversies in the local competition framework are provided, including the benefits of regulatory guidelines as a supplement to bargaining, whether guidelines should be developed at the state or the federal level and the rationality of the guidelines developed by the FCC. It is concluded that regulatory guidelines can provide a more efficient outcome than pure bargaining, that guidelines can best be developed at the national level with provision for adjustment to local conditions and that the FCC guidelines for call completion pricing provide clear benefits over pure bargaining while the benefits of the FCC guidelines for unbundled elements are more ambiguous.

Brown, R. (2003). Full speed ahead: Broadband gains momentum in rural America. *Rural Telecommunications*, 22(3), 20-24.

As more and more small telcos and co-ops are starting to deploy broadband networks or considering making the investment to do so, those who have been on the scene for a while say there's no better time than now to get in. In addition, several telephone executives mentioned the \$1.4 billion available through the Rural Utilities Service's Rural Broadband Access Loan and Loan Guarantee program, which the RUS rolled out early this year. Bundling multiple services is a strong defense against competition, and most said that high-speed Internet access does best when paired with broadband video offerings. Several telephone executives pointed out that digital television via broadband is far superior to cable offerings because subscribers get more channels and access to local channels. Consultants also recommended that new video entrants join a head end consortium that shares the cost of transmitting the video signals.

Brown, G., & Burgess, P. M. (1999). *Points West special report: America's telecommunications revolution : "Not available in all locations"*. Denver, CO: Center for the New West.

"This special report was prepared for the Western Regional Forums on America's Growing Digital Divide November 30-December 10, 1998 in Helena, Montana; Spokane, Washington and Colorado Springs, Colorado. It reflects the findings of the Center's first Regional forum in Salt Lake City in July, 1997, and the most recent recommendations on universal service by the Federal/State Joint Board on November 23, 1998"-- p. [1].

Bruce, D., Gadsden, P., & Sackville, N. B. (1999). *Internet access and use in rural and small town Atlantic Canada*. Canada: Mount Allison University.

This report summarizes the results of a January 1998 survey of 1500 adults living in 20 different communities in Atlantic Canada, with a focus on Internet access and usage patterns and issues. Analysis is provided at both the provincial and community levels. Specific issues discussed include gender, income, age, education, employment, and lifelong learning as they

relate to access and usage patterns. Of particular note is the use of the New Rural Economy classification scheme (<http://nre.concordia.ca>) to describe access and use patterns among different types of communities.

Brutlag, L., & Jorgensen, N. (1996). The rural LEC point of view: CoBank customers offer their perspective on the Telecommunications Act of 1996. *Rural Telecommunications*, 15(5), 30-32.

Interconnection provisions in the Telecommunications Act of 1996 force incumbent local exchange carriers (LECs), including rural telephone companies, to allow competitors to interconnect to their local loop. In return, competitors must compensate the incumbent LEC at a rate negotiated by the 2 sides. Existing local providers have an advantage over new providers in that they know their customers. However, a concern is that the biggest customers may base their decision of whether to stay with the incumbent on price alone. The new act allows any company to offer the local or long-distance service of another carrier through a resale arrangement. Panhandle Telephone Cooperative and South Central Utah Telephone Association plan to position themselves to offer a full line of services, including long-distance resale. The act represents the first time that any law requires Universal Service Fund.

Brutlag, L., & Jorgensen, N. (1996). The Telecommunications Act of 1996 and rural telco financing: A banker's perspective. *Rural Telecommunications*, 15(5), 26-29.

Two areas of the Telecommunications Act of 1996 will affect rural local exchange carriers (LECs): 1. Interconnection rules may allow competitors to offer local service in an LEC's service area. 2. The Universal Service Fund may be affected. Risks resulting from the act could lead to a change in a telco's revenues and a corresponding change in its capacity to repay debt. Risk factors lenders will review when determining whether to extend financing to telcos include: 1. competition, 2. demographics, and 3. revenue. Rural LECs must examine their organization's management to position themselves to attract credit. The 3 primary management functions are: 1. planning, 2. organization, and 3. leadership.

Brynjolfsson, E., & Kahin, B. (2000). *Understanding the digital economy: Data, tools, and research*. Cambridge, MA: MIT Press.

Measuring the digital economy / John Haltiwanger and Ron S. Jarmin -- GDP and the digital economy : keeping up with the changes / Brent R. Moulton -- Understanding digital technology's evolution and the path of measured productivity growth : present and future in the mirror of the past / Paul A. David -- Understanding digital markets : review and assessment / Michael D. Smith, Joseph Bailey, and Erik Brynjolfsson -- Market structure in the network age / Hal R. Varian -- The evolving structure of commercial Internet markets / Shane Greenstein -- Small companies in the digital economy / Sulin Ba, Andrew B. Whinston, and Han Zhang -- Small business, innovation, and public policy in the information technology industry / Josh Lerner -- Technological change, computerization, and the wage structure / Lawrence F. Katz -- The growing digital divide : implications for an open research agenda / Donna L. Hoffman and Thomas P. Novak -- Extending access to the digital economy to rural and developing regions / Heather E. Hudson -- IT and organizational change in digital economies : a sociotechnical approach / Rob Kling and Roberta Lamb -- Organizational change and the digital economy : a computational organization science perspective / Kathleen M. Carley -- The truth is not out there : an enacted view of the "digital economy" / Wanda J. Orlikowski and C. Suzanne Iacono.

Bukenya, J. O., Gebremedhin, T. G., & Schaeffer, P. V. (2003, Spring). Analysis of quality of life and rural development: Evidence from West Virginia data. *Growth and Change*, 34(2), 202-.

"This paper examines the relationship between quality of life, rural development, and several socioeconomic variables. The analysis utilizes data obtained from a survey questionnaire administered to a random sample of more than 2000 residents in West Virginia, and spatial data obtained by geocoding the survey respondents' addresses. Quality of life is measured by a three-point categorical measure of overall satisfaction, and development is measured by a goods and services availability index. A simultaneous ordered probit model is used to examine the relationships. The empirical results are consistent with the theoretical predictions and indicate a simultaneous relationship between quality of life satisfaction and rural development" (ProQuest abstract).

Subjects: Quality of life; Rural development; Indexes; Mathematical models

Byers, A. (1996). Communities address barriers to connectivity. *Rural Clearinghouse Digest on Rural Telecommunications*, 3(1). Retrieved from ksu.edu/~rcled/publications/tele/teledigest.html

Rural areas lag behind urban areas in access to information technologies. Public institutions play a critical role in extending the benefits of information technologies to those who would not otherwise have access. The most successful *Rural Telecommunications* plans address barriers to use, such as unawareness of the benefits, technophobia, the need for training, and the cost relative to perceived value, as well as barriers to access, such as higher installation costs due to distance and low population density. Rural communities are coming online through a number of initiatives. The National Telecommunications and Information Administration has two programs that fund demonstration projects and assist rural communities in gaining access to information services and technologies. Regional and state initiatives include the Rural Datafication Project, which enables state networks to deliver services to rural communities, and several initiatives in Nebraska that focus on stimulating demand. Big Sky Telegraph has pioneered efforts to bring rural residents online and is a model for rural networking systems. The National Public Telecomputing Network's Rural Information Program helps rural communities set up local information networks that are owned and controlled by the community. Information is provided on 12 organizations and online resources. Contains 11 references and 9 additional resources. (TD)

CableDataCom News (2001). Commercial cable modem launches in North America.

CableDataCom News. Retrieved 2002 from

<http://www.cabledacomnews.com/cmhc/cmhc7.html>

Calabrese, A., & Jung D. (1992). Broadband telecommunications in rural America: Emerging Infrastructure for residential service. *Telecommunications Policy*, 16(3), 225-236.

Communication policies have figured centrally in the development of the rural US and in its integration into the national and international markets. Rural and semi-rural locales are providing interesting sites for experimenting with the shared and divergent interests of 2 major players in broadband telecommunications that are mainly at odds, namely the telephone and cable industries. Perhaps the most distinguishing feature of these initiatives is whether or not a system is regulated as a common carrier. The different architectures of broadband delivery systems - including conventional hard-wired systems, over-the-air systems, and switched networks - suggest different approaches to ownership and control. The case of Indiana provides a

useful illustration of the movement by telephone companies into rural broadband service. Ameritech Corp. and a local Indiana cable television company are planning a joint venture to experiment with the integration of broadband and narrowband service. This article reviews the recent history of *Rural Telecommunications Policy* in the USA and assesses the social significance of emerging patterns of infrastructure development in the residential market. Rural America provides an interesting laboratory for experimenting with the shared and divergent interests of two major players in broadband telecommunications which are mainly at odds, namely the telephone and cable industries. These interests, and their significance for current political and economic developments in rural America, are analyzed in detail below. A brief overview of *Rural Telecommunications* development in the state of Indiana is provided for illustrative purposes.

Canadian Radio-Television and Telecommunication Commission. (October, 1999). *Telephone service to high-cost serving areas*. Telecom Decision CRTC 99-16. File No.: 8665-C12-04/97. Ottawa. Retrieved from <http://www.crtc.gc.ca/archive/eng/Decisions/1999/DT99-16.htm>

The level of telecommunications service in Canada is generally very high. However, in some areas carriers face high operating costs to provide service. With some exceptions, the level of service in such high-cost serving areas, which generally occur in remote, rural regions and in the far north, is lower than the level of service generally available elsewhere in Canada. This decision sets out the Commission's determinations and initiatives resulting from an extensive public process it conducted to determine how Canadians in all regions may have access to affordable, high quality telecommunications service. Among other things, this process included regional consultations held across the country in May and June 1998. Further details about the public process are set out in Appendix 2. The Commission is setting three goals for high-cost areas, over time: 1) To extend service to the few areas that are unserved, 2) To upgrade service levels where customers do not currently have access to the basic services enjoyed by Canadians in other areas (i.e., in underserved areas), 3) To maintain service levels, and ensure that existing levels do not erode under competition.

Capello, R., & Nijkamp, P. (1996). Telecommunications technologies and regional development: Theoretical considerations and empirical evidence. *Annals of Regional Science*, 30(1), 7-30.

The paper provides an analysis of network externalities in the telecommunications sector and their effects on corporate and regional performance. It can essentially be regarded as part of the general theoretical reflection on the role of telecommunications in economic development, by emphasizing the importance of telecommunications for future economic growth. However, the advantages derived from these technologies stem not only from the technological changes taking place in the sector, but also from their nature as interrelated technologies. This stems from the fact that when a new subscriber joins the network, the marginal costs of his entry are lower than the marginal benefits he creates for people (firms) already networked. This difference between marginal costs and benefits (in favor of the benefits) inevitably reflects on industrial performance and - via multiplicative effects - on regional performance. The paper presents an empirical part where an effort is made to measure telecommunications network externalities. Regional differences in the exploitation of network externalities emerge between firms located in the north and in the south of Italy.

Case, D., & Rogers, E. (1987). The adoption and social impacts of information technology in U.S. agriculture. *The Information Society*, 5(2), 57-66.

By 1986, microprocessors had diffused to about 18% of all US households and 6% of US farmers. In addition to general consumer uses, farm households in the US employ microcomputers for such small business applications as record keeping, word processing, and payroll handling. A special application of microprocessor technology took place in 1980-1981 when 200 Kentucky farmers participated in a trial of the Green Thumb Box, a videotext system providing market, weather, and technological information. The nature of the information needs of US farmers seems to fit well with the new information technologies built around the microprocessor, although little of this potential has yet been realized. Since the experiment, videotext has proved to have doubtful value as a channel for the distribution of agricultural information, leaving open the question of what might be the best technological vehicle for this audience. Two issues call for additional research: 1) the adoption and use of the new communication technologies, and 2) their social impacts on rural society.

Cattagni, A., & Farris E. (2001). *Internet access to U.S. public schools and classrooms: 1994-2000*. Washington, DC: U.S. Dept. of Education, Office of Educational Research and Improvement, National Center for Education Statistics.

Cavanagh, T. E. (1999). *Community connections: Strategic partnerships in the digital industries*. S. I.: Conference Board.

Report on U.S. computer and Internet use, access, and education, with emphasis on corporate initiatives.

Cavazos, R., & Eisner, J. (2001). *State-by-state telephone revenues and universal service data*. Washington, DC: Federal Communications Commission. Retrieved 2002 from http://www.fcc.gov/Bureaus/Common_Carrier/Reports/FCC-State_Link/lec.html

Charp, S. (2001). Bridging the digital divide. *T.H.E. Journal* 28(10), 10-12.

A topic of great concern to most countries around the world, the "Digital Divide" is usually defined as the gap in technology ownership and access between those who are affluent and those who are poor or live in rural areas with limited or no access to the Internet. Charp describes some projects in the US that have addressed this issue.

Cherry, B. A., Wildman, S. S., & Hammond, A. S. (Eds.). (1999). *Making universal service policy: Enhancing the process through multidisciplinary evaluation*. Mahwah, NJ: Lawrence Erlbaum Associates.

Children's Partnership. (2000, March). *Online content for low-income and underserved Americans: The digital divide's new frontier*. Santa Monica, CA: Author. Retrieved June 2002, from http://www.childrenspartnership.org/pub/low_income/index.html

This report, published in Spring 2000, was one of the first studies to examine content issues and the digital divide. The study found that the information identified as useful by low-income and other traditionally underserved Americans either doesn't exist or is extremely difficult to find on the Internet. This report, the result of nine months of research, analyzes this new frontier of the digital divide, providing an analysis of the "state of the art" along with

recommendations for policymakers, corporate leaders, technology center staff, philanthropists, and those who work with and on behalf of underserved Americans. (Underserved Americans, for the purpose of this report, include people who have low incomes, live in rural communities, have limited education, or are members of racial or ethnic minorities.) The research included discussion groups with more than 100 low-income Internet users, interviews with nearly 100 community technology leaders and other experts, analysis of 1,000 Web sites, and a review of the literature and promising activities across the country. This report is the latest in a series of "Strategic Audits" produced by The Children's Partnership on subjects of national importance that affect large numbers of young people. This Audit has three purposes: To describe the groups of Americans who are underserved by Internet content, what these groups want in the online world, and the barriers they face; To analyze the online content currently available for low-income and underserved Americans, emphasizing the major gaps and the most promising building blocks; and to provide a road map for action -- identifying ways in which the public and private sectors working with underserved communities can ensure rich and relevant online content for Americans at risk of being left behind.

Children's Partnership. (2000). *Online content for low-income and underserved Americans: The digital divide's new frontier: An issue brief ...* Santa Monica, CA: Author. Retrieved February 26, 2003, from <http://www.contentbank.org/TCP-OnlineContent.pdf>

This report, published in Spring 2000, was one of the first studies to examine content issues and the digital divide. The study found that the information identified as useful by low-income and other traditionally underserved Americans either doesn't exist or is extremely difficult to find on the Internet. This report, the result of nine months of research, analyzes this new frontier of the digital divide, providing an analysis of the "state of the art" along with recommendations for policymakers, corporate leaders, technology center staff, philanthropists, and those who work with and on behalf of underserved Americans. (Underserved Americans, for the purpose of this report, include people who have low incomes, live in rural communities, have limited education, or are members of racial or ethnic minorities.) The research included discussion groups with more than 100 low-income Internet users, interviews with nearly 100 community technology leaders and other experts, analysis of 1,000 Web sites, and a review of the literature and promising activities across the country. This report is the latest in a series of "Strategic Audits" produced by The Children's Partnership on subjects of national importance that affect large numbers of young people. This Audit has three purposes: To describe the groups of Americans who are underserved by Internet content, what these groups want in the online world, and the barriers they face; To analyze the online content currently available for low-income and underserved Americans, emphasizing the major gaps and the most promising building blocks; and to provide a road map for action -- identifying ways in which the public and private sectors working with underserved communities can ensure rich and relevant online content for Americans at risk of being left behind.

Children's Partnership. (2002). *Welcome to Contentbank.org* [Home page]. Washington, DC: Children's Partnership. Retrieved June 26, 2002, from <http://www.contentbank.org/homepage.asp>

"Welcome to Contentbank.org, a new online resource for information, tools and people dedicated to building Internet content that works for low-income and underserved communities" -- Contentbank.org home page.

Chone P., Flochel, L., & Perrot, A. (2000). Universal service obligations and competition. *Information Economics and Policy*, 12(3), 249-259.

We provide some elements to assess and compare various regulatory rules for the allocation and funding of universal service obligations (USOs). We restrict ourselves to ubiquity and spatial non discrimination constraints. We examine the welfare consequences of two systems: First, a regulation where USOs are imposed only on the incumbent firm (restricted-entry regulation) and second, a 'pay or play' rule where the entrant may serve non profitable users. Whereas pay or play regulation dominates when only the ubiquity constraint is at work, this result no longer holds when non discrimination is added.

Choura, R. G. (2003, May). Local governments and universities cooperate to expand broadband telecom services: The broadband regional affiliation for managed planning (B-RAMP) and the Michigan State University site for information and telecommunication experimentation (M-SITE). *Government Information Quarterly*, 20(2), 167-176.

Discusses cooperative projects between local governments in Michigan and Michigan State University intended to expand broadband telecommunications services to the state's rural areas.

Chu, C. M. (2002). *Digital divide: A resource list* [Home page]. UCLA Dept. of Information Studies. Retrieved June 13, 2002, from <http://www.gseis.ucla.edu/faculty/chu>

Provides links to information about the digital divide including demographic information and discussions about the topic. Links to eLists, community sites, and funding sources are also included.

Chu, G. C., Srivisal, A. C., & Supadhiloke, B. (1985). Rural Telecommunications in Indonesia and Thailand. *Telecommunications Policy*, 9(2), 159-169.

This article considers the need for telecommunications in the rural areas of Indonesia and Thailand. Using the findings from questionnaire surveys in the two countries, the authors examine how the telephone is used when limited facilities are available, the effects of telephone service in terms of improved communication and work efficiency, and the consequences of not having access to a telephone.

Chute, A., Kroe, E., et al. (2002). *Public libraries in the United States: Fiscal year 2000*. Washington, DC: U.S. Dept. of Education, National Center for Education Statistics: 130.

Provides a wide-ranging statistical portrait of public libraries in the United States during fiscal year 2000.

Cisler, S. (1995). The library and wired communities in rural areas. *Library Trends*, 44(1), 176-189.

As the area of telecommunications shifts, communities in rural areas can decrease their isolation, increase their connectedness and affect the overall health of small towns and whole regions through the use of new technologies and new regulatory structures. Librarians who help serve rural communities will strengthen their own position by understanding the technology.

Clark, D., Brian, I., & Nigel, B. (1995). Telematics and rural business: An evaluation of uses, potentials, and policy implications. *Regional Studies*, 29(2), 171-180.

Recent developments in telecommunications and information technology are discussed in relation to how they impact rural businesses and rural economic development.

Clark, D., & Unwin, K. (1981). Telecommunications and travel: Potential impact in rural areas. *Regional Studies*, 15, 47-56.

Clarkstone, A., Cleevely, D. D., Dymond, A. C., Hills, T. D., & Lauder, G. (1989). *Rural telecoms handbook*. Cambridge, UK: Analysys Publications.

Cobb, W. R. (1999). Building the info highway to anywhere, U.S.A. *Telephony*, 236(23), 194-200.

To truly benefit from the promise of the information age, we must find a way to bring the benefits of new technology to all areas. Providing communication services to the less populated areas of the world has always been a difficult challenge. In the US, the Bell System, albeit a monopoly at the time, addressed this challenge by averaging the cost of providing rural services with the cost of providing urban services, and it simply recovered these costs in an averaged rate structure. In today's world, where we are no longer able to average our costs and rate structure, the challenge of providing rural communications seems to have been transferred to the smaller exchange operators. Small exchange operators must begin to align themselves with other exchanges experiencing similar challenges. Interexchange connections must be established that will provide conduits from the enhanced network nodes to their local exchanges.

Compaine, B. M. (Ed.). (2001). *The Digital divide: Facing a crisis or creating a myth?* Cambridge, MA: MIT Press.

The Digital Divide refers to the perceived gap between those who have access to the latest information technologies and those who do not. If we are indeed in an Information Age, then not having access to this information is an economic and social handicap. Some people consider the Digital Divide to be a national crisis, while others consider it an over-hyped nonissue. This book presents data supporting the existence of such a divide in the 1990s along racial, economic, ethnic, and education lines. But it also presents evidence that by 2000 the gaps are rapidly closing without substantive public policy initiatives and spending. Together, the contributions serve as a sourcebook on this controversial issue.

Contents: The set-up: documenters of the digital divide -- Falling through the net: a survey of the "have-nots" in rural and urban America / National Telecommunications and Information Administration -- Falling through the net: defining the digital divide / National Telecommunications and Information Administration -- The evolution of the digital divide: examining the relationship of race to Internet access and usage over time / Donna L. Hoffman, Thomas P. Novak, Ann E. Schlosser -- The context: background and texture -- Information gaps: myth or reality? / Benjamin M. Compaine -- Universal service from the bottom up: a study of telephone penetration in Camden, New Jersey / Milton L. Mueller, Jorge Reina Schement -- Universal access to online services: an examination of the issue / Benjamin M. Compaine, Mitchell J. Weinraub -- Universal service policies as wealth redistribution / Milton L. Mueller -- The advocates: raising the stakes -- Equality in the information age / William E. Kennard -- The digital divide confronts the Telecommunications Act of 1996: economic reality versus public

policy. The first triennial review, 1999 / Mark Cooper, Gene Kimmelman -- The e-rate in America: a tale of four cities / Andy Carvin, Chris Conte, Allen Gilbert -- Universal access to email: feasibility and societal implications / Robert H. Anderson, Tora K. Bikson, Sally Ann Law, Bridger M. Mitchell -- Clinton enlists help for plan to increase computer use / Marc Lacey -- Reality check: tracking a moving target in high-tech time -- Data from three empirical studies, 2000 -- Internet and society: a preliminary report / Norman H. Nie, Lutz Erbring -- The digital world of Hispanics in the United States / Cheskin Research -- Survey of Americans on technology / National Public Radio, Kaiser Family Foundation, and Kennedy School of Government -- The truth about the digital divide / Ekaterina O. Walsh, Michael E. Gazala, Christine Ham -- Internet access spreads to more classrooms, survey finds / Pamela Mendels -- Cheap computers bridge digital divide / John Simons -- This Internet start-up looks to conquer an online divide / Timothy Hanrahan -- What's it all mean? -- Of gaps by which democracy we measure / Jorge Reina Schement -- Falling for the gap: whatever happened to the digital divide? / Adam Clayton Powell III -- Declare the war won / Benjamin M. Compaine.

Consortium for School Networking (CoSN). (2002). *Consortium for School Networking* [Home page]. Washington, DC: Author. Retrieved June 27, 2002, from <http://www.cosn.org/index.html>

"The Consortium for School Networking (CoSN), a national nonprofit organization, promotes the use of telecommunications and the Internet in K-12 education to improve learning. Our members represent school districts, state and local education agencies, nonprofits, companies and individuals who share our vision" -- CoSN home page. The site includes information about the organization and its major initiatives, information resources about school networking and related topics as well as CoSN K-12 Technology Education Policy Statements.

Conte, C. (2001). *Networking the land: Rural America in the Information Age*. Washington, D.C.: United States. National Telecommunications and Information Administration. Retrieved from http://www.ntia.doc.gov/TOP/publicationmedia/rural2001/networking_the_land_with_illustrations.htm

Examines the role telecommunication plays in rural areas of the US.

Cornell Community and Rural Development Institute (CaRDI). (2000). *CaRDI: Community & Rural Development Institute* [Home page]. Ithaca, NY: Author. Retrieved June 27, 2002, from http://www.cardi.cornell.edu/cev/CEV_Principles.cfm

"The Cornell Community and Rural Development Institute (CaRDI) works to strengthen and support New York's local communities and citizens. CaRDI and the Cornell Local Government Program serve as a point of entry to Cornell University's resources and expertise in community development and local governance, and provides outreach to community leaders, educators, elected officials and citizens interested in the vitality of their communities" -- CaRDI home page. Web site includes a Resource Guide featuring links to community development-related programs and projects at Cornell University and Cornell Cooperative Extension as well as links to CaRDI and affiliate publications.

Cornford, J., Gillespie, A., & Richardson, R. (1996). *Regional Development in The Information Society: A Review and Analysis, Report to the European Commission's High Level Expert Group on the Social and Societal Implications of The Information Society*. S. 1.: Centre for Urban and Regional Development Studies. Retrieved from <http://www.campus.ncl.ac.uk/unbs/hylife2/lib/files/hleg51.pdf>

In this paper, authors are concerned with the processes of regional economic development and with implications which the emergence of an Information Society (IS) has for those processes. At the same time, it has implications for all types of regions. In order to focus the discussion, authors have concentrated their attention in a number of ways. In terms of regions, the focus is on the prospects for development of those European regions which are currently understood as 'Less Favored' in some way. In particular, they will be concerned with: 1) Severely economically distressed or lagging regions, 2) Industrialized regions facing the challenges of re-conversion, 3) Less favored rural areas, and 4) Peripheral regions of all types. The main concern in this report is with the new opportunities which *The Information Society* creates for economic development in such less favored regions (LFRs), the barriers to realizing those opportunities and policy options which seek to address those barriers. The goal of regional cohesion is generally understood in terms of diminishing the gap between the most advanced and the least advanced regions in Europe. In general, cohesion is measured in terms of Gross Domestic Product per head or in terms level of employment and unemployment. It is, therefore, primarily the economic aspects of development, and in particular employment, that we concern ourselves with here. A final focus is on service industries and functions. While many visions of *The Information Society* (IS) have virtually equated it with the development of a service economy, authors would not like to make that mistake here. The IS has important effects on manufacturing (e.g., through the re-organization of inbound and outbound logistics, in the design process, in the application of Computer Aided Design and Manufacturing processes, etc.). An alternative interpretation, and one which avoids the problems of a focus on the manufacturing-services dichotomy, conceives the IS in terms of the increased salience of knowledge in all sectors of the economy. From this point of view, then, the key feature of the IS is the accumulation of knowledge — the process of learning. Nevertheless, it is in services that the IS is clearly having the greatest effects. Authors will therefore concentrate almost exclusively on service industries or service functions in this paper.

Crandall, R. W. & Waverman, L. (Eds.). (2000). *Who pays for universal service? When telephone policies become transparent*. Washington, DC: The Brookings Institution.

In virtually every country, the price of residential access to the telephone network is kept low and cross-subsidized by business services, long distance calling, and various other telephone services. This pricing practice is widely defended as necessary to promote "universal service," but Crandall and Waverman show that it has little effect on telephone subscriptions while it has major harmful effects on the value of all telephone service. The higher prices for long distance calls reduce calling, shift the burden of paying for the network to those whose social networks are widely dispersed. Therefore, many poor and rural households--the intended beneficiaries of the pricing strategy--are forced to pay far more for telephone service than they would if prices reflected the cost of service. Despite these burdens, Congress has extended the subsidies to advanced services for schools, libraries, and rural health facilities.

Crandall and Waverman show that other regulated utilities are not burdened with similarly inefficient cross-subsidy schemes, yet universality of water, natural gas, and electricity

service is achieved. As local telephone service competition develops in the wake of the 1996 Telecommunications Act, the universal-service subsidy system will have to change. Subsidies will have to be paid from taxes on telecom services and paid directly to carriers or subscribers. Crandall and Waverman show that an intrastate tax designed to pay for each state's subsidized subscriptions is far less costly to the economy than an interstate tax.

Crandall, R. W. (2002). *An assessment of the competitive local exchange carriers five years after the passage of the Telecommunication Act*. Washington, DC: Criterion Economics.

Retrieved from <http://www.criterioneconomics.com/documents/Crandall%20CLEC.pdf>

Given the recent shakeout of a number of competitive carriers in the local exchange industry, it is apparent that an analysis of this industry and the competitive local exchange carriers (CLECs) is required. The author has performed a comprehensive analysis and econometric study of these firms in order to determine (1) the relative performance of the major CLECs, (2) the CLEC business strategies that have appeared to be successful thus far, and (3) the causes of CLEC failures during the first five years under the 1996 Telecommunications Act. In particular, I have sought to determine if the recent economic difficulties experienced by many CLECs have been related to problems in interconnecting with the incumbent local exchange carriers (ILECs) or to other causes, including their own business strategies. An in-depth analysis of the numerous publicly traded CLECs leads to conclude that there is wide variation in their performance and that the CLECs' own strategies largely explain this variation. However, author argued that there is no evidence linking CLEC performance to alleged difficulties in interconnecting with the ILECs. Indeed, at least one major CLEC is succeeding even though it primarily resells ILEC services, and the general results suggest that a mixed strategy of building one's own network, in addition to using ILEC services or network elements, works rather well. Nevertheless, the best CLEC strategy is to build out one's own network in a careful, deliberate manner.

Crang, M., Phil, C., & May, J. (Eds.). (1999). *Virtual geographies: Bodies, space and relations*. London: Routledge.

Cremer, J. (2000). Network externalities and universal service obligation in the Internet. *European Economic Review*, 44(4-6), 1021-1031.

This article examines the shape of network externalities for the 'broadcasting services' that can be offered by the Internet. It argues that, because of these network externalities, the marginal value of an added participant to the network could be quite high as the percentage of the population that is connected approaches 100%. Lessons are drawn for the desirability of a Universal Service Obligation for the Internet, and it is shown that it is preferable to subsidize the senders of broadcasting messages rather than the receivers.

Crippen, D. L. (2000, March 16). *Federal loan guarantees for rural television service*. Washington, DC: Congressional Budget Office. Retrieved from

<http://www.cbo.gov/showdoc.cfm?index=1884&from=3&sequence=0>

“The proposed loan guarantee program is designed to encourage investment in systems that deliver local television signals to mostly rural markets that are unlikely to receive those signals through existing direct broadcast satellite (DBS) companies. In the author's statement today, He will provide an overview of some of the factors that affect the budgetary cost of such

loan guarantees. He will also discuss options that might reduce the cost of the proposed program to the federal government. Federal assistance for this venture would be likely to prove costly. Most of the proposals envision large capital investments. But the market for delivering local television signals would be both subject to competition and relatively small, making it difficult to ensure that large investments could be recovered, especially in the near term. Federal credit programs can shift -- but not eliminate -- the risk of such projects. The cost to the federal government would depend largely on the size of the program and how much of the risk was borne by the government.” (PolicyFile abstract).

Cronin, F. J., Colleran, E., Miller, M., & Raczkowski, R. (1997). Local exchange competition, rate restructuring and universal service. *Telecommunications Policy*, 21(3), 251-264.

Some perceive a dilemma between 'Universal Service' and competition in local telecommunications markets. Universal service objectives have been met primarily by a system of cross-subsidies that keep rates artificially low for some (usually residence) and artificially high for others (usually businesses). Increasingly regulators realize that these subsidies are untenable, but voice concern that cost-based rate restructuring will produce 'rate shock' and lower subscribership. Based on a quantitative analysis, the authors show that rate rebalancing may raise local rates in some cases, but these increases will be more than offset by reductions in intra-LATA toll prices. More importantly, declines in business rates will reduce enduser operating costs, ultimately translating to substantial indirect benefits to all consumers through lower prices for goods and services.

Cronin, F. J., Colleran, E. K., Herbert, P. L., & Lewitzky, S. (1993). Telecommunications and growth: The contribution of telecommunications infrastructure investment to aggregate and sectoral productivity. *Telecommunications Policy*, 17(9), 677-690.

Given the weakening economic performance of the USA in recent years, productivity growth has become increasingly the focus of discussions by policy makers at both the federal and state level. While much attention has been directed towards the institutional and social causes underlying stagnant productivity levels, little effort has been given to identifying and measuring the factors that have consistently contributed to the nation's productivity over recent historical periods. For example, industry-specific advancements that not only affect a sector's own productivity but permeate the economy can contribute to overall national productivity. This is the case with telecommunications. The empirical findings in this study suggest that investment in telecommunications infrastructure is causally related to the nation's total factor productivity and that contributions to aggregate and sectoral productivity growth rates from telecommunications advancements are both quantifiable and substantial.

Cronin, F. J., & Herbert, P. L. (1994). Inequities in the benefits and costs of telecommunications across stakeholder groups. *Telecommunications Policy*, 18(4), 306-320.

A methodology for quantifying the benefits and costs of telecommunications to various stakeholder groups is presented. The stakeholders are differentiated by age (elderly), income (high income and low income), and geography (urban and rural). The analysis suggests that there are substantial disparities among the net benefits of telecommunications across these stakeholder groups. Low-income, rural and elderly households benefit substantially less from telecommunications than do high-income and urban households, even when special assistance

programs are accounted for. Existing programs that subsidize low-income and rural areas are an important tool to distribute the benefits of modernization, but need to be targeted.

Cronin, F. J., McGovern, P. M., Miller, M. R., & Parker, E. B. (1995). The rural economic development implications of telecommunications: Evidence from Pennsylvania. *Telecommunications Policy*, 19(7), 545-559.

This study quantitatively examines the impact of telecommunications infrastructure investment on rural society in Pennsylvania. Analysis shows that access to advanced telecommunications services in Pennsylvania varies by geographic region. Telecommunications service prices mirror this disparity; semi-urban and urban residential and business customers with greater access to advanced services experience significantly higher local prices than other Pennsylvania customers. This paper quantifies the impact of telecommunications network infrastructure investment, service availability and pricing. In addition, the paper analyzes the interdependent relationship between economic activity and telecommunications infrastructure investment at the state and county levels.

Cronin, F. J., Parker, E. B., Colleran, E. K., & Gold, M. A. (1991). Telecommunications infrastructure and economic growth: An analysis of causality. *Telecommunications Policy*, 15(6), 529-535.

The causal relationships between economic development and the telecommunications infrastructure are examined using time-series analyses of US data from 1958 through 1988. The analysis shows not only that increases in output or gross national product lead to increases in investment in telecommunications, but that increases in telecommunications investment stimulate overall economic growth. The evidence of the positive effects on the US economy, when combined with consistent earlier results on the excess of external over internal economic returns, provides a powerful rationale for policies designed to provide incentives for telecommunications investment.

Cronin, F. J., Parker, E. B., Colleran, E. K., & Gold, M. A. (1993). Telecommunications infrastructure investment and economic development. *Telecommunications Policy*, 17(6), 415-430.

A two-way causal relationship between telecommunications infrastructure investment and economic development, previously established for the US economy, is tested at the more localized state and sub-state level and for 2 specific sub-categories of telecommunications infrastructure investment: central office equipment and cable and wire. For time series of these 2 sub-categories of telecommunications investment compiled for Pennsylvania and 2 of its counties, this analysis tests 2 causal hypotheses: 1) The level of economic activity at any point in time is a reliable predictor of the amount of telecommunications investment at a later point in time. 2) The amount of telecommunications investment at any point in time is a reliable predictor of the level of economic activity at a later point in time. The findings at both the state and county level support the conclusion that telecommunications investment affects economic activity and that economic activity can affect telecommunications investment.

Daniels, T. L., & Lapping, M. B. (1996, Summer). The two rural Americas need more, not less planning. American Planning Association. *Journal of the American Planning Association*, 62(3), 285-.

"Rural America has become more polarized in terms of income and wealth. The rural-urban fringe regions, 10 to 40 miles outside of major metropolitan centers, are America's primary recipient of population growth and land use change. The rural-urban fringe faces the threat of homogenous, monotonous houses and commercial development. By contrast, inhabitants in remote or deep rural areas lag behind the nation as a whole in income, educational attainment, quality of housing, employment opportunities, and the provision of health care and social services. Many remote communities continue to suffer from a gradual exodus of younger people and a chronic deterioration of transportation, health, and educational services fundamental to a decent quality of life. Both rural Americas are in need of new and bold settlement policies and programs. There are two ways to provide an alternative to sprawl in the rural-urban fringe. First, establish urban growth boundaries and village growth boundaries around existing discrete communities. Second, new towns with population caps should be created" (ProQuest abstract).
Subjects: Urban planning; Urban development; Rural urban migration; Rural development; Rural areas; Public policy; Area planning & development

Daugherty, D. E., & Jaugstetter, M. (1996). North Dakota: Connectivity and cooperation. *Library Hi Tech*, 14(2-3), 241-243.

North Dakota has in place a telecommunications infrastructure that is advanced and active, given the state's rural nature and large pockets of low population communities. Telecommunications, being a distance-neutral business, has great appeal to North Dakota, because it eliminates the liability of requiring proximity to population centers. In 1994, a task force was formed to develop a statewide policy on telecommunications development. This article summarizes some of the key electronic networking projects underway in North Dakota, including the Online Dakota Information Network, the SENDIT statewide network to support distance learning, local library networks, the North Dakota Information Network, the Interactive Video Network, the Educational Telecommunications Council, Prairie Public Broadcasting, and some Governor's Initiatives.

David, M. (2003). The politics of communication: information technology, local knowledge and social exclusion. *Telematics and Informatics*, 20(3), 235-253.

This paper presents results from ethnographic fieldwork with users and non-users, providers, developers and organizers of telematically delivered distance learning packages. ADAPT through RATIO was a European Social Fund sponsored program, organized at a local level by a consortium of further and higher educational institutions and local government agencies in southwest Britain. Its aim was to build an infrastructure for distance learning, and community development, in the region; providing training software packages that could be delivered through a pre-established network of telecentres. In what follows I outline findings from ethnographic and interview based research into the strengths and limitations of telematically delivered training to small businesses and community groups in what is an economically and geographically marginalized area. The research sought to identify the limitations and scope of this attempt to break down economic marginality and geographical isolation via telematically delivered distance learning. Two key questions were asked: (1) Just how far can the abolition of space and time constraints promised by new ICTs aid in redressing

economic and geographical marginality? and (2) Just how far are the weaknesses produced by economic and geographical isolation in fact reproduced within virtual domains? The research suggests imbalances of economic and administrative power were not abolished, and did, to a significant degree, shape outcomes. However, the paper seeks to avoid the simplistic dualism of techno-faith and techno-pessimism. The research focused upon communication breakdowns and their causes. When communication breakdowns occur it is important to distinguish the technical and the social dimensions, and their interaction, rather than to assume failure is an intrinsic manifestation of technology as such. In this regard the success or failure of communication technology to facilitate social network development is political. Top-down technical approaches reflected who defined the problem and who was able to secure the resources with which to address it. Fieldwork offers an innovative approach to the evaluation of local policy formation, implementation, take-up and success.

Davidson, W. H., & Dibble, A. C. (1991). The rural challenge: Telecommunications services; Special report: Approaching the 21st century. *Telephony*, 220(11), 104-112.

Many rural towns facing possible extinction have turned to telecommunications to boost their economies, attract new business to their areas, and obtain needed social service. A study by the US Telephone Association (USTA) examines network modernization initiatives undertaken by Independent telephone companies to spur rural economic development. It concludes that an advanced telecommunications infrastructure attracts new businesses to rural areas, boosts the competitiveness of firms already in those areas, and diversifies the economic base of rural communities. Modern telecommunications facilities and services also enhance the quality of rural life by delivering vital social services. However, local telephone companies often face regulatory and financial obstacles to their network modernization efforts.

Davidson, W. H., Dibble, A. C., & Dom, S. H. (1990, October). *Telecommunications and rural economic development*. Redondo Beach, CA: MESA Inc.

Davis, T., & Trebian, M. (2001). Shaping the destiny of Native American people by ending the digital divide: The nation's tribal colleges and universities. *Educause Review*, 36(1), 38-46.

The projected products of the conference are (1) a detailed strategic plan about how to end the digital divide in Indian country, coordinated with the planning work already completed by the AIHEC Board of Directors and the High Technology Committee, (2) identification of the resources needed to actually accomplish the task of ending the divide, (3) beginning partnerships between the firms, foundations, government agencies, national technology based organizations, TCUs, and communities.

Dawson, E. L. (2000, December). Universal service high-cost subsidy reform: Hindering cable-telephony and other technological advancements in rural and insular regions. *Federal Communications Law Journal*, 51 or 53?(1), 117-135.

Universal service is a public policy initiative designed to ensure that all US citizens receive widespread access to affordable telecommunications services. The Universal Service Fund currently offers subsidies to telecommunications providers serving high-cost regions, but the FCC announced efforts to reform the subsidy allocation system that could potentially impede technological advancement in these areas. This note argues that the FCC should consider developing specialized universal service funding that subsidizes technological improvements in

high-cost regions to ensure that technological advancements such as cable-telephony reach rural customers.

De Reuck, J., & Joseph, R. (1999). Universal service in a participatory democracy: A perspective from Australia. *Government Information Quarterly*, 16(4), 345-352.

This article places universal service policy in telecommunications in Australia in an historical context. Given the dynamic growth in information technologies, universal service should be reconceptualized within a knowledge-based discourse critically linked to considerations for deepening participatory democracy. As a consequence of the discussion this article recommends that funding universal service obligations in telecommunications be based on the preferred notion of a maximally open democratic debate. The universal service obligation in telecommunications should be funded from consolidated revenue with its parameters set by democratic debate.

Deavers, K. (1992). What is rural? *Policy Studies Journal*, 20(2), 184-189

There are three characteristics of rural areas that make them different from urban areas: small scale and low density settlements, distance from large urban centers and specialization of rural economies. Recognizing these differences and differences among rural areas is important to policy development.

Dholakia, R. R., & Harlam, B. (1994). Telecommunications and economic development: Economic analysis of the U. S. experience. *Telecommunications Policy*, 18(6), 470-477.

Investment in the telecommunications infrastructure can be justified because of the positive impact on economic development. Using statistical data for the 50 states of the US, econometric analysis suggests that the influence of telecommunications is very strong when it is viewed as the only developmental input as well as when it is compared with other inputs such as education, energy and physical infrastructure. Multiple regression analysis provides a comparative perspective on resource inputs which have not been available in past research. The analysis also suggests that it is not a question of simple trade-offs between investment in one input with that of another. Instead, investment has to be made in multiple inputs, including education, telecommunications and physical infrastructure.

Dillman, D. A. (1990). *Rural telephone infrastructure and economic development in Washington state: A case study* (Technical Report 90-103). Pullman, WA: Social and Economic Sciences Research Center, Washington State University.

Dillman, D. A. (1991). Telematics and rural development. In C. B. Flora & J. A. Christianson (Eds.), *Rural policy for the 1990s* (pp. 292-306). Boulder, CO: Westview Press.

Dillman, D. A., & Beck, D. M. (1988). Information technologies and rural development in the 1990s. *Journal of State Government*, 61(1), 29-38.

Dillman, D. A., Donald, M. B., & Allen, J. C. (1989, February). Rural barriers to job creation remain, even in today's Information Age. *Rural Development Perspectives*, 21-27.

Dillman, D. A., Scott, L. P., & Allen, J. (1987). *Telecommunications in Washington: A statewide survey* (Technical Report). Pullman, WA: Washington State University, Social and Economic Sciences Research Center.

Dinc, M., Haynes, K. E., et al. (1998). Regional universal telecommunication service provisions in the US; Efficiency versus penetration. *Telecommunications Policy*, 22(6), 541-553.

Universal service, the long time goal of telecommunications regulation, is under new scrutiny by stakeholders. The Telecommunications Act of 1996 eliminated the barriers to competition implemented in the transitional Modified Final Judgment of 1984. The FCC is now setting up a new universal service plan, which extends its scope to schools, libraries and health care providers. At the same time, however, concerns about the effectiveness of the universal service are increasing. This article reports on a study which first investigates the growth patterns in the number of households by income groups in states, and then examines the effectiveness and efficiency of the universal service policy on low-income households at the state level.

Dippon, C. M., & Train, K. E. (2000). The cost of the local telecommunication network: a comparison of minimum spanning trees and the HAI model. *Telecommunications Policy*, 24(3), 253-262.

Under the Telecommunications Act, estimates of local distribution costs may be used to help quantify the subsidy for specified local services whose costs exceed their tariffed rates and as a guide for the pricing of unbundled network elements. The most widely circulated model for estimating these costs, the HAI model, uses a particular procedure to calculate the distribution network and cable length that is required to serve a cluster of customers. We compare the HAI procedure with the minimum spanning tree (MST), which gives the shortest distance for connecting a set of locations. For each cluster in Minnesota we calculated the distribution length with the HAI procedure and the length of the MST. We find that the HAI length is shorter than the MST length in 77% of the main clusters. In low-density areas, the HAI length is less than the MST length for 81% of the main clusters. The too-short cable lengths mean that the HAI model underestimates network costs; this underestimation extends beyond the cost of the cables themselves since many cost components are tied to cable length, such as support structures, maintenance, and associated power and back-up equipment. The use of underestimated costs in determining subsidies and network prices would discourage the provision of services in subsidized areas and encourage inefficient entry that utilizes unbundled network elements.

Donnermeyer, J. F., & Hollifield, C. N. (2003). Digital divide evidence in four rural towns. *IT & Society*, 1(4), 107-117 Retrieved from <http://www.stanford.edu/group/siqss/itandsociety/v01i04/v01i04a09.pdf>

The debate about a digital divide between rural and urban America suggests that communities of place still influence how telecommunications and other advanced technologies are used. This article examines the utilization of email and the Web, based on a sample of 471 residents from four rural communities in Nebraska and Wisconsin, in which the study found nearly identical levels and patterns of use across the communities. The findings are discussed in terms of the two variations on the digital divide. The first is a digital divide between rural people at the same place, based on their location within networks of co-workers and friends, which in turn influences awareness, knowledge and eventual adoption of information technologies. The second divide is between rural communities that have growing economies and populations and

those that are no growing, based on their locations relative to metropolitan areas and urban consumers. Policy implications and directions for future research designs on the adoption of information technology are also described.

D'Orville, H. (1997). *Communications and knowledge-based technologies for sustainable human development*. New York, NY: UNDP. Retrieved 2002 from <http://www.undp.org/comm/>

Guiding document for developing programs and projects involving multimedia information technologies in the delivery and wider outreach of programs underpinning sustainable human development, especially to rural areas. It is envisaged that through pilot and other projects their feasibility and effectiveness can be demonstrated.

Chapters cover: The information and knowledge revolutions-the advent and impact of generic technologies; Telecommunications infrastructure: at the root of information poverty; Multimedia services - the convergence of information technologies; The Internet: potential implications; Sectoral multimedia applications - the sustainable human development nexus; International cooperation for communications development; Implications for UNDP; Priorities for immediate action.

Doty, P., & Erdelez, S. (2002). Information micro-practices in Texas rural courts: Methods and issues for e-government. *Government Information Quarterly*, 9(4), 369-387.

"This paper reports on an empirical study of the information behavior of governmental actors in rural Texas courts. The study used multiple data collection and data analysis methods to produce a rich, thick description of the participants' behavior which is contextualized and used to identify important challenges to e-government. The paper argues that moving beyond the silo-based approach to reporting and information technology implementation that characterizes the current policy environment can be done only with a strong and detailed understanding of governmental actors' job responsibilities and their information and communication patterns. Doing so is important to achieving the vision of e-government." (ScienceDirect abstract).

Downes, T., & Greenstein, S. (2001). *Universal access and local Internet markets in the United States* (The Center for the Study of Industrial Organization at Northwestern University Working Paper #0018). Evanston, IL: The Center for the Study of Industrial Organization at Northwestern University. Retrieved 2002 from <http://www.csio.econ.northwestern.edu/Papers/2001/CSIO-WP-0018.pdf>

"Concern over the potential need to redefine universal service to account for Internet-related services motivates this study of the geographic spread of commercial Internet Service Providers (ISPs), the leading suppliers of Internet access in the United States. The paper characterizes the location of 40,000 access points, local phone numbers offered by commercial ISPs, in the Fall of 1997. Markets differ widely in their structure, from competitive to unserved. Over ninety two percent of the U.S. population has easy access to a competitive commercial Internet access market, while approximately four and one-half percent of the U.S. population has costly access" (Abstract).

Downs, E. (1987). A contextual view of development information technology. *The Information Society*, 5(2), 119-122.

The knowledge that is made manifest in any technology may lead to both beneficial and adverse effects. Three overlapping application areas of information technology (IT) --

communications, expert systems, and manufacturing -- are identified to illustrate its possibilities and their possible effects, both beneficial and adverse. The implications of the terms "beneficial" and "adverse" are examined as used with IT and "development." "Development" is seen as meeting directly the basic needs of most of a -- usually rural -- population. The main target areas are education, agriculture, and health; the technologies are microcomputers and satellites. There is no shortage of technologies, but there are major constraints on achieving the goals of IT. These are political will, money, and skill. This analysis is an attempt to improve the effectiveness of action in promoting the beneficial and limiting the adverse effects of IT. In leading to action, the general and theoretical must be balanced with the specific richness of the real situation.

Drabenstott, M. (2001). New policies for a new rural America. *International Regional Science Review*, 24(1), 3-15.

The U.S. rural economy is undergoing huge changes as the twenty-first century begins. The most compelling feature of these several changes is unevenness: some rural areas are booming while many others struggle. Looking forward, rural America faces five major challenges. Closing the digital divide will help rural America top e-business opportunities. Urging on rural entrepreneurs will help fuel new economic activity on Main Street. Leveraging a new product-oriented agriculture will boost growth in some farming communities, but probably not all. Sustaining the rural environment will provide a strong economic foundation for many scenic rural areas. And boosting rural human capital will be essential for most rural growth strategies. Public policy will play an important supporting role as rural America meets these challenges. But rural policies in the twenty-first century will have to go far beyond a historical focus on agriculture. The period ahead will likely see a rich debate on the goals and mechanisms of a new generation of rural policy.

Drabenstott, M., & Meeker, L. (1997, Second Quarter). Financing rural America: A conference summary. *Economic Review - Federal Reserve Bank of Kansas City*, 82(2), 89-.

"The proceedings of the Financing Rural America conference sponsored by the Federal Reserve Bank of Kansas City December 4-5, 1996, in Omaha, Nebraska, are reported. Conference participants agreed that improving liquidity for community banks was a useful starting point for improving rural capital markets. Banks might be given greater access to Farm Credit System funds to provide greater liquidity for rural business loans. Rural community banks could be granted greater access to funds through the Federal Home Loan Bank System. Kerry Vandell proposed a 5-point plan for making secondary markets more viable in rural America. Frank Altman endorsed the view that secondary markets represent a value chain, in which pricing of each link in the chain is critical to a functioning market" (ProQuest abstract).
Subjects: Capital markets; Rural development; Secondary markets; Rural areas; Finance

Duncan, B., & Culver, V. (2000). *The Potential impact of E-commerce on the rural South: Will it equalize or deepen the Digital Divide?* Mississippi State, MS: Mississippi State University, Southern Rural Development Center. Retrieved 2002, from <http://srdc.msstate.edu/publications/duncan.pdf>

Buying and selling on the Internet, known as e-commerce, has become big business, and is still growing. E-commerce has two components, business to consumer retailing and business to business supply-chain operations. Participation is dependent on access to and adoption of advanced information technologies. Access to technology is influenced by education, income,

race, and residence (rural or urban). The South is disadvantaged in all these areas. Businesses in the South cannot afford to let the barriers hold e-commerce back. Rural businesses need to position themselves now for a technology-driven future to increase their chances of survival. Even though there is interest in e-commerce, there is a critical lack of unbiased educational information and technical assistance for businesses. To facilitate economic development through e-commerce in the rural South, all people and businesses must have the opportunity to be connected to the Internet; educational institutions must develop programs that assist businesses and communities with connectivity, infrastructure, e-commerce, and other technology-related issues; states must educate, recruit, and retain people with technical expertise in the region; and state and local policymakers must take a comprehensive and strategic look at e-commerce from an economic development perspective.

Duncombe, R., & Heeks, R. (2002). Enterprise across the digital divide: Information systems and rural microenterprise in Botswana. *Journal of International Development*, 14(1), 61-74.

This paper focuses on the role of information and information-handling technologies within the many rural microenterprises that currently lack access to ICTs. On the basis of field research in Botswana, it finds that poor rural entrepreneurs rely heavily on informal, social and local information systems. While highly appropriate in many ways, these systems can also be constrained and insular. Priorities for breaking this insularity will be greater access to shared telephone services. ICTs may play a supplementary role. They will need to be based in intermediary organizations that can provide complementary inputs of finance, skills, knowledge and other resources.

Du Plessis, V., Beshiri, R., Bollman, R. D., & Clemenson, H. (2002, December). *Definitions of "rural"* (Agriculture and Rural Working Paper Series Working Paper No. 61). Ottawa, ON: Statistics Canada, Agriculture Division.

Dvorak, John C. (2003, September 2). The agony of unresolved standards. *PC Magazine*, 22(15), 63. Retrieved September 11, 2003, from the EBSCOhost Academic Search Premier database. Note: Article printed out.

"Just as it was becoming universal, standards gods moved on to 802.11a and 802.11g, because they offer more speed. This is just fine, but if the past is any indication of the future, then the entire wireless-networking industry will be in flux until things settle down. The most satisfied users of wireless networking have two things in common, a Macintosh and AirPort, an ersatz proprietary version of 802.11b. Although AirPort isn't quite as unusual as Apple's early implementations of SCSI technology, it carries the same sub-rosa message, 'If you want to be sure that your 802.11a/b/g network runs flawlessly, then make sure all components are from the same vendor.'"--EBSCOhost Academic Search Premier abstract.

Dyer, P. (1997). Households without telephones in the UK. *Telecommunications Policy*, 21(4), 341-353.

UK telephone penetration has reached approximately 90% of all households. There are still 10% of households who are not connected to a telephone in their homes. The 'unphoned' 10% are characterized by their geographical location and their socioeconomic characteristics. Low income households and households in inner city locations are least likely to own a telephone. These same households, arguably, have most to gain from connection to information

services which the phone provides. This paper explores these issues through a review of the current literature, and from empirical evidence collected by the author.

Dymond, A., & Oestmann, S. (July, 2002). *Rural Telecommunications development in a liberalising environment: An update on universal access funds*. S. I.: Intelcon Research & Consultancy. Retrieved from http://rru.worldbank.org/documents/Update_Universal_Access_Funds.pdf

One prominent mechanism for mobilizing investment into challenging rural areas is the universal access fund or *Rural Telecommunications* development fund model. These funds offer subsidies and licenses, under a single competitive bidding process, to operators wishing to serve designated areas or communities selected by Government. The funds initially focused on creating and supporting telephone service licenses to provide payphones in challenging areas, but now some also offer subsidies for Internet access and advanced ICT projects. Since the first fund was established in the mid-1990's, approximately 20,000 communities have received telephone service for the first time through fund mechanisms in five countries, and many more thousands will follow in the dozen or so countries that are now beginning to implement such mechanisms. This note provides an update on the experience gained by these funds and their licensees, and the actual record of achievements in the countries that have implemented these programs. The experience is reviewed from two perspectives: first, whether government targets to serve remote and low-income communities are being achieved; and second, whether the funds have been effective in catalyzing market-oriented and commercially sustainable service provision in the long run.

East, H. (1983). Information technology and the problems of less developed countries. *The Information Society*, 2(1), 53-64.

Some 130 sovereign states may be termed less developed countries (LDC). LDCs have many different cultures, economic and social conditions, population sizes, political structures, and research and development potentials. Communications problem areas among LDCs include: 1. lack of appreciation by national decision makers of the role of scientific and technical information in development, 2. inadequate infrastructure for information storage and processing, 3. inadequate infrastructure for information use and absorption by users, and 4. economic, administrative, cultural, educational, technological, and structural barriers to adequate information flow. Information technology offers limited benefits to LDCs because these basic problems remain unsolved. Electronic publishing and delivery may be logical developments within capital intensive economies, but the required investment and volume of use do not match present capacities of LDCs. The imposition of modern information technology may polarize developmental activities and may retard instead of encourage the growth of indigenous resources. It cannot be assumed that databases available within the industrialized world are appropriate or adequate for the needs of developing countries.

Economic Development Association of North Dakota and Nexus Innovations. (2000). *Economic development & technology: A guidebook*. Bismarck, ND: Author. Retrieved February 24, 2003, from http://www.westgov.org/wga/initiatives/ND_econ_guide.pdf

"On May 9, 2000, a group of North Dakota economic development professionals representing communities across the state gathered to discuss the unique challenges and opportunities of the evolving digital economy. They examined how Information Technology (IT)

represents a tool for North Dakota communities to build a promising future--first by improving existing businesses, and second, by creating new enterprises. There was general agreement about the exciting potential of the digital economy even in the most isolated rural areas, as well as questions about how to overcome the challenges. Above all, there was agreement that communities must act quickly given the pace of change.... In an effort to assist North Dakota economic developers and community leaders in their IT endeavors, as well as to respond to their concerns, EDND contracted with Nexus Innovations to create and assemble this guidebook to assist North Dakota economic developers in their IT efforts" -- p. 3

Economic Research Service. (2001). *Agricultural Outlook Forum 2001*. [Washington, DC?]: Author.

Annual report presenting texts of papers and speeches presented at the 77th Annual Agricultural Outlook Forum, held Feb. 22-23, 2001, in Arlington, Va. Forum focuses on current developments and outlook for the food and agriculture sector, with sessions on market conditions for specific agricultural commodities, agricultural policy, international trade, farm income and finance, crop insurance programs, rural development, electronic commerce, food safety, animal husbandry, environmental management, biobased products, and agricultural structural change.

Editorial Projects in Education. (2001). *Technology counts 2001: The new divides : Looking beneath the numbers to reveal digital inequities*. Bethesda, MD: Author. Retrieved September 4, 2001, from <http://www.edweek.org/sreports/tc01>

Examines complexities of the "digital divide," and types of students who appear to be at a disadvantage for technology; includes results from a new survey of 500 middle and high school students; US. Specifies technology-disadvantaged students as including students from poor families, minority children, girls, low achievers, students learning to speak English, children with disabilities, and children who live in rural areas.

Egan, B. L. (1992). Bringing advanced technology to rural America: The cost of technology adoption. *Telecommunications Policy*, 16(1), 27-45.

This study examines the factors that are working for and against the development of an advanced telecommunications infrastructure to serve rural areas of the USA. There is a notable difference between the costs of local network upgrades for existing rural telephone subscribers and of bringing service to new and physically remote subscribers. The latter group should be treated separately for policy purposes. The infrastructure serving the existing subscriber base could be upgraded to a digital network without necessitating large rate increases, provided there is sharing of network facilities between the energy, transportation and telecommunication sectors. The preferred medium is likely to be digital fiber.

Egan, B. L. (1996). Improving *Rural Telecommunications* infrastructure. Paper prepared for TVA Rural Studies University of Kentucky, Lexington, KY. Retrieved from http://www.rural.org/workshops/rural_telecom/egan/1.htm

This paper examines the *Rural Telecommunications* infrastructure focusing on technological developments and the costs and financing of network modernization. While there has been considerable hype in the industry and trade press about digital information "superhighways" (as if we all can just sit back and wait for "it" to happen), a look at the facts would lead to a more pessimistic view, especially for rural areas of the country. The most

important conclusion of all is that technological solutions must be tailored to specific circumstances regarding topology, terrain, subscriber demand and spatial distribution. A "cookie cutter" approach to technology deployment, while easier from a network standards perspective, is usually not the least cost method to optimize the network for local supply and demand conditions or for planning future network upgrades. Indeed, flexibility in network deployment strategies is the key to successful low cost investment. This means that flexible standards must be developed by both wireline and wireless network equipment manufacturers to allow efficient interconnection between networks and a high degree of connectivity between end users.

Elers, P., & Elders, K. (1999). Innovation in *Rural Telecommunications*: Interactive TV at work. *Rural Telecommunications*, 18(4), 46-50.

Many rural telephone cooperatives share a common problem: low member turnout at annual meetings. How does a modern co-op combat this problem when faced with an aging rural population? ENMR-Plateau Telecommunications (Clovis, New Mexico) may have found an answer to this daunting problem. Canvassing a whopping 24,000 square miles, the co-op boasts a membership of approximately 11,000. At several members' urging, Tom Phelps, general manager, decided to get innovative and combat low member participation by implementing some type of remote voting procedure. ENMR placed its faith in interactive television. ENMP tapped into established interactive sites at the primary meeting location in House, New Mexico, and at four remote sites. This experiment resulted in a 65% increase in registered member attendance.

eMarketer Inc. (2001). *eDemographics report*.

Semiannual report, for Mar. 2001, on worldwide Internet user demographic characteristics, usage patterns, and on-line activities, with detail by world region and/or country. Data are generally current to 2000, with selected projections (generally to 2004 or 2005). North America and Canada Internet users and penetration rates in North America, with detail for U.S. and Canada, and with comparisons of users by world region. c. Canada: Internet users and penetration rates, by access location and/or Province; number of Internet sessions conducted and average length per session; time spent on-line and per Web site; number of unique pages viewed and Web sites visited; users participating in selected on-line activities; percent of households that have shopped on-line; and user characteristics, including age, sex, income, educational attainment, and primary language used (English vs. French). U.S. [Data by race-ethnicity are shown variously for white, black, Hispanic, Asian-American or Asian/Pacific Islander, Native American, and other.] d. Internet users and penetration rates, with detail for users by access location; number of on-line households and PC ownership rates; Internet sessions conducted and average length of session, time spent on-line and per Web site, and unique Web sites visited, with detail by access location; Internet usage frequency; percent of users participating in selected on-line activities; ranking of 35 major cities by penetration rate; and percent of children age 8-12 using selected media products or services.

e. User characteristics: Internet users and/or penetration rate, by community type (rural, small city/town, suburb, and large city), census division, age, sex, race-ethnicity (with detail for Hispanic ethnicity by ancestry), and income; and median income of households with and without Internet access.

Enders, A., & Seekins, T. (1999). Telecommunications access for rural Americans with disabilities. *Rural Development Perspectives*, 14(3), 14-21.

People with disabilities may be inadvertently excluded from rural community life unless telecommunications access—economic, social, and physical—is addressed and ensured locally. New telecommunications policies are committed to the inclusion of people with disabilities. However, policy alone cannot ensure equitable access. Grassroots understanding is needed to define access in telecommunications and to determine how access can inform development activities.

Engebretson, J. (1999). A Handle with care. *Telephony*, 236(11), 26-36.

The crafters of the Telecommunications Act of 1996 mandated an overhaul of universal service support mechanisms, with the directive to make them more explicit. This means that pricing should be more closely associated with costs and any additional funding required should be raised in a neutral manner that does not penalize any particular service. The task of recommending a plan to fund non-rural areas was given to regulators on the federal/state joint board. One of the joint board's tasks was to develop a forward-looking model that estimates the cost of building the US telecom network today. Once the model has been refined, the FCC will use it to calculate a carrier's requirement for funding based on study area. The first step will calculate each carrier's need by comparing the average cost per line within a study area with a national average. The 2nd step will look at the ability of carriers in a given state to cover their own funding requirement. A rural task force has begun work on a plan for high-cost rural areas. The rural task force likely will want to refine or replace the non-rural cost model and the study areas upon which the model is based.

Eriksson, R. C., Kaserman, D. L., & Mayo, J. W. (1998). Targeted and untargeted subsidy schemes: Evidence from post-divestiture efforts to promote universal telephone service. *Journal of Law and Economics*, 41(2), 477-502.

Normative economic analysis traditionally has pointed toward the merits of policies wherein prices reflect the economic cost of providing a good or service. Subsidization policies are, nevertheless, common in a variety of industries. Where such subsidies occur, economists have long advocated targeting those subsidy flows to maximize their effectiveness and minimizing the allocative inefficiency caused by financing of the subsidy. A set of large-scale targeted and untargeted subsidy flows that have been developed side by side, each with the same nominal policy goal - promoting universal telephone service - is examined. Specifically, the relative contributions of the alternative subsidy mechanisms in promoting the policy goal of maximizing subscription to the public switched telephone network is tested. The analysis indicates that targeted subsidy programs are considerably more effective than untargeted subsidies in promoting the goal of universal telephone service. Moreover, the results indicate that the financing mechanism used to generate subsidy flows may seriously erode the effectiveness of either targeted or untargeted subsidy policies.

Ewalt, J. H. (1998, Winter). Rural America online: Cable television brings the benefits of broadband telecommunications to rural communities. *Forum for Applied Research and Public Policy*, 13, 84-86.

Falch, M., & Anyimadu, A. (2003). Tele-centres as a way of achieving universal access-the case of Ghana. *Telecommunications Policy*, 27(1), 21-39.

Creation of a countrywide network of tele-based information centres (or 'tele-centres') offers a low cost opportunity to empower local communities in developed and developing countries to meet the challenges of *The Information Society*. This paper presents a field study of how tele-centres in Ghana have contributed to universal access and discusses their potential impact on rural development.

Faulhaber, G. R. (1996). *Public policy for a networked nation*. Philadelphia, PA: The Annenberg Public Policy Center. Retrieved from <http://rider.wharton.upenn.edu/~faulhabe/ppnn.pdf>

The extremely rapid emergence of the Internet as a mass communications service and its concomitant commercialization has stirred great interest in creating a broadband infrastructure, both in the US and worldwide. The concept of a national, even global, network linking citizens and governments, friends and neighbors, customers and firms, schools and students appears new and exciting, almost unprecedented to many. Whether this will occur, and how it will play out, appear as great uncertainties. Central to this uncertainty is the role that public policy will play in the deployment of interactive broadband networks. In virtually all countries, networks of all kinds have been tightly regulated (or owned outright) by governments. This pervasive public intervention into the market is often justified by economies of scale or universal service. Indeed, we have heard concerns as the Internet has expanded that it must be made available to all to ensure that everyone has access to the skills and information to succeed in the 21st century. In this article, the arguments for government intervention are critically reviewed and assessed. It is argued that the appropriate model for the Internet is to permit and encourage market forces to drive the development of this new resource. Relying on government regulation is both unnecessary and likely to lead to inefficient outcomes and a significant slowing of Internet growth.

Federal Communications Commission (FCC). *Statistics of communications common carriers*. Washington, DC: Author. Retrieved from http://www.fcc.gov/Bureaus/Common_Carrier/Reports/FCC-State_Link/socc.html

Publication provides data on revenues and earnings of local and long distance telephone companies as well as other related information.

Federal Communications Commission (FCC). *Trends in telephone service*. Washington, DC: Author.

Semiannual report on telephone service subscribership, charges, local and long distance firm finances, and international operations.

Federal Communications Commission (FCC). (2000). *Deployment of advanced telecommunications capability: Second report*. Washington, DC: Author. Retrieved from http://www.fcc.gov/Bureaus/Common_Carrier/Orders/2000/fcc00290.pdf

In this Second Report, the Commission concludes its second inquiry into the availability of advanced telecommunications capability in the United States.¹ In general, we find that advanced telecommunications capability is being deployed in a reasonable and timely fashion, although we identify certain groups of consumers that may be particularly vulnerable to untimely access to this capability. We have seen significant investment in the facilities needed to provide

advanced telecommunications capability, steadily rising subscription rates for advanced services, and a proliferation of providers in the marketplace. We are encouraged that these factors will lead to widespread deployment. As with any technology, particularly in its early stages, deployment of advanced telecommunications capability is not uniform across the nation. Some consumers will gain access to that capability before others. While we expect that economic forces will drive deployment as the market develops, it appears that consumers in certain areas of the country may be particularly vulnerable to not receiving timely access to advanced telecommunications capability. As discussed below, we have already taken -- and will continue to take -- steps to ensure that consumers in all regions of the nation have access to advanced telecommunications capability in a reasonable and timely fashion. This report answers the four basic questions we set forth in the Notice of Inquiry: (1) What is advanced telecommunications capability? (2) Is advanced telecommunications capability being deployed to all Americans? (3) Is overall deployment reasonable and timely? (4) What actions by the Commission will accelerate deployment?

Federal Communications Commission (FCC). (2000). *Funding commitments made to schools and libraries by the Universal Service Administrative Company as of Nov. 1, 1999*. Washington, DC: Author.

Second annual report, for July 1999-June 2000, on funding commitments to schools, libraries, school districts, and school/library consortiums for discounts on telecommunications and dedicated access, Internet access, or internal connections services, as of Nov. 1, 1999. Includes 1 extended table showing applicant name, location, urban/rural setting, and type; funds committed; service type; discount eligibility; and funding request identification number; arranged by State, as of Nov. 1, 1999.

Federal Communications Commission (FCC). (2002). *FCC-state link: Providing access to reports and data prepared by the Wireline Competition Bureau's Industry Analysis and Technology Division* [Home page]. Washington, DC: Author. Retrieved from <http://www.fcc.gov/wcb/iatd/stats.html>

Provides access to the reports and data prepared by the Federal Communications Commission's Wireline Competition Bureau's Industry Analysis and Technology Division. The reports and data are arranged into the following categories: a) recent releases, b) statistical trends in telephony, c) local and long distance telephone industries, d) local telephone competition and broadband deployment, e) statistics of communications common carriers, f) telephone industry infrastructure and service quality, g) Federal-State Joint Board monitoring reports, h) National Exchange Carrier Association and Universal Service Administrative company data, i) international traffic data, and j) telephone numbering facts.

Federal Communications Commission (FCC). (1999). *Inquiry concerning the deployment of advanced telecommunications capability to all Americans in a reasonable and timely fashion, and possible steps to accelerate such deployment pursuant to section 706 of the Telecommunications Act of 1996*. CC Docket 98-146: February. Washington, DC: Author. Retrieved from http://www.ncta.com/pdf_files/CC_Docket_98-146_Comments.pdf

Federal Communications Commission (FCC). (2002). *Local telephone competition and broadband deployment* [Home page]. Washington, DC: Author. Retrieved from <http://www.fcc.gov/wcb/iatd/comp.html>

Provides links to a variety of reports and statistics related to local competition and broadband deployment.

Federal Communications Commission (FCC), Common Carrier Bureau, Industry Analysis Division. *High-speed services for Internet access: Subscriberhip as of ...* Washington, DC: Author. Retrieved February 25, 2003, from <http://www.fcc.gov/wcb/iatd/comp.html>

"Provides summary statistics of subscribership data that facilities-based providers of high-speed services file twice a year on FCC Form 477" -- FCC (<http://www.fcc.gov/wcb/iatd/comp.html>).

Federal Communications Commission (FCC), Common Carrier Bureau, Industry Analysis Division. *Local telephone competition*. Washington, DC: Author. Retrieved February 25, 2003, from <http://www.fcc.gov/wcb/iatd/comp.html>

"Provides summary statistics of data that incumbent and competitive local exchange carriers, and mobile wireless telephone service providers, file twice a year on FCC Form 477, or summary statistics of voluntary survey data and selected other data (in the 1998 and 1999 releases)" -- (FCC <http://www.fcc.gov/wcb/iatd/comp.html>).

Federal Communications Commission (FCC), Consumer & Governmental Affairs Bureau. (2002). North Dakota TRS page. Washington, DC: Author. Retrieved January 30, 2003, from http://www.fcc.gov/cgb/dro/trs_north_dakota.html

FCC page devoted to North Dakota Telecommunications Relay Service (TRS). Provides links to information about related programs, public notices, and quarterly reports.

Federal Reserve Bank of Richmond. (2000, Winter). *West Virginia: From country roads to information super highways, West Virginia is racing into the future*. Richmond, VA: Author. Retrieved from <http://www.rich.frb.org/regionfocus/winter00/index.html>

"Something new is growing along the highways and byways of West Virginia -- technology. In the process of economic diversification, new industries are slowly squeezing out old ways of life. What once was a scattering of isolated, rural communities is now becoming a cyber state. Technology is revolutionizing the state's criminal justice system. At the same time, Interstate 79 between Morgantown and Clarksburg is brimming with activity. West Virginia has embarked on a new and fascinating future." (PolicyFile abstract).

Federal-State Joint Board on Universal Service, Rural Task Force. (2000). *Competition and rural service*. Retrieved March 21, 2001, from [http://www.wutc.wa.gov/rtf/rtfpub.nsf/43e458610b70dda8882567d00074c6cd/6597dd7d0c39c96f88256977006190f7/\\$FILE/Wp5.pdf](http://www.wutc.wa.gov/rtf/rtfpub.nsf/43e458610b70dda8882567d00074c6cd/6597dd7d0c39c96f88256977006190f7/$FILE/Wp5.pdf)

"Addresses the components of a universal service system affecting competitive entry into rural and insular areas served by 'rural telephone companies'"--Introduction.

Fettig, D. (1991, October). Can you create a high-tech environment? *Fedgazette*, 3(3), 1-. Retrieved November 17, 2003, from the EBSCOhost Business Source Premier database.

"Looks into the success of high technology companies in Saint Paul and Minneapolis in Minnesota. Comment of Herbert Johnson, president of the Minnesota Technology Corridor Corp. on the success of the state; Factors which helped the rise of the state; Resources needed for growth by technological companies." (EBSCOhost Business Source Premier abstract).

Flora, C., & Christenson, J. (Eds.). (1991). *Rural policies for the 1990s*. Boulder, CO: Westview Press.

The crisis in rural America is far from over - changing demographics, economic decline, and increasing poverty continue to plague rural areas. This book focuses on policy-relevant research that addresses the crucial issues of employment, demographics, environment, and technology that must be dealt with to improve the situation that exists in rural areas. Written by leading experts, this book offers a broad perspective on the problems facing rural America and presents concrete proposals for revitalizing it.

Flora, J. L., Green, G. P., Gale, E. A., Schmidt, F. E., & Flora, C. B. (1992). Self-development: A viable rural development option? *Policy Studies Journal*, 20(2), 276-288.

Research findings suggest that self-development should not be considered the primary economic development strategy for most rural communities. There seems to be a positive relationship between self-development and industrial recruitment.

Folen, R. A., James, L. C., et al. (2001). Biofeedback via telehealth: A new frontier for applied psychophysiology. *Applied Psychophysiology and Biofeedback*, 26(3), 195-204.

Psychophysiological diagnostic and therapeutic methods, to include biofeedback, have been found to be empirically effective in the treatment of a variety, of physical disorders. In many areas of the country, however certified biofeedback practitioners are not well distributed, limiting patient access to this treatment modality. Psychologists at Tripler Army Medical Center have pioneered efforts to develop and provide these needed services via a telehealth venue. Such capability significantly, improves access to care, particularly for patient's located at considerable distance from the provider As the telecommunications infrastructure in rural and remote areas is often quite basic, such a system must be capable of operating within these limited parameters. The system developed by the authors provides real-time video and audio interactivity and allows the therapist to monitor and control biofeedback equipment located at the remote site. The authors discuss the clinical applications, the technology, and relevant practical and ethical issues.

Fox, W. F., & Porca, S. (2001). Investing in rural infrastructure. *International Regional Science Review*, 24(1), 103-133.

Freshwater, D. (1998, Winter). Rural America's Information Age: The economic future of rural communities depends on their ability to take advantage of emerging telecommunications technologies. *Forum for Applied Research and Public Policy*, 13, 72-79.

Friedlander, A. (2001, November 1). *More than connected: Americans' access to high technology : A review of the recent literature from the perspective of time*. Prepared for the Computer Science and Telecommunications Board of the National Research Council at the request of the National Science Foundation.

Fuhr, J. P. Jr. (1990). Telephone subsidization of rural areas in USA. *Telecommunications Policy*, 14(3), 183-188.

This comment puts under scrutiny the structure of the rural telephone industry in the USA and the subsidies which rural telephone companies and their customers have received and continue to receive. The current system of subsidizing rural telephone subscribers is inefficient and inequitable, the author finds. He examines the future of the rural telephone companies in the light of the regulatory changes that have occurred, and outlines some public policies which would help achieve universal service and improve equity and efficiency.

Fuhr, Joseph P., Jr. (1991, Spring). Rural telephony since divestiture. *Review of Industrial Organization*, 86-95.

Fuhr, Joseph P., Jr. (1993, Summer). Should the U.S. subsidize rural telephone companies? *Journal of Policy Analysis and Management*, 582-589.

A study of various cost and revenue segments of the telephone industry was conducted to determine the actual cost of providing telephone service. The effectiveness of subsidizing rural telephone companies is also discussed.

Fulton, W. (1989, August). Getting the wire to the sticks: Digital switches and fiber optics can boost a rural economy; but deregulation isn't the only way to get the job done. *Governing*, 2, 34-37.

Gabel, D., & Kennet, D. M. (1997). The effect of cellular service on the cost structure of a land based telephone network. *Telecommunications Policy*, 21(5), 411-422.

While economies of scale and scope have been extensively studied in traditional telephone networks, thus far little academic attention has been paid to the effect of cellular communications, which is one of the most rapidly growing segments of the telecommunications system. We use LECOM—our Local Exchange Cost Optimization Model—to generate data representing an optimal telephone network before and after the introduction of a cellular network. We derive geographic data from Statistics New Zealand's meshblock data. Our cost data for network components are 'typical' North American annual costs. Our initial results suggest, somewhat intriguingly, that there may be potential gains to more widespread introduction of cells in some rural areas, particularly those characterized by customer populations clustered along major roads.

Gable, D., & Kwan, F. (2000). *Accessibility of broadband telecommunication services by various segments of the American population*. Telecommunications Policy Research Conference.

Gasmi, F., Laffont, J. J., & Sharkey, W.W. (2000). Competition, universal service and telecommunications policy in developing countries. *Information Economics and Policy*, 12(3), 221-248.

Local telecommunications service has traditionally been provided by a monopoly under a regulated price structure. In most countries and jurisdictions, an explicit goal of regulation has been the provision of service to customers in high cost areas at 'affordable' prices and this has been achieved by cross-subsidies within the regulated monopoly. In recent years, however, changing technologies and an increased appreciation of the benefits of competition in traditional natural monopoly industries have generated powerful forces for deregulation of local telecommunications. These forces threaten the viability of this traditional method of universal service funding. In this paper, we empirically evaluate these tradeoffs with special attention to parameter values that are relevant for developing economies. Using a forward-looking engineering process model of the local exchange network, we generate cost data sets that we use to fit cost functions corresponding to various entry scenarios. These cost functions, in turn, are combined with models of firms' competitive behavior that represent these entry scenarios and regulatory intervention to calculate market equilibria and compare them on the basis of social welfare. This analysis provides a simple characterization of the conditions under which urban-to-rural cross-subsidies may still prove to be a powerful tool for financing universal service under competition. The main conclusion of the paper is that these conditions are often met by developing countries.

Gieseke, J. A., & Korsching, P. F. (1998). Effects of local versus absentee telephone company ownership on participation in rural community economic development. *The Journal of the community Development Society*, 29(2), 256-275.

Acceleration of the Information Age has heightened the importance of telecommunications services in the economic vitality of rural communities. The local telephone service provider is a key actor in the community's economic development activities, but telephone company involvement in economic development varies significantly across communities. This article focuses on the effects of local ownership versus absentee ownership of telephone companies on their participation in local community economic development. Data from a study of community economic development professionals in Iowa indicate a positive relationship between local telephone company ownership and involvement with economic development efforts. Building upon the community of limited liability concept, it was found that the nature of local investments affects participation in economic development. Implications of the results are discussed in the context of ongoing structural changes in the telecommunications industry.

Gillan, J. (1986, May 15). Universal telephone service and competition: The rural scene. *Public Utilities Fortnightly*, 117, 22-26.

Gillespie, A. E., & Richardson, R. (2000). Telematics innovation and the development of non-metropolitan areas: Lessons from policy experience. In D. F. Batten, C. S. Bertuglia, D. Martellato, & S. Ocelli, (Eds.) *Learning innovation and urban evolution*. Boston: Kluwer Academic Publishers.

Gillette, J. E. (1996). The information renaissance: Toward an end to rural information colonialism. *Pacific Telecommunications Review*, 18(2), 29-37.

This paper argues that we are in the midst of an information renaissance that may well have the world-changing impact of the earlier European renaissance. The negative side of the information renaissance is that isolated rural areas can be dominated by urban areas through rural "information colonialism." The positive side is that information networking can be a catalyst for change, enabling rural areas to declare "information interdependence," as co-equal contributors to the renaissance of our time. The paper is in five sections: The Information Renaissance; Urban-Rural Dynamics; Information Networking is the Catalyst for Change; Practical Recommendations for Communities in the Information Economy; Declaration of Information Interdependence. Includes illustrations and references.

Gillett, S. E. (2000). Universal Service: Defining the policy goal in the Age of the Internet. *The Information Society*, 16(2), 147-149.

The current universal service policies for the Internet focus almost entirely on physical connectivity. This emphasis is misplaced because the Internet is an overlay network that rides piggyback on the existing telecommunications infrastructure. The focus instead should be on Internet services and the end-user equipment and training needed to access them.

Gillett, S. E., & Lehr, W. (2000). *Availability of broadband Internet access: Empirical evidence*. Retrieved 2002 from http://itel.mit.edu/itel/docs/MISC/LehrGillettTPRC99_0523.doc

Gillett, S. E., & Vogelsang, I. (1998). *Competition regulation and convergence: Current trends in telecommunications policy research*. Mahwah, NJ: Lawrence Erlbaum.

Gilson, P., Bannister, M., & Aistrup, J. (2001). Economic impact of a rural computer services center. *Economic Development Review*, 17(3), 52-55.

The economic impact of a rural computer service center in Hays, Kansas, is examined. The center is owned by Sykes Enterprises Inc., one of the leading third-party support providers for the computer and software industries. The incentive package provided Sykes to expand to Hays has been a successful investment. Retail, housing, automotive and several other sectors have benefited substantially from Sykes expansion. Governmental entities with the exception of the City of Hays recouped their investment very quickly and are netting more revenues than the expansion of services or direct investments have demanded. By the close of 2003, the city should also enjoy a net benefit. Kansas and other state governments may fiscally have the most to gain from this type of expansion and may benefit themselves and local communities with greater economic development investment.

Glasmeier, A. K. (1991). *The high-tech potential: Economic development in rural America*. New Brunswick, N.J.: Center for Urban Policy Research.

This book provides a hard-nosed look at the high-tech potential in rural economic development. Are rural areas attractive to high tech, or will rural communities be bypassed completely for even lower-wage third-world locations? The author provides the answers in a sober analysis that separates fact from myth. Her analysis includes a critical evaluation of state and local economic development policy and recommendations for its improvement.

Glasmeier, A., & Howland, M. (1995). *From combines to computers: Rural services and development in the age of information technology*. Albany, NY: State University of New York Press.

The purpose of the book is to explore the impact of modern information technology on rural services and development. It examines the transition to a service economy in rural America, drawing on analysis of national data and case studies and documents the intraregional spatial patterns and trends of services in the national economy. In addition, It compares services in urban and rural communities, and identifies the potential and limitations of rural development strategies based on services.

Glass, V. (2001). *NECA middle mile broadband cost study*. Whippany, NJ: National Exchange Carriers Association.

Glass, V. (2000). *NECA rural broadband cost study: Summary of results*. Whippany, NJ: National Exchange Carriers Association. Retrieved from <http://www.neca.org/media/broadban.pdf>

This study estimates the investment dollars needed to upgrade rural study area lines in NECA's Common Line pool1 to broadband capability. Included in the estimate are plant upgrades on the customer side of the switch. Not included in the estimate are investment expenditures on DSL equipment, switch and backbone transport to other service areas or the ongoing maintenance of the upgraded network necessary to provide broadband services. The results confirm two widely held beliefs about wiring rural America for broadband service2 that seem contradictory on the surface. First, the estimated bill for completing the job is enormous, about \$10.9 billion. Second, rural telephone companies are rapidly deploying a broadband capable network. According to the study's respondents, about 65% of rural lines will be capable3 of providing broadband service by 2002. This fact, coupled with the ambitious rollout of data-network services documented in NECA's Access Market Survey4, show that rural telephone companies are trying to meet their customers' needs for high-speed lines. Whether the pace is quick enough for policy-makers, or the targeted penetration rates are high enough for them to accept, will determine the funding needed to reach public policy objectives.

Glass, V., Chang, J., & Petukhova, M. (2003, May). Testing the validity of NECA's Middle Mile cost simulation model using survey data. *Government Information Quarterly*, 20(2), 107-119.

"Providing affordable high-speed Internet service in rural areas is a challenge because of low population density and long distances from customers to major Internet Backbone Ports (IBPs), which are entry points onto the World Wide Web. NECA's Middle Mile Study, issued November 2001, focused on the cost of transporting traffic from an Internet Service Providers operating in a rural telephone company's serving area to the nearest IBP. In general, the study concluded that high-speed Internet access loses money in most of the rural telephone company serving areas. Because the Middle Mile study relied on simulated data, the National Exchange Carrier Association (NECA) surveyed 200 serving wire centers (SWC) of rural telephone companies to test the reliability of the simulation model and its output. The survey results reported in this article confirm that the Middle Mile study was reasonable in measuring distances and conservative in estimating transport costs." (Copyright Elsevier Inc. All rights reserved).

Note: Article printed out and also saved as a pdf file, glassveta2003.

Glass, V., & Talluto, S. (2003, May). Cable TV is the next market for rural Telcos. *Government Information Quarterly*, 20(2), 177-183.

This article describes how the DSL revolution transformed the local telephone network into a broadband platform. It describes the reasons for upgrading telephone networks to broadband capability and highlights some of the more interesting transition strategies that telecommunications carriers (telcos) use to enter the cable TV market. Finally, the article also discusses other cable TV requirements such as a head-end and video content

Note: Article printed out and also saved as a pdf file, Glass&Talluto2003.pdf.

Glass, V., Talluto, S., & Babb, C. (2003, May). Technological breakthroughs lower the cost of broadband service to isolated customers. *Government Information Quarterly*, 20(2), 121-133.

"Two years have passed since the completion of the National Exchange Carriers Association's (NECA) Broadband Study.¹ This paper examines two of its conclusions: (1) the prediction that 65% of rural telephone company lines would be broadband capable by 2002, and (2) the \$5.6 billion price tag for upgrading remote lines. The "remote line" issue is especially important because these lines were classified on the other side of the digital divide as the "have nots" of the high-speed Internet age. As this article demonstrates, the "capability" prediction was accurate, but rapid technological breakthroughs have reduced the cost of upgrading remote lines considerably. A rural telephone company can now offer many of its remote customers broadband service where in the past the cost was prohibitive." (Copyright 2003 Elsevier Inc. All rights reserved).

Glass, V., et al?. (1999). *The Adoption of proxy cost models by telecommunications regulators as the means to calculate universal service support: What is at stake for rural America?* Columbia, MO: Rural Policy Research Institute (RUPRI). Retrieved from <http://www.rupri.org/publications/archive/old/telecomm/p99-4/index.html>

This study is designed to help us ask the right questions about proxy models so that we can decide whether or not they are the right tool for overhauling the existing support mechanisms that keep basic local service affordable. Toward this end, this study gives background information needed to answer the following questions: 1) What is basic local service? 2) How will it evolve? 3) Why proxy models? 4) Are they reliable enough to target support dollars to high cost customer locations? 5) Do they calculate enough support to replace all existing implicit and explicit supports for basic service? 6) Are they flexible enough to include other services that may become part of basic service? 7) Are they flexible enough to incorporate new technology or more than one provider in a service area? 8) What is the status of using proxy models for non-rural and rural carrier support? 9) What is the status of the RTF's review of proxy models for rural carriers?

Goldman, C. (2001). Satellite service could come down to earth. *Wireless Review*, 18(19), 8-10.

New ICO and other mobile satellite service (MSS) providers asked the FCC for permission to operate terrestrial networks over their MSS spectrum, creating a combination satellite and terrestrial-based wireless communications service. MSS providers believe the pairing can serve rural and international customers better than traditional satellite-only or wireless-only networks. ICO believes the rule change would help bridge the digital divide. Profit would be a bonus. For all intents and purposes, MSS providers are asking to use their licenses to

provide the same kind of service wireless carriers already provide. Consequently, CTIA and many wireless carriers have filed opposition to the proposal.

Goldsmith, H. F., Puskin, D. S., et al. (1993). *Improving the operational definition of "Rural Areas" for federal programs*. [Washington, DC?]: United States Department of Health and Human Services. Health Resources and Services Administration. Retrieved 2002 from <http://ruralhealth.hrsa.gov/pub/Goldsmith.htm>

"This paper uses decennial census data to demonstrate a method that can be used to identify small town and rural parts of large metropolitan counties ... that most likely do not have easy access to central areas" -- p. [1].

Goodman, S. E., Gottstein, J. B., et al. (2001). Wiring the wilderness in Alaska. *Communications of the ACM*, 44(1), 21-25.

Goodridge, E. (2001). Rural district catches up. *Informationweek*, 830(26), 54-56.

As North Carolina's economy has boomed - fueled largely by the presence of high-tech companies such as IBM and Cisco Systems - poor, racially mixed rural schools such as Butner-Stem Middle School in rural Granville County, NC, have been the last to benefit. The digital divide is just as prevalent in rural America as it is in inner cities. In many respects, rural areas will have a harder time bridging the divide. One reason is that Internet access is prohibitively expensive: The installation of a T1 line to a rural area can cost more than \$7,000 because the necessary telecommunications infrastructure is often lacking. Last year, to come up with \$834,000 needed for technology equipment and support, Ernest Bibby, the county's director of technology and secondary education, tapped local, federal, and state grants, business and individual donations, business partnerships, local universities, nonprofit organizations, and volunteers. As a result, Butner-Stem boasts 3 computer labs, 2 outfitted with PCs, one with Apple Macintoshes - and 2 full-time computer-literacy teachers to train the 600 students.

Gorman, S., & Malecki, E. J. (2000). The Networks of the Internet: An analysis of provider networks in the U.S.A. *Telecommunications Policy*, 24, 113-134.

Gramlich, E. M. (2000). *The Digital divide*. The Federal Reserve Board. Retrieved December 29, 2001, from <http://www.bog.frb.fed.us/boarddocs/speeches/2000/20000417.htm>

The recent economic expansion has proved gratifying in many respects. During the past five years, in contrast to the preceding ten years, wages and labor income have risen across the board for low- and high-wage workers alike. Unemployment rates for minorities and for those without college education have dipped, for many groups to historic lows. Long-term unemployment is way down. State and local treasuries are flush with revenue, limiting the cuts in social spending that characterized earlier periods. Access of low- and moderate-income groups to credit has dramatically increased as well. As a result of the good economy, technological change, and innovative financial products, low-income credit has exploded in recent years. Between 1993 and 1998, conventional home-purchase lending to low-income borrowers increased by nearly 75 percent, compared with a 52 percent rise to upper-income borrowers. Conventional mortgages to African-Americans increased by 95 percent over this period and to Hispanics by 78 percent, compared with a 40 percent increase in all conventional mortgage borrowing. This expansion of credit has permitted many low-income and minority borrowers to realize their dream of owning a

home and a chance to realize the capital gains that have so increased the wealth of upper-income households. Technology is at the root of both the overall economic changes and the expansion of credit to low- and moderate-income households. While technology holds the promise of spreading benefits to all Americans, low- and high-income alike, this spreading is not automatic. Until recently, technology had seemed to increase disparities in wage income. Lately that is no longer the case. Beyond this, many observers justifiably worry about what is known as the "digital divide," the gap between those who have the resources and skills required to access and use technology and those who do not. In a series of recent studies, the National Telecommunications and Information Administration of the Department of Commerce has found that location, income, and race are the primary factors identifying the technologically underserved. Households in rural areas are least likely to have access to computers and the Internet, followed by low-income minorities living in central cities. Follow-on studies show this divide more graphically. Census data from 1998 show that although more Americans now have access to telephones, computers, and the Internet, disparities in home-based Internet access continue to increase. Households with incomes of \$75,000 and higher are five times more likely to have home computers than those at the lowest income levels, a gap that expanded by 29 percent between 1997 and 1998. White households are roughly two and one-half times more likely to have home-based Internet access than African-American and Hispanic households, a disparity that increased by 38 percent in the same one-year period. The gap between those at the highest and lowest education levels who can access the Internet at home increased 25 percent. Recognizing that there are enormous overall benefits to technology and the Internet and that innovations will naturally be adopted first by those with high incomes and educational achievement, one can still worry about this digital divide. As more and more routine business and interacting is done on the Internet, it becomes more likely that those who are not connected will be excluded from opportunities that are available to others. In this sense it is critical that public, private, and nonprofit sectors collaborate to design policies and programs that will enable all segments of the population to reap the benefits that technology offers. Today the author wants to discuss some challenges in this area, and also recount some positive experiences.

Gray, J. C. (1983). Information-policy problems in developing countries. *The Information Society*, 2(1), 81-89.

The United Nations Educational, Scientific, and Cultural Organization (UNESCO) and the UN Interim Fund on Science and Technology for Development cooperated to review the progress and problems of developing library and information services in 8 countries. Before inception of this project in 1981, developing countries sought to build up library and information services, but neither they nor the organizations that helped them analyzed progress and failure on a significant level. The countries studied were: 1. Colombia, 2. Costa Rica, 3. Jordan, 4. Kenya, 5. Republic of Korea, 6. Malaysia, 7. Morocco, and 8. Nigeria. With the help of national liaison officers, a team of information specialists reviewed relevant information and held interviews with citizens involved in the production, exchange, and use of information for economic and social development. The experts concluded that urgent action was needed to increase the high-level administrative commitment to information policy, to build up national capabilities for identifying and developing potentially useful services, and to promote their effective use. They recommended initially that these and related issues be discussed at a series of regional, subregional, and national meetings at a high administrative level, placing emphasis on the development of national policies and plans that could improve the problems uncovered.

Gray, T., & Flinn, W. (1978). *Perspectives on rural industrialization and rural development: Preliminary results*. Rural Sociological Society (RSS) [Conference paper].

"The objective here is to make explicit underlying methodological & ontological assumptions to Ru industrialization literature. Part one deals with methodological foci of pro/con issues on Ru industrialization. Such foci were held to be atomistic, i.e., community-impact oriented, or holistic, i.e., regionally oriented. Part two is an empirical reexamination--from a conflict perspective--of a neoclassical/regional economics approach to growth potential in an Appalachian region. Data analysis consists of an input/output analysis of data collected under Title 5 of the Rural Development Act of 1972. The neoclassical/regional economics approach held that growth potential lay within emphasizing existing links to metropolitan regions; the conflict approach held such links would only perpetuate existing development gaps. Given underlying methodological & ontological assumptions, these assumptions, to a large degree, structure results & consequent policy recommendations."

Descriptors: Rural; Industrialization; Industrializing; Development; Developments Appalachia; Appalachian; Appalachians

Identifiers: rural industrialization, development; methodological foci, conflict perspective, neoclassical/regional approach; Appalachia

Classification: Social change and economic development

Greenstein, S. M. (1998). *Universal service in the digital age: The commercialization and geography of U.S. Internet access* (Working Paper No. W6453). Cambridge, MA: National Bureau of Economic Research. Retrieved from <http://papers.nber.org/papers/W6453.pdf>

In 1997, the Council on Library and Information Resources (CLIR) supported a project on the geographic spread of the commercial Internet Service Provider (ISP) market. This Research Brief describes some of the principle findings of a report (by Professor Shane Greenstein of the Kellogg Graduate School of Management, Northwestern University) on the project. The ISP market is the leading supplier of Internet access in the United States. A critical issue for policymakers is whether commercial ISPs will naturally provide wide geographic scope of their own accord, in pursuit of profitability. There are two predominant business models of commercial service providers: one that depends on firms structured to provide a national service, and one that depends on local firms providing local services. The commercial ISP industry will provide geographic scope not as an end in itself but as part of a general strategy to target a particular type of customer. ISPs are assigned to five categories in terms of strategy/structure: urban/national; urban/local; rural/local; rural/national; and regional firms. The survival of local and national ISPs has important implications for the geographic scope of the industry; expansion of the Internet by ISPs is driven by pursuit of commercial opportunities. Structural and strategic differences in the ISP industry and within markets should be central issues in policy discussions of universal access to advanced communications and computing technology. Two United States maps show the distribution of ISPs in March 1997, and urban counties with and without ISPs for the same month and year. (AEF)

Abstract 2: "Many analysts anticipate a need to redefine universal service to account for Internet-related services and other combinations of communication and computing. This concern motivates a study of the geographic spread of the commercial Internet Service Provider (ISP) market suppliers of Internet access in the United States. The paper argues that two business models presently vie to diffuse commercially-oriented Internet-access across the US. One business model emphasizes a standardized national service, the other a customized local service.

The paper then characterizes the location of over 14,000 access points, local phone numbers offered by commercial ISPs in the spring of 1997. Markets differ widely in their structure competitive to unserved. Just under three quarters of the US population has easy access to commercial Internet service providers, while approximately fifteen percent of the US population has costly access. Urban/rural coverage must be understood in the context of the different strategies of national/local providers.” (PolicyFile abstract).

Greenstein, S. M. (2000). Building and delivering the virtual world: Commercializing services for Internet access. *Journal of Industrial Economics*, 48(4), 391-411.

This study analyzes the service offerings of Internet Service Providers (ISPs), the commercial suppliers of Internet access in the United States. It presents data on the services of 2089 ISPs in the summer of 1998. By this time many ISPs had begun to offer services other than basic access. This paper develops an Internet access industry product code which classifies these services. Significant heterogeneity across ISPs is found in the propensity to offer these services, a pattern with an unconditional urban/rural difference. Most of the explained variance in behavior arises from firm-specific factors, with some evidence of location-specific factors.

Grigsby, W. J. (2001). *Community vitality: Some conceptual considerations*. University Park, PA: The Pennsylvania State University, Northeast Regional Center for Rural Development. Retrieved 2002 from

<http://www.cas.nercrd.psu.edu/Publications/RDPAPERS/GrigsbyCommVitality.htm>

Explores the concept of community vitality.

Grimes, S. (2000). Rural areas in *The Information Society*: Diminishing distance or increasing learning capacity? *Journal of Rural Studies*, 16(1), 13-21.

This paper examines the prospects for rural areas within *The Information Society*, referring particularly to the EU experience. Among these are the diminishing effects of distance from core markets and enhancing the learning capacities of rural areas by improving access to relevant information. EU policy to date has been influenced by a strong technology dimension with an emphasis on the installation of necessary infrastructure and equipment. There is an increasing awareness, however, of the need to focus on the social dimension, as skepticism grows about wasted resources, poorly thought out projects and False expectations. Teleworking, which was widely hyped as the best prospect for rural areas, continues to be predominantly an urban or suburban phenomenon. Although the new technologies are no substitute for entrepreneurship, the potential they present, within a more enlightened policy environment, should nor be underestimated.

Grubestic, T. H. (2002). Spatial dimensions of Internet activity. *Telecommunications Policy*, 26(7), 363-387.

The global diffusion of Internet activity is advancing at an unprecedented rate. However, it is increasingly apparent that the diffusion of information technologies and their associated activity is spatially uneven. Utilizing a comprehensive database of domain registrations, spatial-statistical methods, and a geographic information system (GIS), the spatial dimensions of Internet activity are explored for the state of Ohio. In addition to identifying considerable differences in Internet activity between urban and rural locales, results suggest that existing

telecommunication infrastructure and educational institutions also play significant roles in the level of Internet-related activity for the region.

Grubestic, T. H., O'Kelly, M. E., & Murray, A. T. (2003) A geographic perspective on commercial Internet survivability. *Telematics and Informatics*, 20(1), 51-69.

The earliest predecessor to the commercial Internet of today was ARPANET, a packet switched computer network developed by the US Defense Department's Advanced Research Projects Agency. Designed to withstand a nuclear attack, ARPANET utilized a deurbanized, decentralized, and distributed network topology. As ARPANET gradually evolved into NSFNET and eventually the commercial Internet, increasing traffic, demands for interconnection, and growing private interests required the movement from a distributed network topology to a more economically viable network configuration, hub-and-spoke. Although transmission speeds and capacities of today's commercial Internet clearly surpass those of its predecessors, the economics of network survivability and reliability have also become more relevant. With thousands of businesses, corporations, universities, and governments relying on the Internet for day-to-day functions, major disruptions in service have the potential to be economically catastrophic. This paper explores the network topology of the commercial Internet, with a focus on network survivability. GIS based approaches are used to simulate both nodal and link failure in the US commercial backbone system in order to assess potential impacts. Results suggest that many of the larger metropolitan benefit from robust network infrastructure, while smaller cities are more prone to service disruptions.

Guard, R., et al. (1995). *Ohio Valley Community Health Information Network*.

The Ohio Valley Community Health Information Network (OVCHIN) works to determine the efficacy of delivering health information to residents of rural southern Ohio and the urban and suburban Cincinnati area. OVCHIN is a community-based, consumer-defined demonstration grant program funded by the National Telecommunications and Information Administration and by corporations and universities. Information is delivered via ISDN, standard dial, and dedicated network connections. Purposes of OVCHIN include providing equitable, widespread access to health-related information resources in the Ohio Valley, particularly for rural Appalachian and urban minority populations; providing comprehensive training programs for health information resources; demonstrating the use of existing telecommunications and hardware infrastructure for information dissemination; and contributing to health education and awareness. Project needs assessment revealed information needs on seven preeminent topics: drugs, diseases, physician referrals, general health and wellness, insurance, health planning, alternative therapies, and health literature. Among the materials available through OVCHIN are 14 electronic health information resources selected to meet assessed needs, information on "hot topics," and "ask the expert" electronic bulletin boards. A multifaceted approach to training the diverse users of the OVCHIN region includes in-person, on-site training in public libraries, public schools, and universities; training videos available via loan, purchase, and public television broadcast; and televised interactive training programs. This report also describes OVCHIN's hardware and software; rural problems relevant to the network's effectiveness; standards issues; the future of OVCHIN; and political, economic, and technical lessons learned.

Guillory, M. (1990). Building the rural telecommunications infrastructure. *Rural Telecommunications*, 9(3), 26-34.

Hacker, K. L. (1996). Missing links in the evolution of electronic democratization. *Media, Culture, & Society*, 18(2), 213-232.

Hacker explores the need for connecting theories of democracy with theories of communication in order to allow new communication technologies to contribute to the expansion of democracy and the empowerment of more people. Rhetorical claims and research findings regarding the e-mail system at the White House are examined as a case study of official arguments made regarding the power of communication technology to enhance democracy.

Hadden, S. G., & Lenert, E. (1995). Telecommunications networks are not VCRs: The public nature of new information technologies for universal service. *Media, Culture & Society*, 17(1), 121-140.

Hadden and Lenert show that some kinds of communications networks, especially those that are useful for universal service, cannot be treated in the same way as other commodities.

Hammond, A. S. (1997). The Telecommunication Act of 1996: Codifying the digital divide. *Federal Communications Law Journal*, 50(1), 180-214.

The Telecommunications Act of 1996 purports to ensure every American eventual access to advanced telecommunications networks and services, and more immediate access to basic telephone networks and services. This access is essential because it determines the ease with which Americans can acquire an education, obtain employment, control financial affairs, access emergency assistance, and participate in the political process. The interpretation and implementation of the 1996 Act is critical because there is an imminent danger that a large portion of society - those in inner cities, near suburbs, and small towns - will not be connected to the national electronic nervous system. To ensure that more Americans are technologically empowered, it is suggested that telecommunications discounts be extended to eligible community based organizations and urban health care providers.

Hansen, S., Cleavelly, D., Wadsworth, S., Simon, B., & Hilary, B. (1990). Telecommunications in rural Europe: Economic implications. *Telecommunications Policy*, 14(3), 207-222.

A study was conducted on behalf of the Commission of the European Community by telecommunications economists at Analysys Ltd. (UK). The study evaluated the economic implications of stimulating applications of telecommunications and information technology (IT) in rural areas across Europe. It was one of 3 studies to be conducted in support of the planning phase for a possible Community action known as ORA, whose broad objectives are to stimulate the provision of technologies, services, and infrastructure suited to business activities and public services in rural areas. The study's main findings are that substantial aggregate gains in employment are likely to result from investment in telecommunications and IT in the rural economies. The cost of developing this new employment compares very favorably with other means of job creation. However, telecommunications companies may suffer considerable net cash outflows in the initial years of investment, so that it may be necessary to deploy some form of public assistance to get the investment started.

Hare, W. (2001). Rural telecommunications: Partnerships bridge the digital divide. *Public Management*, 83(6), 14-17.

Basic telecommunications literacy is really not that difficult. The process begins with a desire to secure a better future for one's community. Rural leaders already know how to get

things done, whether it's building a new sewage treatment plant or an industrial park. Acquiring appropriate telecommunications infrastructure requires many of the same skills. Hare discusses the development of *Rural Telecommunications*.

Haring, J., & Rohlfs, J. H. (1997). Efficient competition in local telecommunications without excessive regulation. *Information Economics and Policy*, 9(2), 119-131.

Competition in local telecommunications can provide large benefits. The US has made great progress in promoting such competition, but the US approach is extremely regulatory. A possible way is described to introduce competition efficiently in local telecommunications without excessive regulation. It involves the combination of symmetrical call-termination charges and substantial pricing flexibility for the incumbent LEC. In this context, symmetry provides a strong safeguard against anti-competitive pricing.

Hausman, J. A., & Sidak, J. G. (1999). A consumer-welfare approach to the mandatory unbundling of telecommunications networks. *Yale Law Journal*, 109(3), 417-.

In this Article, Professors Hausman and Sidak propose a consumer-welfare model for the mandatory unbundling of telecommunications networks. Their approach, responsive to both the Supreme Court's 1999 decision in *AT&T Corp. v. Iowa Utilities Board* and the Federal Communications Commission's Second Further Notice of Proposed Rulemaking later the same year, reconciles the "necessary" and "impair" standards of § 251(d)(2) of the Telecommunications Act with the economic analysis of antitrust law. The essential facilities doctrine in antitrust law provides four necessary, but not sufficient, conditions for finding impairment. The authors add a fifth condition, responsive to the explicit text of § 251(d)(2), which addresses whether an incumbent local exchange carrier could exercise market power over end-users by restricting competitors' access to a requested telecommunications network element in a particular geographical market. The authors also recommend that "necessary" be interpreted to mean that competition in end-user services would be impossible unless the requested element were unbundled at a cost-based regulated price. This heightened standard, they argue, will protect the economic incentives to create the intellectual property embodied in elements that are proprietary in nature. The authors' proposed interpretation of § 251(d)(2) focuses on the effectiveness of competition in the end-user services market, rather than on the ability of a particular competitor to earn profits. Thus, the test adopts consumer welfare, rather than competitor welfare, as its touchstone.

Healey, J. (1995). Telecommunications: Fear of "two-tiered" society splits Senate Commerce : At issue is whether government should ensure widespread access to "Superhighway". *Congressional Quarterly Weekly Report*, 53, 937-8.

Proposed regulation requiring telephone companies to provide discounted service to schools, libraries, and small-town hospitals. Issues of "haves" and "have-nots" in access to the "information superhighway", service to low-income and rural areas, and free market or social policy agendas.

Heath, Tracy. (1999, September). Telecom infrastructure: The new facility backbone. *Site Selection Magazine*. Retrieved January 12, 2004, from <http://www.conway.com/sshighlites/0999/p751>

Heeks, R. (2002). Information systems and developing countries: failure, success and local improvisations. *The Information Society*, 18(2), 101-112.

"This paper presents evidence that - alongside the successes - many information systems in developing countries can be categorized as failing either totally or partially. It then develops a model which seeks to explain the high rates of failure. The model draws on contingency theory in order to advance the notion of design-actuality gaps: the match or mismatch between IS designs and local user actuality. This helps identify two high risk archetypes that affect IS in developing countries: country context gaps and 'hard-soft' gaps. The model is also of value in explaining the constraints that exist to local IS improvisations in developing countries. Overall, the paper shows how model and theory help understand IS cases in developing countries but, equally, how those cases provide valuable data to help develop IS models and theories".

Henry, M., Drabenstott, M., & Gibson, L. (1987, June). Rural growth slows down. *Rural Development Perspectives*, 25-30.

Hepworth, M. (1990). *Geography of the information economy*. New York, NY: Guilford Press.

Hindman, D. B. (2000). The Rural-urban digital divide. *Journalism & Mass Communication Quarterly*, 77(3), 549-560.

This study used national survey data to determine whether the "digital divide" between metropolitan and non-metropolitan populations was widening. The findings showed that one's income, age, and education were more closely associated with the use of information technologies than was geographical location. The positive association among status indicators and technology use appeared to be strengthening over time. The study concluded that contrary to utopian predictions of the universal benefits provided by the tools of the digital revolution, innovative uses of information technologies are likely to remain closely associated with social indicators.

Hobbs, V., M., & Blodgett, J. (1999, August). *The Rural differential: An Analysis of population demographics in areas served by rural telephone companies*. Columbia, MO: The Rural Policy Research Institute (RUPRI). P99-8. Retrieved from <http://www.utexas.edu/research/tipi/Reports/RuralDiffP99-8.pdf>

Absent from much of the discussion about rural America and the extent to which universal service programs and policies impact its residents is an understanding of the population served by rural telephone companies¹ and impacted by any change in universal service policies. It has been assumed that the demographics of those areas served by rural telcos were synonymous with the demographics of rural America. In reality, the 7% of the US population served by rural telcos may not necessarily typify the 61,656,000² or 25% of all persons classified as rural in the 1990 Census nor can any generalizations made be certain to apply to any particular geographic area. As important as the distinctions between those areas served by rural and non-rural telcos are the distinctions which can be drawn among those areas served by rural telcos. As part of this analysis of the 'rural differential', telephone area code and exchange (NPA/NXX) were added to the search variables of the Basic Tables Generator maintained by the Office of Social and Economic Data Analysis at the University of Missouri. The development of this capability, funded by the Rural Policy Research Institute (RUPRI), in response to the anticipated needs of the Rural Task Force, enables web-based access³ to 1990 census data (STF3 files) for

any telephone exchange based on the census data of the wire center to which it is linked. (See pages 20-30 for an in-depth description of the methodology employed.) This effort was also undertaken as a precursor for the 2000 census data, which, when available, will yield parallel but more demographically current results. This empowering information can enable better understanding of local demographic circumstances as they relate to the provision of telecommunications services and of the potential local impact of changes in universal service support mechanisms. Certainly, reported “averages” or “means” do not do justice to the multiplicity of circumstances existing within the geographic regions of the U.S. served by rural telcos. Ultimately, it is only by understanding discreet service area distinctions that a full understanding of the mosaic of rural America can be achieved with respect to the provision of telecommunications. Several important demographic characteristics highlight the significant differences between those areas served by rural and non-rural telcos. For illustrative purposes, several differences within telco service areas are also examined at the state level. No attempt is made herein to report all available demographic data by telco service area or to include all data accessible by wire center, state or region. Full, user-definable access to the complete dataset is available through the RUPRI website.

Hollifield, C. A., & Donnermeyer, J. F. (2003, May). *Creating demand: Influencing information technology diffusion in rural communities*.

"In the 21st century, access to information technologies will be necessary for rural communities to attract and retain businesses and, therefore, remain economically viable. However, low population density makes it difficult for rural areas to support expensive technology investments such as are required for broadband. In addition, history shows rural adoption timelines significantly lag those in urban areas, which slows development of the demand economically necessary to support infrastructure construction.

This study examined variables that influenced rural residents' comparatively early adoption of information technologies at a time when the rural-urban digital divide in the use of basic online services was still growing. The study found employment by a company that was using specific information technologies was the strongest predictor of individual adoption. The effect was particularly strong among those with less formal education. The findings suggest rural development specialists should focus on encouraging locally owned rural businesses to adopt information technologies as a means of maximizing local diffusion and increasing demand levels."

Hollifield, C. A., Donnermeyer, J. F., Wolford, G. H., & Arunga, R. (2000). The effects of rural telecommunications self-development projects on local adoption of new technologies. *Telecommunications Policy*, 24(8-9), 761-779.

"In the mid-1990s, rural US communities began investing in local telecommunications self-development projects in anticipation of market and policy failure to provide advanced telecommunications services. This study examines whether self-development projects were effective in encouraging local adoption of new telecommunications services by businesses and residents as compared to control communities. Results show that the projects had some effect. However, the study also found that market forces provided similar services in the control communities more quickly than anticipated, and after four years, differences in adoption between project and control communities were generally not significant. This raises questions about whether investments in such projects are justified. Residents of project communities did,

however, have significantly more positive attitudes towards new technologies.”—Authors’ abstract.

Hollister, D. (2001, Spring). The fiber optic railway town: Chattanooga at a technical crossroads. Retrieved November 16, 2003, from http://www.chattmag.com/spring_01/phiberoptik.htm

Hopkins, J., & Morehart, M. (2001, November). Farms, the Internet, & e-commerce: Adoption & implications. *Agricultural Outlook*, 286, 17-20.

Horner, D., & Reeve, I. (1991). *Telecottages: The Potential for rural Australia*. Canberra: AGPS.

House of Commons. (2003, July). *Rural broadband*. Environment, Food and Rural Affairs Committee. HC 587. Retrieved from <http://www.publications.parliament.uk/pa/cm200203/cmselect/cmenvfru/587/587.pdf>

This report focuses on what can be done to address the fact that access to broadband in rural areas currently lags behind that available in urban and suburban areas: in other words, what can be done to eliminate the digital divide in the United Kingdom. In particular it will consider: 1) What demand there is for broadband in rural communities; 2) What provision already exists, and what is planned; 3) What obstacles there are to the provision of broadband in rural areas; 4) What roles are played by Defra and the Countryside Agency in relation to broadband, and what their relationship is with the UK Broadband Taskforce and those in Regional Development Agencies dealing with broadband; and 5) What alternatives to broadband exist or are being developed that might be of particular relevance to rural areas.

Hudson, H. E. (1981). The Role of telecommunications in the development process: Rural communications in developing countries. In L. Lewin, (Eds.). *Telecommunications: The US-trends and policies* (pp. 415-449). Dedham: Artech.

Hudson, H. E. (1984). *When telephones reach the village: The role of telecommunications in rural development*. Norwood, NJ: Ablex.

The volume examines the role of telecommunications in the development process. While it seems obvious that telecommunications contribute to the efficient operation and productive growth of an economy, telecommunications may be a cause, a consequence, and a manifestation of development. There has been a growing interest among researchers in examining the impact of telecommunications in both industrialized and developing societies. The purpose of this volume is to bring together the research in the field in order to make it more widely available, and to put research questions and findings within a development framework.

Hudson, H. E. (1985). Demand and need: Problems in planning rural telecommunications. *Telematics and Informatics*, 2(3), 251-258.

Hudson, H. E. (1988). *A Bibliography on telecommunications and socio-economic development*. Norwood, MA: Artech.

Hudson, H. E. (1995, June). *Economic and social benefits of rural telecommunications: A Report to the World Bank*. Retrieved from <http://www.usfca.edu/fac-staff/hudson/papers/Benefits%20of%20Rural%20Communication.pdf>

The purpose of this report is to set the stage for a re-examination of investment priorities and strategies in *Rural Telecommunications* by synthesizing what we know about the role of telecommunications in the development process. The report provides an overview of the evidence to date of the economic and social benefits of *Rural Telecommunications* (RT). The report reviews key studies and identifies theory and research findings that are particularly relevant to rural regions of developing countries. It emphasizes research on developing countries, but also includes research conducted in industrialized countries that appears particularly relevant for rural regions of the developing world.

Hudson, H. E. (1997). *Global connections: International telecommunications infrastructure and policy*. New York: Wiley.

This book is a comprehensive guide to international telecommunications, explaining complex technical standards, government regulations, and enforcement practices that vary by country or by region. Hudson clarifies standards and practices relating to voice and data transmissions and addresses the difficult process of privatizing government-run and/or broadcast networks. It also provides a thorough understanding of the technological aspects of international telecommunications and the political and socio-economic issues involved, both for industrialized countries and developing countries.

Hudson, H. (1997). *Universal service: The Rural challenge, changing requirements and policy options* (Communications Working Paper #2). Washington, D.C.: Benton Foundation. Retrieved from <http://www.benton.org/publibrary/rural/working2.html>

Transitions in the U.S. economy show declines in primary industries and manufacturing and rapid growth in the service industry. Rural economies mirror this structural shift -- public and private services now dwarf agriculture and manufacturing. Yet the shift to services is only part of the change. Information activities account for the largest part of the growth in services, and other sectors are becoming increasingly information intensive. Thus, access to information is an important requirement for rural development. Historically, rural development took place geographically, relying on land or natural resources. In the provision of physical goods and services, rural areas could only compete across barriers of distance if they had a natural resource advantage. New economic development now more often depends on human resources, telecommunications, and information-processing infrastructure. In the provision of these goods and services, reliable telecommunications infrastructure makes geography and distance irrelevant. Rural education and medical services also face wrenching changes. Shrinking rural populations in many areas make their community schools and hospitals hard to justify. Many states have legislated new curricula that raise the standards of schools and teachers to improve the competence of students. Rural schools generally lack the funds to attract the specialized teachers necessary for courses like physics and foreign languages. To take these courses, rural students must be bussed to larger regional schools. If the rural school is forced to close completely, the community loses one of its cornerstones. Many rural areas also have severe shortages of physicians, making residents travel long distances to regional health centers. Many go without treatment or preventive care until their condition becomes critical. Rural health care services are also vital to rural economies: "If a community doesn't recognize the value of its

health care system and loses it, it doesn't just lose the health care system. It loses a great big piece of the economic machine of that community." Rural demand for high-quality telecommunications is growing substantially, largely because of the changes described above. Facsimile communication is particularly important in rural areas, because mail delivery is often slow and unreliable. The need for access to centralized data bases, whether for libraries, inventory control and ordering, or updating of government records, has increased demand for data communications. Electronic mail and computer conferencing are also spreading to rural areas, where they can save time or travel costs. Demands for access to a wider range of educational opportunities under restricted educational budgets have led to growing interest in distance education using telecommunications.

Hudson, H. E. (1999). Beyond the myths: Universal access from Tanana to Timbuktu. *Rural Telecommunications*, 18(5), 22-30.

Technological innovations coupled with economic globalization have focused new attention on *Rural Telecommunications*. Terrestrial wireless and satellite technologies can extend connectivity to rural areas, while backbone fiber optic networks across continents and under oceans link the most isolated communities to the Internet. Demand for rural access to telecommunications is also growing as unserved populations in the developing world clamor for service, and rural residents in industrialized countries request upgrades to enable them to access the Internet and use network features and services primarily available in urban areas. The phrases universal access and universal service are sometimes used interchangeably. Access, however, is a broader concept that involves the following components: infrastructure, services, affordability, and quality. Some strategies for extending universal access to telecommunications services are proposed.

Hudson, H. E. (2000). Extending access to the digital economy to rural and developing regions. In E. Brynjolfsson and B. Kahin (Eds.), *Understanding the digital economy*. Cambridge, MA: The MIT Press.

Hudson, H. E., & Parker, E. B. (1990). Information gaps in rural America: Telecommunications policies for rural development. *Telecommunications Policy*, 14(3), 193-205.

This article discusses the challenges facing the US telecommunications industry in the context of rapid changes affecting the rural economy. The structural shift in the national economy towards services and information based activities has generally worked to the disadvantage of rural areas. Improving the provision of telecommunication services could help overcome their handicaps and improve the efficiency and productivity of rural business, but it will be necessary to extend access to telecommunication services and improve switching systems and transmission quality. The article concludes with a set of policy goals and recommendations addressed to federal and state government institutions.

Hunter, A. M. (1985). State and local government liability for failing to use reasonably available information and technology in emergency management. *The Information Society*, 3(4), 313-326.

Management of emergencies is an activity that could result in potentially large liability judgments against public officials, but there is a question about whether state and local

governments can be held liable for not using computer-based data and information to plan for and deal with emergencies.

Hurley, D., & Keller, J. H. (1999). *The First 100 feet: Options for Internet and broadband access*. Cambridge, MA: The MIT Press.

The growth of the Internet has been propelled in significant part by user investment in infrastructure: computers, internal wiring, and the connection to the Internet provider. This "bottom-up" investment minimizes the investment burden facing providers. New technologies such as wireless and data transmission over power lines, as well as deregulation of telecommunications and electric utilities, will provide new opportunities for user investment in intelligent infrastructure as leverage points for Internet and broadband access.

Recasting the "problem of the last 100 feet" as "the opportunity of the first 100 feet," this book challenges individuals, businesses, and policymakers to rethink fundamental issues in *Telecommunications Policy*. The contributors look at options for Internet and broadband access from the perspective of homeowners, apartment complexes, and small businesses. They evaluate the opportunities and obstacles for bottom-up infrastructure development and the implications for traditional and alternative providers at the neighborhood, regional, and national levels. Already, some argue that Internet service will become the common denominator platform on which all other services can be carried.

Indiana Economic Development Council, Inc. (1991). *Lifelines to rural Indiana: The role of telecommunications in rural economic development*. Indianapolis, IN: Author.

Industry Canada. (2003). *Broadband: Frequently asked questions*. Retrieved December 1, 2003, from <http://broadband.gc.ca/pub/faqscomplete.html>

International Telecommunication Union. (1997, May). *Report on communications for rural and remote areas* (Document 2/224(Rev.1)-E). Geneva, Switzerland: International Telecommunication Union, Telecommunication Development Bureau. Retrieved from http://www.itu.int/ITU-D/univ_access/reports/mso2bd.pdf

This report provides a comprehensive guideline to developing countries in addressing the telecommunication needs of rural and remote areas, and describes the urgent need for these services. It explains why telecommunications are important and economically attractive, provides information on what has to be accomplished to bring telecommunication services to rural and remote areas, and, through the Recommendations, how this can most effectively be carried out. The Report also identifies relationships with the other Study Group Questions and with the Programmes of the Buenos Aires Action Plan which are most important in providing telecommunication services to rural and remote areas.

International Telecommunications Union. (2001). *Final Report of UIT-D Focus Group 7: New technologies for rural applications*.

ITU report which examines new telecommunications technologies that can be conducive for use in rural areas.

International Telecommunication Union. (2001, October). *Promotion of infrastructure and use of the Internet in developing countries: Final report on ITU-D question 13/1* (Document 1/185(Rev.1)-E). Geneva: International Telecommunication Union, Telecommunication Development Bureau. Retrieved from http://www.itu.int/ITU-D/study_groups/SGP_1998-2002/SG1/Documents/2001/185REV1E.doc

The purpose of this report contribution is to draft a set of guidelines and recommendations to help government officials and other policy-makers develop telecommunications regulations and policies that will promote Internet infrastructure development in developing and least developed countries. The guidelines presented here are not meant to be exhaustive, but rather to serve as a starting point for countries interested in building out their Internet infrastructure. It is important to note that the suggestions presented in this document are not prerequisites or requirements for increasing Internet access and use. Several developing countries have made progress and will continue to make progress without meeting all of the guidelines presented. Generally, however, the implementation of these guidelines is likely to facilitate and speed up Internet development.

Internet access: Hearing, October 4, 1994. Committee on Science, Space, and Technology. Subcommittee on Science. (1994). Washington, DC: Superintendent of Documents.

Examines difficulty that residents in rural and suburban areas have in gaining affordable access, focusing on the long-distance telephone charge, and what the government can do to assure low-cost access for all users; recommendations.

Iowa Utilities Board. (2001?). *2000 Iowa Utilities Board annual report.*

Annual report of the Iowa Utilities Board. Topics covered include telecommunications.

Irwin, L. (1990). *Telecommunications and rural development.* Spokane, WA: Community Colleges of Spokane and Washington State University.

Jonas, D. K. (2000). Building state information highways: Lessons for public and private sector leaders. *Government Information Quarterly*, 17(1), 43-67. Retrieved December 22, 2003, from the ScienceDirect database.

"In America's state houses small yet powerful collections of policy leaders, in the public and private sector, are guiding the initial conception and early implementation of advanced communication networks. This article investigates how the beliefs of leading actors collide to produce two distinctive state networks. Rather than focus exclusively on the simple dichotomous "yes" or "no" decision regarding the adoption or nonadoption of an advanced telecommunications system, like a statewide information highway, this article focuses on the critical role of debate imbedded within that decision. Analysis and presentation of interviews and extensive literature reviews of the development of information highways, in North Carolina and Iowa, provide the setting for the generation of hypotheses suggesting the future trajectory of technology policymaking. While praised for their bold, visionary leadership and innovative system designs, the accounts of network development in these two American states also provide a cautionary tale for other subnational governments and for private sector telecommunications firms interested in the business of building public sector information highways." (ScienceDirect abstract).

Jones, C. (1996). The Information superhighway's rural route. *American City & County*, 111, 50+.

Describes a public/private partnership to provide Internet access for personal and business use in a small, rural town in New York State. Case study of Norwich, New York.

Jussawalla, M., & Lamberton, D. M. (1982). *Communication economics and development*. Elmsford, NY: Pergamon.

Kamal, A. A. (1981). *A Cost benefit analysis of rural telephone service in Egypt*. The Organization for Economic Cooperation and Development (OECD).

Kamal, S. S. (1990). Advanced telecommunication for rural applications. *Satellite Communications*, 14(10), 21-23.

Historically, village communications were served by importing obsolete technology that was no longer used in the advanced world. However, the industry appears to have moved in the other direction, sometimes to extremes. For example, cellular radio and packet-switching very small aperture terminal networks are being installed in villages and provinces that need basic telephone service. In such environments, the actions of suppliers offer only one guarantee: that customers will become laboratories for their experimentation in total network solutions. Although single channel seize-and-release technology is becoming outdated for rural telephony, new technology has been developed that allows micro telephone terminals to access an amorphous capacity instead of a pool of fixed-size voice circuits. This technology makes it possible to install rural telephone networks virtually overnight.

Kaserman, D. L., Mayo, J. W., Blank, L. R., & Kahai, S. K. (1999). Open entry and local telephone rates: The economics of IntraLATA toll competition. *Review of Industrial Organization*, 14(4), 303-319.

The Telecommunications Act of 1996 removes state-level legal and regulatory barriers to entry that previously have proscribed facilities-based interchange carriers from entering intraLATA toll markets. Traditionally, these markets have provided excess profits that local exchange companies ostensibly have used to subsidize local telephone rates. Elimination of these entry barriers, then, raises concern that the resulting intensification of competition will force unwanted local residential rate increases. In this paper, we critically examine the local-rate-increase question both theoretically and empirically. Our analysis finds no evidence that intraLATA toll competition will adversely affect local rates.

Kaul, S. N. (1978). *Benefits of Rural Telecommunications in developing countries*. Paris: OECD.

Kavanaugh, A. L. (1998). *The Social control of technology in North Africa: Information in the global economy*. Praeger.

In order to improve productivity and economic development, developing countries have been expanding their telecommunications infrastructure and integrating advanced information technology into their socioeconomic system. Some scholars argue that new media will be integral to the overthrow of authoritarian regimes and will allow democracy to bloom throughout developing countries. Others claim that new media will strengthen centralized control and further

erode social liberty and pluralism. This study of three North African states--Tunisia, Algeria, and Morocco--shows that developing countries are able to control the introduction and diffusion of new information technologies, including the Internet, by allowing a careful disbursement of new media privileges to a select minority. By maintaining direct or indirect social control over the market for advanced technologies, governments of North Africa can embrace new media for modernization, economic growth, and integration into the global economy without being overcome by civil unrest or instability.

Kayani, R., & Dymond, A. (1997). *Options for Rural Telecommunications development* (World Bank Technical Paper No. 359).

The paper reviews relevant international experience in *Rural Telecommunications*, draws out the lessons to be learned, and provides an overview of the policy options for effective commercial service development within the context of the ongoing sector reform process. The focus of the study has been to answer the following four questions:

1) Is there an ideal policy environment and regulatory framework for the development of rural telecommunication services in developing countries on a commercial basis? 2) Are current technology and cost trends significant enough to change the financial equation, which has until now been viewed as unfavorable? 3) If the technology and cost trends are positive, what are the limits of feasibility and what policy interventions would be required beyond these limits? 4) Can rural service programs be established that combine commercial viability with enlightened policy intervention, in order to attract sufficient finance to accelerate the infrastructure and service deployment? The report presents an array of options for commercial operation of *Rural Telecommunications* and challenges the general perception that *Rural Telecommunications* are unprofitable. It demonstrates that services can be economically delivered to rural areas at affordable prices while at the same time providing reasonable financial returns to investors.

Keare, D. H. (2001, Summer). Learning to clap: Reflections on top-down versus bottom-up development. *Human Organization*, 60(2), 159-.

"This paper draws on the experience of the World Bank in rural and urban development during the 1970s and 1980s to explain why neither predominantly top-down nor bottom-up approaches have succeeded--nor indeed deserved to--or can be expected to succeed in the future. It then proceeds through a selection of related innovations initiated in the latter 1980s and through the 1990s; notes their failure to promote significant breakthroughs to date; and suggests improved initiatives that blend top-down and bottom-up approaches and, beyond their general efficacy, would seem to be particularly suitable for confronting many of the principal problems in the Mexico-U.S. borderlands" (ProQuest abstract)

Subjects: Urban development; Rural development; International relations-US; Boundaries

Kellerman, A. (1993). *Telecommunications and geography*. London: Belhaven Press.

This book is divided into two parts beginning with a presentation of geographical concepts for the study of telecommunications such as the information economy, nodes, networks, flows and diffusion. Part Two places telecommunications within geographical contexts-- urban, regional, national and international. It concludes with present and potential future trends.

Kennedy, C. H. (2001). *An Introduction to U.S. telecommunications law*. Artech House.

This book introduces themes of telecommunications law, for readers with no background in the law, economics, or technology of telecommunications. General discussions of theory and history are avoided in order to focus on legal and business problems. Chapters sketch the legal and regulatory environment in which each of the major categories of regulated telecommunications companies operates. Part I covers incumbent local exchange carriers (ILECs) and how much they can charge for local exchange and nonbasic services, ILEC interconnection with other service providers, the Bell operating companies, and competing local exchange carriers. Part II covers non-ILECs, with chapters on interexchange carriers, pay telephones and operator services providers, mobile telephone companies, Internet service providers, universal service, and International services. A 35-page appendix outlines the economic background of telecommunications law.

Kerr, W. T., & Blevis, B. C. (1984). Telecommunication services for rural and remote areas. *Telematics and Informatics*, 1(1), 37-46.

This article describes the Canadian experience in the development and implementation of service delivery concepts using telecommunications links to people in rural and remote areas. The methods and processes used are discussed. Results of the service development initiatives, particularly in the field of health and education are summarized. Several major conclusions are drawn in the Canadian context and their applicability to developing countries are discussed.

King, J. L. (2000). Increasing telephone penetration rates and promoting economic development on tribal lands: A proposal to solve the tribal and state jurisdictional problems. *Federal Communications Law Journal*, 53(1), 137-160.

Under the Telecommunications Act of 1996, Congress instructed the FCC to ensure that all Americans have access to affordable telecommunications services. This note argues that the FCC's proposed tribal and state jurisdiction policies deter eligible telecommunications companies from serving tribal and non-tribal lands, because the process of petitioning the state or federal commission to determine jurisdiction is time-consuming and goes against the principles of tribal sovereignty. In addition, this note proposes that Congress must expressly limit state jurisdiction in order for telephone penetration rates to increase on tribal lands.

Kingsfield, B. (1996). On-line upcountry: Science and technology as an economic development tool in a non-urban setting. *Economic Development Review*, 14, 9-13.

Explores grass-roots efforts to bring a science and technology culture to rural regions dominated by forestry, mining, and fishing; British Columbia. Projects introduced by the Science Council of British Columbia, including Internet access, regional science and technology expertise database, computer recycling, business seminars, and science education.

Koch, K. (2000). The Digital divide: Should Internet access for the poor be subsidized? *CQ Researcher*, 10(3), 41-64.

Examines equal access and the growing gap between information rich and information poor; deals with government regulations, universal service, public-private partnerships, e-rate program for schools and libraries, rural and low-income areas, and broadband; US.

Korsching, P. F., Borich, T. O., & Stewart, J. (Eds.). (1992). *Multicommunity collaboration: An evolving rural revitalization strategy: Conference proceedings*. Ames, IA: North Central Regional Center for Rural Development.

This book is comprised of many papers that were presented at a conference which focused on multicommunity collaboration as a rural revitalization strategy. The conference organizers outlined objectives on which the conference concentrated. The objectives focused on a definition and taxonomy of rural multicommunity alliances, structure, organization, and process of creating and sustaining collaboration, investigating collaboration strategies, external environment's effect on rural multicommunity collaboration, and examining the role of land-grant's Cooperative Extension Service in developing multicommunity collaboration concepts.

Korsching, P. F., El-Ghamrini, S., & Peter, G. (2001). Rural telephone companies: Offering technology innovations to enhance the economic development of communities. *Technology in Society*, 23(1), 79-91.

Telecommunications can encourage development in rural communities by helping them overcome geographic barriers. Rural telephone companies are integral to ensuring that communities in their service areas compete in the Information Age economy by adopting advanced technologies that enable the companies to provide a full spectrum of innovative services. In this study we examined rural telephone companies in the State of Iowa and the organizational characteristics and environmental factors related to their adoption of innovative telecommunications technologies and services. We found that the involvement of rural telephone companies in local development activities was important to their technological innovativeness, suggesting that local leaders should seek the involvement of telephone company managerial personnel in community development activities.

Korsching, P. F., Hipple, P. C., & Abbott, E. A., (Eds.). (2000). *Having all the right connections: Telecommunications and rural viability*. Westport, CT: Praeger.

Examines the role of telecommunications in rural development.

This edited book, based on five years of survey research in Iowa and case study examples from across the United States, examines the implications of telecommunications technologies for rural community development. Supported by data from five years of survey and case study research, telecommunications adoption and use is explored in nine sectors of the rural community to determine the influence these organizations and institutions have on telecommunications development within the broader rural community. These sectors include local government, economic development, business, newspapers, library services, health care, university extension to communities, and farming. Also considered are the factors that promote and retard telecommunications development, particularly the impact of *Telecommunications Policy*, the availability of state-of-the-art infrastructure and service, and the involvement of telephone companies in local community development. Using a community development framework, this work discusses the physical, financial, human and social capitals necessary for holistic community development and the significance of critical mass, the roles of internal and external networks, as well as vertical and horizontal linkages, and the importance of visionary leadership and the championing of telecommunications.

Korsching, Peter F., Sapp, Stephen G., & El-Ghamrini, Sami. (2003, September). Rural telephone company adoption of service innovations: A community field theory approach. *Rural Sociology*, 68(3), 387-.

"Recent telecommunications innovations have the potential to improve the economic vitality of rural communities, but many rural telephone companies have not adopted them to provide needed advanced services. To explain the differences in adoption by rural telephone companies we distinguish between service innovations, adopted primarily to improve direct services to clients, and operations innovations, adopted primarily to improve the operation of the business. Using community interaction field theory we develop and test a conceptual framework for the adoption of innovative service telecommunications technologies by Iowa rural telephone companies. As field theory predicts, involvement in local economic development activities has a strong, direct effect on innovativeness. Results suggest that the service and operations innovations distinction has theoretical utility in explaining organizational innovativeness." (InfoTrac OneFile abstract).

Kretschmwe, R. K., & Donovan, J. E. (1999). The High-cost fund: A universal dis-service. *Public Utilities Fortnightly*, 137(5), 34-40.

The injustice in telephone rate subsidization exists due to the High-Cost Loop Fund portion of the federal Universal Service Fund. The current system shifts costs among consumers regardless of their ability to pay. Telephone customers, including the poor of Chicago, New York City, Los Angeles, and many other cities, are subsidizing other customers (wealthy or not) who live in rural and remote areas. The question is how people in both urban and rural areas who cannot afford to pay the actual cost of local telephone service should be subsidized. It is essential to implement a cost-based rate structure that requires those who can afford to pay for the service to do so with no subsidy. Those customers who cannot afford to pay for those services can get assistance.

Lake, D. (2001). What geeks do. *Industry Standard*, 4(26), 54-55.

Article on demographic characteristics of "technology enthusiasts" vs. total adult population. Technology enthusiasts are adult Internet users who own a personal computer and 2/more high-technology products. Data are from an annual survey of 26,000 adults conducted by Mediamark Research. Includes 1 table showing demographic characteristics of technology enthusiasts vs. total adult population, including sex, age, household income, educational attainment, occupational category, race and Asian ethnicity, marital status, number of children, region, and urban/suburban/rural status. Also includes 1 table showing on-line activities and ownership of selected types of electronic products, for technology enthusiasts.

Lal, K. (2001). Institutional environment and the development of information and communication technology in India. *The Information Society*, 17(2), 105-118.

The paper examines the impact of institutional environment on the growth of the Indian information technology (IT) industry. The study reveals that before the first generation of reforms, that is, 1991, the government was pursuing a structuralist approach toward economic development. After liberalization in 1991, the government embarked on pro-active economic policies for the diffusion and production of IT. Consequently, the IT industry experienced an unprecedented growth rate in domestic as well as export markets. However, foreign direct investment (FDI) policies have not been successful in attracting the desired level of foreign

investment, which is very important for a high-tech sector such as IT hardware manufacturing. The study suggests that immediate corrective measures need to be taken to augment the IT manufacturing industry, which can significantly contribute to national economic development and employment generation.

Lalor, E. (1987). Action for Telecommunications Development: STAR: A European Community Program. *Telecommunications Policy*, 11(2), 115-120.

The Special Telecommunications Action for Regional Development (STAR) program, sponsored by the Commission of the European Communities, has as its primary objective the use of advanced telecommunications services to aid in the economic development of the less favored regions of the European Economic Community (EEC). The 5-year STAR program is described, first by situating it in the context of EEC policy and explaining how EEC financial instruments are being used. The analysis that led to the formulation of the program is described, followed by an outline of the chief components of the regulation establishing the program. Finally, the current status of STAR activity is discussed. It is anticipated that the national intervention programs of STAR will be approved by autumn 1987. The EEC will play an active role in the implementation of the program.

LaRose, R., & Jennifer, M. (1989). Who uses information technologies in rural America? *Journal of Communication*, 39(3), 48-60.

This paper examines technology users in America, comparing technology use of rural and urban individuals, their socioeconomic status, personal attitudes, and sociocultural factors affecting information technology use. A large-scale survey of seven geographically and demographically diverse rural areas suggests that residents of commercial communities are as likely to use and be well disposed toward computer technologies as their non rural counterparts, regardless of age, income, and employment.

Lasley, P., Padgitt, S., & Hanson, M. (2001). Telecommunications technology and its implications for farmers and extension services. *Technology in Society*, 23(1), 109-120.

The telecommunication revolution holds important implications for both farmers and the Extension Service. With the proliferation of communication technologies, farmers have a broad array of channels and sources for information, leading some to argue that traditional modes of information delivery will be replaced. Based on survey data from Iowa farms, this article examines the extent to which farmers have adopted electronic communication. Next, we explore their interest in precision farming which is expected to be related to their adoption of telecommunication. Finally, we examine farmers' preferences for receiving information. Based on indicated preferences, the analysis finds that the capacity to receive information via various means of telecommunication reinforces producer support for more one-on-one and personalized communication. We conclude that telecommunications may supplement rather than replace traditional delivery methods, suggesting that it may increase rather than decrease the demand for Extension education.

Lavey, W.G. (1990). Universal telecommunications infrastructure for information services. *Federal Communications Law Journal*, 42(2), 151-190.

Rural areas of the US and the nation as a whole would benefit from the widespread availability of high-quality information services at reasonable prices. However, without a strong

policy commitment by federal and state governments to a universal infrastructure, many information services will bypass rural areas. Both technical and economic factors contribute to this problem. Similar barriers have been overcome in making basic telephone service universal. While current regulations embrace the goal of universal information services, the mechanisms employed are not sufficient to achieve this goal. Furthermore, using regulation to mandate universal implementation of certain information services seems burdensome, and it may slow innovation and impede competition. Instead, a narrower approach based on universal implementation of an advanced telecommunications infrastructure holds more promise. New government commitments and initiatives building on existing programs are necessary.

Lazarus, W., & Lee, K. (2000). *Online content for low-income and underserved Americans: The digital divide's new frontier : a strategic audit of activities and opportunities*. Santa Monica, CA: Children's Partnership. Retrieved from http://www.childrenspartnership.org/pub/low_income/

This report is intended to: "1. To describe the groups of Americans who are underserved by Internet content, what these groups want in the online world, and the barriers they face; 2. To analyze the online content currently available for low-income and underserved Americans, emphasizing the major gaps and the most promising building blocks; and 3. To provide a road map for action -- identifying ways in which the public and private sectors working with underserved communities can ensure rich and relevant online content for Americans at risk of being left behind". It "includes recommendations for policymakers, corporate leaders, technology center staff, philanthropists, and those who work with and on behalf of underserved Americans. (Underserved Americans, for the purpose of this report, include people who have low incomes, live in rural communities, have limited education, or are members of racial or ethnic minorities.) The research included discussion groups with more than 100 low-income Internet users, interviews with nearly 100 community technology leaders and other experts, analysis of 1,000 Web sites, and a review of the literature and promising activities across the country" -- Executive summary.

Leatherman, J. (2001, May). Adaptive strategies for rural communities in an information-intensive economic environment. *Community Economics Newsletter* (Center for Community Economic Development, University of Wisconsin-Extension [Newsletter] No. 295). Retrieved November 5, 2003, from <http://www.aae.wisc.edu/www/pub/cenews/ce295.txt>

Leatherman, J. (2001, March). Information technologies and rural competitiveness. *Community Economics Newsletter* (Center for Community Economic Development, University of Wisconsin-Extension [Newsletter], No. 293). Retrieved November 5, 2003, from <http://www.aae.wisc.edu/www/pub/cenews/ce293.txt>

Leatherman, J. (2001, April). Internet commerce: Challenges for the rural public sector. *Community Economics Newsletter* (Center for Community Economic Development, University of Wisconsin-Extension [Newsletter] No. 294). Retrieved November 5, 2003, from <http://www.aae.wisc.edu/www/pub/cenews/ce294.txt>

Discusses issues of Internet commerce in relationship to the rural public sector.

Lee, H., Nazem, S. M., & Shi, Y. (1994). Designing rural area telecommunication networks via hub cities. *Omega- International Journal of Management Science*, 22(3), 305-314.

Rural areas provide an interesting laboratory for experimenting with technological advances in telecommunication networks. *Rural Telecommunications* becomes an emerging infrastructure to improve rural services. This paper presents a decision support framework for designing such a rural area network. Rural residential areas are organized around a set of service centers called hub cities. The Analytic Hierarchy Process is employed to use conflicting multiple criteria in measuring the relative importance of information services available via hub candidates. Based on the resulting analysis, hub cities are selected so that overall utility of telecommunication networks can be maximized by using an integer programming technique. A prototype for the state of Nebraska is built to demonstrate the applicability of the two-phased decision support system in real-life situations.

Lee, H., Shi, Y., Nazem, S. M., Kang, Y. S., Park, H. T., & Sohn, H. M. (2001). Multicriteria hub decision making for rural area telecommunication networks. *European Journal of Operational Research*, 133(3), 483-495.

Thanks to emerging telecommunications technologies, rural area networks (RAN) can be built via hub cities that function as service centers for neighboring smaller rural communities. The hub decision requires compromise among economic and social goals. This paper demonstrates the use of a zero-one compromise programming coupled with an eigenvalue estimation method to accommodate the goal setting process in *Rural Telecommunications* establishment. The model reflects the policy makers' concerns about the optimal trade-off of conflicting goals. An empirical result for the state of Nebraska can be readily applied to other rural areas.

Lego, B., & Goetz, S. J. (2001). *High-technology industry growth in the Northeast U.S.* University Park, PA: Northeast Regional Center for Rural Development, The Pennsylvania State University: 11. Retrieved 2002 from <http://www.cas.nercrd.psu.edu/Publications/RCBusReports/RcbrNo1.pdf>

Report examines high-technology growth in the Northeastern United States.

Lehman, D. (2001). Friend or foe? *Rural Telecommunications*, 20(2), 20-22.

Instead of asking whether competition is compatible with the goal of preserving and advancing universal service, policy makers are embarking on a course that actively promotes competition in rural areas on the one hand, and worries about advanced service provision in rural areas on the other. It is inconceivable that the goal of providing reasonably comparable rates and services can be promoted by simultaneous subsidization of competition in rural areas and constraints on the availability of high-cost funds for infrastructure investment.

Lehman, D. E., & Weisman, D. (2000). The political economy of price cap regulation. *Review of Industrial Organization*, 16(4), 343-356.

The last decade has witnessed a dramatic substitution of price cap regulation for rate-of-return regulation in the telecommunications industry. The 1996 Telecommunications Act empowers state regulators to set the terms of competitive entry in local telephone markets. We investigate whether the form of regulation endogenously affects the regulator's behavior with respect to competitive entry. The evidence reveals that regulators in price cap jurisdictions tend

to set more liberal terms of entry in comparison with regulators in rate-of-return jurisdictions. This suggests that price cap regulation suffers from incomplete contracting, undermining the potentially superior incentive properties of this important regulatory reform.

Lehner, J. C. (1989). Rural development at a crossroads: The emergence of a national consensus. *Rural Telecommunications*, 8(4), 36-41.

Lehner, J. C. (1990). Toward rural revival: The telco-community partnership. *Rural Telecommunications*, 9(3), 10-15.

Lehner, J. C., & Young, I. K. (1989). Conspicuous personalities: Ideas from rural telephony. *Rural Telecommunications*, 8(1), 8-26.

Rural Telecommunications has selected 11 individuals that represent the kind of ideas that rural telephony has consistently developed to better serve rural citizens and to promote rural development. A. M. Bennett, president of the National Telephone Cooperation Association, is one of the highly visible figures in the industry. Bennett is concerned with how the rural telephone industry will fare under the Bush Administration. He is particularly interested in the continued importance of the Rural Electrification Administration. Eleanor Haskin, vice-president and manager of Waitsfield-Fayston Telephone Co., feels that small and rural companies have yet to experience real competitive pressure. Ken Parsons, president of U. S. Intelco Networks, believes that independents' future lies in becoming enhanced service providers. Profiles of 8 other individuals and of the Rural Telephone Co. are included.

Leighton, W. A. (2001). *Broadband deployment and the digital divide: A primer* (Policy Analysis No. 410). Washington, DC: The Cato Institute. Retrieved 2002 from <http://www.cato.org/pubs/pas/pa410.pdf>

In the New Deal of the 1930s the Rural Electrification Administration used federal subsidies to extend electricity to rural and isolated communities across the country. By subsidizing the significant capital investment needed to run wires and build infrastructure, REA support brought electricity to households that might otherwise have waited many years for such service. Today, similar arguments are being made for subsidizing new technologies, such as broad-band Internet service. Some people are promoting the equivalent of an "REA for broadband" to ensure that rural and low-income communities gain access to high-speed communications connections. However, the REA analogy is not only misplaced, it is harmful. The wires over which broadband service can be transmitted are already in place owned by telephone, cable, and even electricity providers. Upgrades are needed to provide broadband, but not the massive investment that is required to run a new line to every customer's home. And wireless transmission from both satellite and land-based systems has just begun. Whereas electricity has traditionally been provided by a single distributor, broadband Internet service has many potential distributors that use a variety of technologies. Tax credits or subsidies to promote broadband deployment would distort competition between those technologies, enriching incumbents and thwarting the technologies of tomorrow. For an industry in which the technologies of today were unheard of just a few years ago, nothing could threaten progress more. And for those consumers who are waiting for prices to fall or service to extend to their communities, new technologies and competition will offer the best solution. Lost in this debate, moreover, is the fact that access to the information superhighway does not require broadband.

While broadband is superior, it is not necessary for access. The first question, then, is whether low-income, rural, and other households are gaining access to the Internet at all. The second question is whether those households and for that matter, all Americans are gaining broadband Internet access. To both questions, the answers are decidedly positive. In light of this, broadband tax credits or subsidies appear to be an unwise, unnecessary, and expensive approach to what is quickly becoming a nonproblem.

Leistritz, F. L., Allen, J. C., Johnson, B. B., Olsen, D., & Sell, R. (1997). Advanced telecommunications technologies in rural communities: Factors affecting use. *The Journal of the Community Development Society*, 28(2), 257-276.

The role of telecommunications technologies in economic development has received increased focus in recent years. This study assesses the level of use of various telecommunications technologies by rural residents and identifies the community characteristics and individual attributes that are conducive to the adoption and use of these technologies. Data are from surveys of nearly 2,000 residents in 20 communities representing 6 states in the Midwest. The study findings reveal relatively high levels of use of a number of telecommunications technologies ? levels that may rival or even exceed urban rates. The findings also indicate that economic development that involves growth of the service sectors will likely increase the use of telecommunications technologies in rural areas.

Lentz, R.G. (2000). The e-volution of the digital divide in the US: A mayhem of competing metrics. *Info*, 2(4), 355-377.

The 'digital divide' between information and technology 'haves' and 'have nots' in the USA has been the topic of considerable academic, journalistic, business and political discourse since the federal government published its first report on information technology inequities in 1995. This article traces the trajectory of this issue by focusing on different areas of research that are competing to shape the public policy agenda. One benchmarks computer and internet consumption patterns and argues that the divide is disappearing. The other focuses more on continuing barriers to access and use. The author's perspective is that policy should focus at least as much on the context and content of technology use as it has thus far on the increased distribution of computing resources.

Lentz, R., & Oden, M. (1999, September). *The telecommunications complex in the Mississippi Delta region, 1988-1996: Implications for economic development policy*. Jackson, MS: Enterprise Corporation of the Delta.

Authors examine the presence of telecom and information industries in the Mississippi Delta to understand their implications on the economic prospects of poorer rural regions. The Delta was recently acknowledged by President Clinton as one of the most economically depressed in the United States and one of the sites of his New Markets Initiative designed to spread the benefits of economic growth to regions left out of the current boom. It is widely claimed that access to and effective utilization of electronic information and communications capabilities are critical to allowing businesses to compete in product markets and households to increase skill and income. However, limited work has been done to determine which telecom technologies are the most important and appropriate to public and private sector institutions in the rural Delta. Similarly, little information is available concerning the presence or capacity to use telecommunications and related high technology industries in rural regions such as the

Mississippi Delta. The study offers a basis for understanding the importance of telecommunications and related industries in a 58-county region bordering the Mississippi River in three states: Arkansas, Mississippi, and Louisiana. It provides essential information on the core telecommunications manufacturing and services industries in the Delta, the main suppliers to these industries, and the industry sectors that rely heavily on core telecommunications manufacturing and services to competitively produce and market their products and services is provided at four geographic levels: regional, metro, near-metro, and rural. Findings indicate that core telecommunications industries in the region constitute an emerging growth sector and that the industries that rely on telecom outputs in their business operations are large and growing, constituting many of the major economic growth sectors in the regional economy. The study argues for considerable attention on analysis of the development and use of telecommunications technologies in the region. Without this, the Delta risks losing additional ground to more urbanized, wealthier areas that are rapidly implementing the latest digital technologies. The central economic development challenge will be to ensure that rural businesses, government, education, and non-profit institutions have access to a world-class telecommunications infrastructure and that they have the capacity to leverage this access to enhance their performance and expand their reach.

Lentz, R., & Oden, M. D. (2001). Digital divide or digital opportunity in the Mississippi Delta region of the US. *Telecommunications Policy*, 25(5), 291-313.

This study analyzes the interdependence of telecommunications manufacturing, services, and user industries in the Mississippi Delta region of the US to understand the social and economic prospects of poorer rural areas of the US as advanced technologies rapidly proliferate. An underlying assumption is that telecommunications industries should not be viewed only by the employment they directly support; they should also be analyzed in terms of their linkages to other industries and how those linkages influence the competitiveness and growth prospects of businesses and public institutions in the region by building a capable community of technology users. The absence of leading telecom manufacturing and service firms in rural Delta counties together with low levels of connectivity suggest that digital divide problems are very real for the region. The central economic development challenge should be to ensure that rural businesses, government, health care, education, and non-profit institutions gain access to an advanced telecommunications infrastructure and that they develop the capacity to leverage this access to enhance their performance and expand their reach.

Leupolt, M. (1977). Integrated rural development: Key elements of an integrated rural development strategy. *Sociologia Ruralis*, 17, 1-2, 7-28.

"Integrated Ru development attempts to reemphasize the need for a comprehensive approach to Ru development. The need for such a rethinking is caused by the failure of past efforts to set a broad-based development process in motion. The strategies based on economic cause-effect relationships benefit only those who have access to means of production, but tend to marginalize the Ru masses. Integrated Ru development gives particular emphasis to the involvement of the less privileged strata through an appropriate design of development programs. One of the critical elements is to assure greater participation in planning & implementation through the establishment of peoples' organizations & a functional decentralization of decision-making. This is more conducive to mobilizing people's initiative & providing a better system to take into account the needs of the various social groups, as well as

the links between them. Some objectives of such a group should be: (1) to increase agricultural production without environmental depletion, (2) to improve income & benefit distribution, (3) to improve consumption patterns, & (4) to improve living conditions to increase productivity. Plans can be implemented which use or change existing plans & structure, build essential services, concentrate on key areas, & create production-oriented activities." Modified HA. (Sociological Abstracts).

Descriptors: Production; Productivity; Producer; Rural; Development; Economic; Planning
Classification: Rural sociology and agriculture; Rural sociology (village, agriculture)

Lewin, L. (Ed.). (1981). *Telecommunications: The US-trends and policies*. Dedham, MA: Artech.

Lewis, P. F., & Jamison, M. A. (1997). *Universal service for schools, libraries, and government: A handbook on planning and funding technology*. Sacramento, CA: Government Technology Press.

Chapter contents: 1. Introduction -- 2. Telecommunication Act of 1996 and Universal Service -- 3. FCC's Universal Service rules -- 4. How to apply for funds -- 5. Support for rural areas -- 6. Technology Literacy Challenge Fund program -- 7. Technology innovation challenge -
- 8. Telecommunications and information infrastructures assistance program -- 9. Examples of TIIAP grant winners -- 10. Institute of Museum and Library Services national leadership grants -
- Appendices A-M.

Lievrouw, L. A. (2000). The Information environment and universal service. *The Information Society*, 16(2), 155-159.

This essay focuses on universal service and the Internet as means to support social and political participation. The emphasis on access to telecommunications systems in conventional approaches to universal service is contrasted with access to content. A model of the information environment is described that accounts for the roles of content and conduit, both of which are necessary conditions to achieve true access. A method is outlined for employing information indicators to observe or measure the information environment.

Lloyd, A. (1988). The rural radio connection. *Rural Telecommunications*, 7(4), 20-22.

The SR 100 is a point-to-multipoint subscriber microwave radio system designed by SR Telecom in Canada. The system provides 2-way conversation telephone service through microwave radio that is identical to conventional cable service. The system was initially used to provide telephone service to rural or remote areas, but as users have learned of the flexibility of the SR 100, it has become a transportation tool. To meet the need for adequate telecommunications services for the 1988 Summer Olympics, a transportable communications service vehicle was created to provide automatic pay phone, facsimile, and Telex services. Two vehicles were outfitted with SR 100 outstations with the capacity to offer up to 12 subscriber lines each. SR Telecom was asked by another client to develop a transportable communications for oil drilling sites in Oman. For this application, SR Telecom developed a solar-powered telephone system complete with a telescopic tower. The benefits of a point-to-multipoint system are that it is cost-effective, its components are easy to install, repair, and relocate, and it is compatible with any existing system.

Lobao, L. M., & Lasley, P. (1995). Farm restructuring and crisis in the Heartland: An Introduction. In P. Lasley, et al. *Beyond the amber waves of grain: An Examination of social and economic restructuring in the heartland* (pp. 1-27). Boulder, CO: Westview Press.

An introduction to the substantive issues, research questions, & conceptual issues examined in this volume (see abstracts in IRPS No. 87). The empirical studies draw on a 1989 survey of 7,000+ farming men & women in 12 north-central states, focusing on 3 areas of rural life: the farm enterprise, household, & community. This work is a product of interdisciplinary efforts of sociologists & economists, incorporating a range of perspectives. Long-term structural trends & specific economic events leading to the crisis in farm restructuring in the 1980s are described. Four distinct views on the meaning & significance of the crisis are discussed: (1) attributes financial difficulties to personal qualities of individual farmers; (2) argues that the crisis was a unique occurrence; (3) views overregulation of government as a causal factor; & (4) examines the farm crisis as part of a larger overall restructuring of agriculture. Drawing from these disparate perspectives, focus is on the consequences of the crisis for midwestern men & women. Previous research on the effects of the crisis on production, household, & community life is assessed, & the conceptual framework of the study, which emphasizes the relationships between the three arenas of central concern, is described. 1 Figure, 57 References. C. McSherry. (Sociological Abstracts)

Descriptors: Agricultural Enterprises; Agricultural Economics; Midwestern States; *Rural Communities; Economic Crises; Farms; United States of America; Agricultural Development
Identifiers: farm restructuring, socioeconomic crisis, midwestern US

Lyons, T. S. (2002, August). Building social capital for rural enterprise development: Three case studies in the United States. *Journal of Developmental Entrepreneurship*, 7(2), 193-.

"Rural poverty in the US has become as intense as that found in the inner cities, and has stubbornly resisted a variety of attempts at mitigation through economic development policies. The latest strategy for addressing this problem is the encouragement of emerging home grown enterprises in rural communities. This paper examines an approach to rural social capital building that is based on the specific needs of the entrepreneurs to be served as defined by the context in which they operate" (ProQuest abstract).

Subjects: Rural development; Entrepreneurs; Business incubators; Poverty

MacAnany, E. G. (Ed.). (1980). *Communications in the rural Third World: The Role of information in development*. New York: Praeger.

Macdonald, S., & Madden, G. (Eds.). (1998). *Telecommunications and socio-economic development*. New York: Elsevier.

Telecommunications systems are a fundamental means by which both societies and economies are organized and managed. The link between telecommunications and economic development is well established and well tested by sophisticated econometric analysis. This volume takes a broader approach to the connection and is as much concerned with the social as with the economic. Four themes are considered. "Telecommunications and Development" focuses on the diffusion of new telecommunications technology and the impact of telecommunications investment within and among regions. "International Dimensions" examines the political, strategic and legal environment in which new telecommunications technology evolves and is used. The role and impact of telecommunications within firms is investigated in

"Organisational Aspects", though not from the "telecommunications as oil" perspective of so much recent analysis. The last section, "Country Studies", looks at telecommunications issues in the Asia-Pacific region, in South America and in the former communist nations of Central and Eastern Europe.

Macias, E., R. Cutler, et al. (2002). *Promoting access to network technologies in underserved communities: Lessons learned*. Tomas Riveria Policy Institute. Retrieved 2002 from http://www.trpi.org/PDF/Promoting_Access_to_Network_Technologies.pdf

Reports upon the impact of networking upon underserved communities including those in rural areas.

MacMahon, S. (1995). . *Telecommunications Policy*, 19(4), 299-305.

Against the background of EU proposals for liberalization of telecommunications infrastructure, this paper considers the impact of liberalization on Ireland and other peripheral and small economies. Ireland is characterized as on the periphery, with a small open economy and rural nature, with a big, liberalized neighbor--the UK. This makes Telecom Eireann particularly vulnerable to competition, but there is no reason why effective and appropriate regulation should not allow a smooth transition to a competitive market.

Madden, G., & Coble-Neal, G. (2003). Internet use in rural and remote Western Australia. *Telecommunications Policy*, 27(3), 253-266.

Australian telecommunications universal service policy has recently been extended to include the provision of basic data services within a contestable universal service framework. In view of this fundamental policy change, information about the demand for telecommunication services is critical if competition is to deliver intended outcomes. This analysis examines the demand for Internet in rural and remote communities in Western Australia. Toward this end econometric Internet subscription and use models are estimated on survey data collected for this purpose. Estimation results indicate price reduction will have a positive influence among existing Internet subscribers. A model of Internet subscription itself, however, suggests that demand for access is derivative of education and work requirements.

Madden, G., Savage, S. J., Coble-Neal, G., & Bloxham, P. (2000). Advanced communications policy and adoption in rural Western Australia. *Telecommunications Policy*, 24(4), 291-304.

Recent moves toward contestable universal service markets for rural areas raises issues of measuring the net cost of service provision. Measurement of net cost requires estimates of latent demand for advanced communications. This paper seeks for the first time to provide quantitative estimates of the magnitude of latent income pools available to carriers in rural WA. Estimates of latent expenditure on broadband services in rural WA are obtained using a combination of stated-preference and survey data. These expenditures increase with computer ownership, community isolation and information need. Further, the statistical model supports the commonly held belief that more distant populations have stronger information demands and are willing to pay for services. This finding suggests that carrier aversion to providing services to rural regions may not be justified on commercial grounds.

Madden, G., Savage, S., & Simpson, M. (1997). Regional information access: the use of telecentres to meet universal service obligations. *Telematics and Informatics*, 14(3), 273-288.

Access to information is essential for efficient business operation. While many regional businesses are exposed to international markets their corresponding information requirements are not well met. Barriers to information and communications technology (ITT) access also restricts the ability of regional populations to generate income streams through enterprise and education. The Commonwealth government has recently instituted a review of Australian telecommunications universal service obligations (USOs). The review includes a redefinition of the "plain old telephone service" to reflect new technology and changing community needs in regional areas. Telecentres are public access points through which regional information delivery is currently facilitated. Surveys undertaken here concern community telecentre use in regional Western Australia. Patterns of ITT use are identified, as is the quality of service. The survey enables an assessment to be made of the capacity of telecentres to deliver a wider range of USOs.

Madden, G., & Simpson, M. (1996). A profit model of household broadband service subscription intentions: A regional analysis. *Information Economics and Policy*, 8(3), 249-267.

Much recent debate concerns the effect of carrier roll-out on access to networked services. However, whether particular groups within passed communities are unable or unwilling to subscribe to networked services is also an important policy issue. This paper sets out to identify households that are less likely to subscribe and examines whether there exists a systematic link between subscription interest and commonly accepted measures of social disadvantage. A probit regression is estimated on stated-preference subscription data obtained from a national survey of one thousand households. The results show that the potential exists for an information poor class to develop.

Madon, S. (1997). The information based global economy & socio-economic development: The case of Bangalore. *The Information Society*, 13(3), 227-244.

Information technology is at the core of the current process of economic globalization. New areas of the world and new regions within countries are experiencing growth by entering the information age as manufacturers and users of information technology. However, often growth and decline take place simultaneously within the same region due to the tension that results from participation in global operations and the local socioeconomic context of the region. India presents a major case study of this tension, which we describe through a study of the region of Bangalore. The description reveals that the region faces pervasive forms of asymmetry between those who can participate in the global information economy and those who cannot. We argue that these internal disparities will ultimately affect capitalist development and discuss some issues of relevance to planners and policymakers concerned with the twin processes of globalization and local regional development.

Madon, S., & Sahay, S. (2002). An information-based model of NGO mediation for the empowerment of slum dwellers in Bangalore. *The Information Society*, 18(1), 13-19.

With the rapid increase in population coupled with the seemingly irreversible flow of people from rural to urban areas, cities in the developing world are acquiring unplanned and uncontrolled squatter settlements at their peripheries. The provision of urban services and infrastructure in these cities is hampered by the failure of formal bureaucratic government institutions to collect appropriate information for planning, especially in areas that fall outside

the remit of the formal networks. A growing number of grass-roots nongovernmental organizations (NGOs) have sought to rectify the situation by acting as intermediaries between urban slum dwellers and the government. In this article, we review the literature on forms of intermediation by NGOs and other organizations working for citizen groups. We then present a case study of Jana Sahayog, an NGO operating in the slums of Bangalore, which employs an information-based model of NGO-mediated intervention. The article describes the various information-based initiatives that Jana Sahayog has undertaken to open up channels of communication between citizens and the government. Jana Sahayog's experience offers valuable lessons for NGOs operating in other parts of the world.

Maher, M. E. (1999). Access costs and entry in the local telecommunications network: a case for de-averaged rates. *International Journal of Industrial Organization*, 17(4), 593-609.

The telecommunications bill passed by Congress in February 1996 means that the present method of covering the cost of customer access to the local telecommunications network through non-cost based access charges cannot be sustained over the long run. However, there is a belief that cost-based rates at the local level would be prohibitively high and would threaten universal service objectives. A generalized translog cost function is estimated of access costs at the local level in order to address these issues. The results are that there are economies of scale in the provision of access to the local network and that these costs differ by geographical location. One of the important findings is that, contrary to popular belief, cost-based rates at the local level would not be prohibitively high and would not threaten universal service objectives. However, given the economies of scale, pro-competitive regulatory controls will be required that will restrain dominant carriers from abusing their market power and network owners from squeezing out new entrants.

Maher, M. E. (1999). Cable Internet unbundling: Local leadership in the development high-speed access. *Federal Communications Law Journal*, 52(1), 211-238.

With the pending merger of TCI and AT&T and their promise of "one-stop" television, Internet, and telephone service, the cable Internet issues move to the forefront. The desire of traditional Internet Service Providers to gain access to new high-speed technologies for Internet access led to requests for unbundling or open access to cable systems. Despite the heated debate on the need for unbundling that has occurred at the federal level, local authorities have taken the lead in requiring open access to cable for competing ISPs. General anticompetitive concerns with cable Internet dominated by the cable company could be alleviated in large part by requiring open access to cable for Internet Service Providers.

Maitland Commission. (1984). *The Missing link*. Geneva: International Telecommunication Union.

The chicken-and-egg question of whether telecommunications development follows economic development or whether economic development follows telecommunications development has long plagued those who would promote telecommunications as an important, even essential, prerequisite for socio-economic development. Attempting to relate past GNP performance to numbers of telephones has never successfully settled the issue. Instead of looking into the past to resolve the question, a look into the future of what the socio-economic situation of countries would be like in the absence of means of transporting, acquiring, manipulating and storing information rapidly demonstrates the absolutely essential nature of information and

knowledge in this on-going era of the information revolution. Modern telecommunications is obviously an infrastructural necessity for forging the link in the information/socio-economic development chain. The International Telecommunication Union (ITU) can be very effective in fostering the development of telecommunications infrastructures in developing countries by promoting the connection between telecommunications, information and knowledge, and socio-economic development.

Making wise choices: Telecommunications for rural community viability. Proceedings of a workshop, Kansas City, Missouri. (1997).

This proceedings contains keynote speeches, community case studies, and small-group recommendations concerned with successful telecommunications initiatives in rural communities. The four keynote addresses are: "Electronic Highways and Byways: Converging Technologies and Rural Development" (Heather E. Hudson); "Information Technologies and Rural Community Viability: Lessons from the Past" (J. Paul Yarbrough); "Investment in the Rural Infrastructure: The Lessons from the First 100 Years" (Mary McDermott); and "Community Social Capital and Leadership: Keys to the Technological Future of Rural Communities" (Daryl Hobbs). Community strategies for taking advantage of new technologies, problems encountered, and successes and failures are described in eight community case studies: "GRANeT: Grant County, Wisconsin" (Terry Gibson, Tom Schmitz); "Telemedicine: Hays, Kansas" (Robert Cox); "Fiber to Every Home: Kalona, Iowa" (Ronald Slechta, Ray Marner); "ACENet: Athens, Ohio" (Amy Borgstrom); "Nevada, Missouri: The TeleCommunity Project" (Alan Kenyon); "Mitchell, South Dakota: The Teleport" (Dan Muck, Chris Paustian); "Telecommunications Builds on Long-Term Community Development: Aurora, Nebraska" (Gary Warren, Dixie Whitlow); and "Traversenet: Wheaton, Minnesota" (Darrell Zimmerman, Jim Milne, Earl Steffens). In the final section, "Making Wise Choices: Ideas and Observations Concerning Ways To Improve Use of New Telecommunications Technologies by Rural Communities," five community representatives, policy experts, and researchers highlight problems in technology use and the benefits and opportunities available for schools, health care, local government, and businesses. The presenters were Ray Marner, Alex Weego, Peter Korsching, Dom Caristi, and Tom Tate. Specific recommendations for community telecommunications development, generated in small group discussions, are summarized. A participant list is included. (SV)

Malecki, E.J. (1996). *Telecommunications technology and American rural development in the 21st Century*. Report prepared for TVA Rural Studies, Lexington, Kentucky. Gainesville, FL: Dept. of Geography at the University of Florida. Retrieved from http://www.rural.org/workshops/rural_telecom/malecki/

In this paper, the author sketches briefly the history of telecommunications technologies, including the Internet and business use of telematics. This is followed by a discussion of the Internet and its impact on demand for telecommunications. Next, telecommunications as a factor of production for location of firms is considered, especially knowledge-based activities and the telecommunications-travel tradeoff. The specific problems of rural areas is the focus of the next section. The paper concludes with policy concerns in the light of regional development.

Malecki, E. J. (2003). Digital development in rural areas: potentials and pitfalls, *Journal of Rural Studies*, 19(2), 201-214.

“The potential for rural areas to benefit from telecommunications technology is a persistent question. This paper examines data for the USA concerning the ‘digital divide’ and access of residences and businesses, which tend to suggest that all is (or will soon be) well. The paper also presents data on aspects of digital infrastructure in rural America, including points of presence and digital telephone switches, which suggest that there are major shortcomings in most rural communities. Demand aggregation is a possible solution, but more serious pitfalls are those related to shortages of human capital. These might be resolved in some rural places, where immigration and return migration bring needed cerebral inputs to rural areas. A final set of improvements concerns how businesses use the Internet and e-commerce. In the end, telecommunications is not a ‘quick fix’ solution for rural development, and the desired improvements will be limited to a fraction of rural places.” (Author’s abstract).

Mandy, D. M. (2000). Progress and regress on inter-LATA competition. *Federal Communications Law Journal*, 52(2), 321-380.

The FCC has denied Bell Operating Company applications for entry into in-region interLATA (long distance) markets in Oklahoma, Michigan, South Carolina, Louisiana and on reapplication in Louisiana; approved one application for New York; and is currently considering an application for Texas. Thus, almost 4 years elapsed from the passage of the Telecommunications Act of 1996 until any Bell company received relief from the line-of-business restriction, and even now relief has been received in only one state. The economics of Bell Company entry into interLATA markets is briefly reviewed. The reasons given by the FCC for its extant orders and the resulting slow pace of interLATA entry are summarized. These decisions are compared with the law and economics of Bell Company entry. It is concluded that the FCC has largely adopted sound policies regarding checklist compliance and safeguards, but that the position taken on Track compliance and public interest issues are troubling.

Manohar, K. (2001). *Will technology trickle down to rural America?* NetAction. Retrieved 2002 from <http://netaction.org/alt-tech/alt-tech.pdf>

On Election Day 2000, 49% of U.S. households were still not online and 57% of those not online said that they do not plan to go online any time soon. Is it that people do not value the importance of ICTs, or is access not a matter of choice for a large portion of Americans? The Consumer Federation of America and Consumers Union Report (October 2000) found that the digital divide is not the result of a failure of those without access to appreciate the importance of technology. It states that approximately 93% of those without access believe that computer skills are vital, 83% believe that understanding technology is critical to success, and 84% believe that children learn more when they have access to technology. There is a will to learn. Is there then a way to bridge a divide that threatens to create a schism in society? This paper examines alternative communication technologies that are economically viable -- yet increase Internet access for those on the other side of the digital divide.

Mansell, R. (1988, April). The role of information and telecommunication technologies in regional development. *Science, Technology, Industry Review*, 135-173.

Marshall, R. (2001). Rural policy in the new century. *International Regional Science Review*, 24(1), 59-83.

Martin, W. J., & McKeown, S. F. (1993). The potential of information and telecommunications technologies for rural development. *The Information Society*, 9(2), 145-156.

Rural areas throughout Europe are facing extreme pressures of decline, unemployment, poverty, and peripherality. The European Community (EC) has embarked on a series of measures to combat these phenomena, notably through programs such as STAR and Telematique, which involve the promotion and use of advanced telecommunications infrastructure, and ORA, which aims specifically at the development of telematics in rural areas. The experience of such programs in Northern Ireland is used to assess the relevance of information and telecommunications technologies for rural areas in general. Examples are given of the application of these technologies in other parts of Europe, particularly with the development of teleworking. The most obvious conclusion is that neither EC intervention nor the application of information and telecommunications technologies is sufficient to address the problems of rural areas, without adherence to the principles of integrated rural development.

Matta, K. F., & Boutros, N. E. (1989). Barriers to electronic mail systems in developing countries. *The Information Society*, 6(1-2), 59-68.

The use of electronic mail systems (EMS) in less developed countries is practically nonexistent. The barriers to the use of EMS in these countries can be categorized as technical, economic, political, and social. Technological barriers include: 1. the unavailability of the technology to receive, store, and transmit data, 2. the status of communication lines, and 3. the lack of technological support, including a skilled labor force and reliable power supplies. Economic barriers include relatively high unemployment rates and large debts to industrialized nations. The most important political barrier facing EMS in developing countries is nationalism; most countries view information as a national resource that should be governed by rules and regulations. The most difficult barriers to overcome are social barriers, which include individualistic, organizational, and societal factors. Multinational organizations should develop and implement international standards for EMS.

Mayne, J. (2000). Changing of the guard at NTIA: Greg Rohde takes the helm. *Rural Telecommunications*, 19(2), 20-25.

Greg Rohde, the newly appointed administrator of the National Telecommunications and Information Administration (NTIA), comes to the agency from the office of Senator Byron Dorgan, where he helped craft the Telecom Act. He is confident that his rural background will help him carry out NTIA's mission. Rohde believes the next challenge is keeping all parts of the US in step with the telecom revolution. That means finding ways to promote the deployment of advanced services. Rohde unequivocally supports funding for advanced services. He wants customers to associate universal service and other federally funded programs with ingenuity, economic development, and opportunity. He is particularly enthusiastic about NTIA's own grant program, the Telecommunications Opportunities Program, which provides matching grants to state, local, and tribal governments; health care providers; schools; libraries; police departments; and other community-based non-profit organizations.

Mayo, J. K., Heald, G. R., & Klees, S. J. (1992). Commercial satellite telecommunications and national development: Lessons from Peru. *Telecommunications Policy*, 16(1), 67-79.

The Rural Communication Services Project (RCSP) led from a commitment by the Peruvian and US governments to determine whether a satellite-based communication system that incorporated a variety of agencies and technologies could provide reliable and cost-effective service to a remote region of eastern Peru. During the mid-1970s, about half of Peru's population had no access to telephone communications. The RCSP had 4 objectives: 1. to develop and test cost-effective models by which communication satellites and related technologies could improve the delivery of rural services, 2. to show satellite service and ground station equipment providers that there is an important market for satellite services to meet the needs of small rural communities, 3. to provide evidence for aid agencies on the cost-effectiveness of communication investments for rural areas, and 4. to support the development of national capacities for integrating communication investment planning with sectoral development planning.

McDowell, S. D., Strover, S., et al. (Eds.). Symposium issue: Setting the agenda for rural broadband. *Government Information Quarterly*, 20(2), 85-191.

McElhinney, S. (2001). Telecommunications liberalisation and the quest for universal service in Australia. *Telecommunications Policy*, 25(4), 233-248.

For at least 20 years privatization and liberalization have been championed as forces to lower prices and improve the telecommunication services available to consumers. Yet three years after Australia completed the radical transformation of its telecommunications market and began the privatization of the former national monopoly carrier, the long cherished egalitarian goal of universal service has become a high-stakes policy contest as industry complains about cost-burdens and people in regional and remote Australia demand improved telecommunications infrastructures. In this environment the policy makers must carefully consider the risks associated with addressing the competing demands of telecommunications companies, new shareholders and key electoral constituencies. This paper uses the Australian universal service obligation in telecommunications to illustrate the unforeseen pitfalls that emerge when the effects of liberalization threaten to undercut the delivery of a long cherished social objective.

McGregor, M. A. (1994). Toward a unifying regulatory structure for the delivery of broadband telecommunication services. *Journal of Broadcasting & Electronic Media*, 38(2), 125-143.

This paper analyzes the regulatory environment in which three potential competitors--the telephone companies, the cable industry, and SMATV systems--currently operate. In order to provide a more competitive market for the delivery of broadband video services, a unifying regulatory system that will level out the regulatory playing field for these three industries is constructed. This unifying regulatory structure corrects such problems as current entry barriers, uneven market power and the ability to cross-subsidize competitive services with monopoly profit and jurisdictional structure among federal, state, and local governments.

McKnight, L., S. Gillett, et al. (2001). *The Delta Technology Zone: A White paper on telecommunications and economic development for the Enterprise Corporation of the Delta*.

McMahon, K., & Salant, P. (1999). Strategic planning for telecommunications in rural communities. *Rural Development Perspectives*, 14(3), 2-7.

The high-speed, broadband infrastructure needed to take advantage of telecommunications opportunities is not available in many rural communities. To overcome this problem, some local leaders are using a planning process that helps identify which strategies are most likely to meet top-priority goals and attract new telecommunications investments. The most effective strategic planning processes involve broad-based input from businesses, public agencies, and households.

McMahon, K., & Salant, P. (2001, February). Strategic planning for telecommunications in rural communities. *Community Economics Newsletter* (Center for Community Economic Development, University of Wisconsin-Extension No. 292). Retrieved November 5, 2003, from <http://www.aae.wisc.edu/www/pub/cenews/ce292.txt>

Note: Article printed out and filed in *Rural Telecommunications* file.

Melody, W., & Moore, J. (2001). Converging infrastructures: Telecommunication synergies in the US rural electricity sector. *Journal of Network Industries*, 2(1), 77-91.

Millard, N. L. (1997). Universal service, section 254 of the Telecommunications Act of 1996: A hidden tax? *Federal Communications Law Journal*, 50(1), 255-273.

Congress has the sole power to levy and collect taxes. The Supreme Court has ruled that Congress may delegate this authority so long as the will of Congress is clearly defined in the legislation. An article asserts that section 254 of the Telecommunications Act of 1996 operates as an unconstitutional delegation of Congress's authority to tax. This legislation provides the FCC with unfettered discretion in defining the boundaries of universal service and the authority to mandate that all consumers of telecommunications services subsidize the cost for the low-income and rural consumers, as well as schools, libraries and health care providers.

Min, J., Sukhumaran, B., et al. (2001). *Internet-based economic development for rural communities* (Reviews of economic development literature and practice, no.9). [Washington, DC]: U.S. Economic Development Administration.

Mitchell, S., & Clark, D. (1999). Business adoption of information and communications technologies in the two-tier rural economy: some evidence from the South Midlands. *Journal of Rural Studies*, 15(4), 447-455.

This paper explores the reasons why rural firms choose to adopt and use information and communications technologies. Evidence for rural restructuring and its implications for conceptualizing the rural economy, is reviewed. Information on firms is obtained by means of a questionnaire survey and intensive in-depth interviews. Pronounced variations in adoption are identified. They are explained by the pressures exerted by customers and suppliers and the ways these are responded to by managers. The concept of a two-tier rural economy, based upon levels of adoption, is introduced. The need to focus upon global–local rather than urban–rural differences is emphasized. Implications for those who advise and seek to help rural businesses are considered.

Morentz, J. W. (1983). Information technology in rural emergency management. *The Information Society*, 2(2), 131-143.

The social and economic life of rural communities continually is jeopardized by emergency situations caused both by natural events and human activities. Advances in information technology are making it possible for rural emergency management teams to prepare effectively for and respond to disasters. In Minnesota, microcomputers have been used to aid rural communities in managing and deploying emergency resources. Several states have implemented 2-way cable television links to local emergency services, such as fire stations, police stations, and emergency medical services. Arizona has developed an emergency satellite communications system to coordinate state and county emergency operations. These applications have been based on commercially adaptable technologies. However, widespread use of information technology will require the development of specific emergency management applications.

Morring, F. J. (2001). Hughes argue merger will help close 'digital divide'. *Aviation Week & Space Technology*, 155(19), 35-37.

EchoStar and Hughes will portray their proposed \$25.8-billion merger, in part, as a way to help close the digital divide that deprives rural Americans of high-speed Internet access by making it easier to use satellites to beam interactive broadband service to homes without terrestrial broadband capability. The Internet argument could help the company fight what some see as an uphill battle to win approval at the US Justice Department and Federal Communications Commission (FCC) for the deal, which will essentially create a monopoly in the direct-to-home satellite television arena.

Moss, M. L., & Townsend, A. M. (2000). The Internet backbone and the American metropolis. *The Information Society*, 16(1), 35-47.

Despite the rapid growth of advanced telecommunications services, there is a lack of knowledge about the geographic diffusion of these new technologies. The Internet presents an important challenge to communications researchers, as it threatens to redefine the production and delivery of vital services including finance, retailing, and education. This article seeks to address the gap in the current literature by analyzing the development of Internet backbone networks in the United States between 1997 and 1999. We focus upon the intermetropolitan links that have provided transcontinental data transport services since the demise of the federally subsidized networks deployed in the 1970s and 1980s. We find that a select group of seven highly interconnected metropolitan areas consistently dominated the geography of national data networks, despite massive investment in this infrastructure over the study period. Furthermore, while prosperous and internationally oriented American cities lead the nation in adopting and deploying Internet technologies, interior regions and economically distressed cities have failed to keep up. As information-based industries and services account for an increasing share of economic activity, this evidence suggests that the Internet may aggravate the economic disparities among regions, rather than level them. Although the capacity of the backbone system has slowly diffused throughout the metropolitan system, the geographic structure of interconnecting links has changed little. Finally, the continued persistence of the metropolis as the center for telecommunications networks illustrates the need for a more sophisticated understanding of the interaction between societies and technological innovations.

Mueller, M. L. (1993). Universal service in telephone history. *Telecommunications Policy*, 17(5), 352-369.

The universality of telephone service is generally believed to be an achievement of regulated monopoly and rate subsidies. This paper critically examines the historical claims of what it terms the ideology of universal service. It shows that a ubiquitous telephone infrastructure developed in the USA because of competition between Bell and the independents in the period 1894–1921. Moreover, it shows that it was the refusal of Bell and the independents to interconnect with each other, a phenomenon which is generally ignored or condemned in the historical and economic literature, which propelled both systems into a race to achieve universality, leading to rapid increases in penetration and geographic scope, particularly in rural areas. The phrase universal service, which first emerged in telephone policy debates in 1907, did not mean a telephone in every home or rate subsidies, but the interconnection of the systems into a unified, non-fragmented service.

Mueller, M.L. (1997). *Universal service: Competition, interconnection, and monopoly in the making of the American telephone system*. Cambridge, MA: MIT Press.

Mueller, M.L. (1999). Universal service policies as wealth redistribution. *Government Information Quarterly*, 16(4), 353-358.

This article, which offers a critical reassessment of the underlying rationale for universal service policies, argues that public policies designed to promote universal telecommunications access are simply a form of wealth redistribution. By reconceptualizing universal service subsidies in this way, one can obtain a more realistic assessment of the proper scope and limits of universal service policies. Universal service policies, at best, can play a supplementary role. Economic reforms that encourage investment and promote robust competition are more fundamental to the development of an ubiquitous infrastructure than government subsidies. The redistribution of wealth via telecommunications can ameliorate inequalities, but it cannot eliminate their causes, and advocates should stop pretending that it can. Furthermore, universal service advocates must become more aware of the political and economic risks and pitfalls that are inherent in the process of wealth redistribution.

Mueller, M.L., & Schement, J.R. (1996). Universal service from the bottom up: A study of telephone penetration in Camden, New Jersey. *The Information Society*, 12(3), 273-292.

Ethnographic methods and geographic information systems were used to investigate the extent, causes and consequences of telephone disconnection in Camden, NJ. The results have significant implications for public policies intended to promote universal telephone penetration. Universal service is usually perceived as an issue for rural areas and the elderly, but the most extensive pockets of low telephone penetration are found in inner cities, where the problem is associated with the young, the transient, and ethnic minorities. The basic monthly rate paid by subscribers is usually thought to be the most important factor affecting affordability, but the data suggest that most marginal users are driven off the network by usage-related costs, and more generally by the problem of credit-worthiness. Given prevailing consumption patterns in low-income urban areas, "electronic redlining" seems less of a threat than that poor Americans will, upon exposure to the advanced features of the national information infrastructure (NII), buy services that they cannot afford. Intellectuals and policy analysts value telephone service more than cable television service, but residents of inner cities frequently do not agree with this

evaluation. In reformulating universal service policy, we must take account of the growing heterogeneity of telecommunications services, and keep in mind the importance of credit risk as a factor affecting the public's ability to access and use telecommunication networks.

MultiMedia Telecommunications Association and Telecommunications Industry Association. (2000). *2000 multimedia telecommunications market review and forecast*.

Annual report, for 2000 on the telecommunication equipment and service industry, presenting detailed market trend and outlook data by industry sector. Covers network services, voice communications, mobile/wireless communications, and internetworking markets; collaborative technologies; and computer-telephone integration.

Mundt, J. C., Kaplan, D. A. et al. (2001). Meeting the need for public education about dementia. *Alzheimer Disease & Associated Disorders*, 15(1), 26-30.

Research continues to advance the knowledge of pathophysiology and development of effective methods for treating patients with Alzheimer disease and other dementias. Dissemination of information is likely to be slowest among the general population, who may be the first to recognize dementia symptoms but may also be reticent to discuss concerns because of fear, embarrassment, and/or inadequate knowledge. The feasibility of providing public education and access to dementia resources was studied using a toll-free interactive voice response (IVR) telephone system. Public interest in this service and willingness to use this technology were evaluated in a 1-month study conducted in a predominantly rural upper Midwest county (population of 102,565). One hundred ninety-three calls were received during November 1999, with an average length of 9 minutes and 29 seconds. One in six calls lasted 15 minutes or longer. One third of the calls were received outside typical business hours (8:00 AM to 6:00 PM). Concern for a parent or grandparent was the most frequent reason (50.6%) given for the call. Self-concern was indicated by 24.7% of the callers. Callers provided positive feedback. Such IVR technology may provide a cost-effective bridge to the "digital divide" existing among elderly, lower socioeconomic status, and rural populations underrepresented as computer and Internet users.

Murdoch, J. (2000). Networks – a new paradigm of rural development? *Journal of Rural Studies*, 16(4), 407-419.

The network concept has become widely utilized in socioeconomic studies of economic life. Following the debates around exogenous and endogenous development, networks may also have particular utility in understanding diverse forms of rural development. This paper assesses whether networks provide a new paradigm of rural development. It seeks to capture a series of differing perspectives on economic networks — including political economy, actor-network theory and theories of innovation and learning — and attempts to show how these perspectives might be applied to different types of rural areas. The paper demarcates two main "bundles" of networks: "vertical" networks — that is, networks that link rural spaces into the agro-food sector — and "horizontal" networks — that is, distributed network forms that link rural spaces into more general and non-agricultural processes of economic change. It is argued that rural development strategies must take heed of network forms in both domains and that rural policy should be recast in network terms.

Murdock, D. (2000). *Digital divide? What digital divide?* The Cato Institute. Retrieved December 29, 2001, from <http://www.cato.org/dailys/06-16-00.html>

The Rev. Jesse Jackson calls it "classic apartheid." The NAACP's Kweisi Mfume decries "technological segregation." To President Clinton, it's the digital divide, the alleged chasm between the information haves and have-nots. Earlier this year, Clinton unveiled plans to give free computers to poor Americans. He specifically called for \$2.38 billion in taxpayer money to finance "1,000 community centers with computers serving the adults of America who otherwise would not have access to them." Clinton also rhapsodized about the Web's wonders. "I come from a small town in rural Arkansas," he said, "and I've got a cousin that plays chess once or twice a week with a guy in Australia. I mean, it's unbelievable." This is all very touching, but -- like so much else that Washington perpetrates the Clinton-Gore administration's scheme addresses a problem the free market already is solving.

Nakazawa, A. T., & John, P.C. (1993). The rural information center: A resource for economic development. *Economic Development Review*, 11(2), 62-65.

The availability of timely and relevant information on economic development opportunities, markets, applied research, and financing options is a critical link in enabling businesses and organizations to be successful in responding to changing conditions. In recognition of this fact, in 1987 the US Department of Agriculture Extension Service in cooperation with the National Agricultural Library (NAL) established the Rural Information Center (RIC). RIC is a joint project of the Cooperative Extension Service and NAL. RIC, located at the library in Beltsville, Maryland, is designed to provide information and referral services to local government officials, community organizations, businesses, rural citizens, and others working to maintain the vitality of US rural areas. RIC provides information on assistance in economic revitalization and local government planning projects, rural tourism development, rural health topics, funding sources, educational workshops, research studies, and other related issues.

Narasimhan, R. (1983). The socioeconomic significance of information technology to developing countries. *The Information Society*, 2(1), 65-79.

Economic development in the industrially advanced societies of the West invariably has been accompanied by a structural shift of labor from the primary and secondary production sectors to the tertiary service sector. A systematic analysis of the service sector shows that the commodity on which this sector acts is information. The growing importance of information for control and management in a developed society is the primary reason for the structural shift of labor to the service sector. A professionalized service sector constitutes the critical backbone of a developing society, and information technology is the underpinning of this sector. The development and application of information technology for use by professionals and paraprofessionals are necessary to extend the scope and improve the standards of functionally available services in a society. Information technology in this sense is an appropriate technology for socioeconomic development in the countries of the Third World.

National Association for Equal Opportunity in Higher Education. (2000). *Historically black colleges and universities: An assessment of networking and connectivity*. Washington, DC: National Telecommunications and Information Administration (DOC).

This report contains findings from a technology needs assessment conducted at historically black colleges and universities (HBCUs). The study assessed the computing

resources, networking, and connectivity of HBCUs and other institutions that provide educational services to predominantly African American students. Out of 118 HBCUs, 80 responded to questions about campus planning and policies, facilities and resources, connectivity, and campus network infrastructures. Of those 80 HBCUs, 98 percent had basic access to the Internet, World Wide Web, and campus networks. However, there were serious concerns with the digital divide in the areas of: student access to networking and computing resources; usage of higher bandwidth technologies for accessing the Internet, World Wide Web, or other networks; faculty utilization of Web-based resources in the classroom and in professional exchange and development; awareness of the importance of network security; and utilization and maintenance of technology strategic plans to incorporate innovation and update changing technology. These problems were particularly noticeable at smaller, private, rural institutions. Six appendixes include a U.S. Department of Commerce press release; participating HBCUs; references; information about the National Association for Equal Opportunity in Higher Education; information about the study team; and the study instrument.

National Association of Development Organizations Research Foundations. (1994, April). *Telecommunications and its impact on rural America* (A NADO Research Foundation White Paper). Retrieved from <http://ruralnet.marshall.edu/rural/ruraltel.txt>

Telecommunications has significant potential to contribute to economic development in rural America. Applications of information technologies in rural businesses, schools, health care institutions, and government agencies can help make those organizations more efficient and effective, help them to overcome the "rural penalty" that results from geographic isolation, and help rural communities to diversify their economies. This report describes some of these applications, and the opportunities they present for rural communities. For the full power of these opportunities to be realized, however, action is required by many different players in a number of jurisdictions and industries. We must work together to meet two requirements: 1) A rural public telecommunications infrastructure that is capable of supporting advanced equipment and services at reasonable prices; and 2) Community preparedness to make informed decisions about the planning, purchase, implementation, and evaluation of new information technologies. This report discusses the challenges raised by these two requirements: Changes in market structure and technological advancements are threatening many of our traditional policies for achieving universal service, which leaves rural America especially vulnerable. We will need to find new means for assuring that all Americans have access to basic telephone service, and that, as new advanced services are made available in urban areas, they are introduced in rural areas, as well.

The challenge to prepare rural communities to use telecommunications technologies effectively is just as formidable. We need new partnerships that will improve communication among telecommunications providers and policy makers, economic development professionals, and rural communities. We must also look for new ways to inform potential customers about telecommunications applications, and give them the skills to deploy those applications effectively.

We suggest the following set of goals for the telecommunications industry and policy makers: 1) Comparable Service Delivery: The telecommunications infrastructure in rural communities should support services that are comparable in quality, availability, and cost to those provided by urban infrastructure. 2) Community Preparation: Rural communities should be

familiar with the types of telecommunications services available in their community, and have the skills to plan for, implement, and evaluate new services and equipment effectively.

3) Access to Funding and Financing: Rural communities should have access to adequate capital financing and other forms of funding for telecommunications-related equipment and services.

4) Economic Development Strategy: In each rural community, telecommunications-related development strategies should be integrated with the larger economic development strategies of the community and region.

We have included several recommendations that will help achieve these goals. The recommendations support the two requirements of creating an adequate and affordable telecommunications infrastructure and preparing our communities to take advantage of such an infrastructure.

Our first set of recommendations target national and state policies that assure rural America has an adequate and affordable telecommunications infrastructure. These recommendations are based on the assumption that competition in the telecommunications industry is both desirable and inevitable, and that the role of policy makers should be to facilitate that competition and safeguard consumer interests. These recommendations include: 1) Lift current restrictions on increased competition in the telecommunications industry including long distance telephone, local telephone and cable television services as well as manufacturing and other communications related services, 2) Protect rural communities from potential negative effects from competition which may result in reduced capital investments in *Rural Telecommunications* through appropriate timing of local competition and universal service safeguards, 3) Bring down long distance rates through increased competition and extended local calling areas, 4) Protect universal service funds and broaden the base of contributors to universal service to include all providers of telecommunications services, 5) Create a new definition of basic telephone service for all consumers that evolves over time to take advantage of new technologies, 6) Support infrastructure sharing between larger and smaller local telephone companies in order to allow rural customers access to advanced telecommunications services, 7) Provide incentives for local telephone companies to invest in *Rural Telecommunications* infrastructure through alternative state regulations.

The second set of recommendations target rural communities, telecommunications providers, and economic development professionals in order to help them prepare for the opportunities that an expanded information infrastructure provides in job creation and economic growth. These recommendations include: 1) Include telecommunications strategies as a component within comprehensive, locally based economic development plans which are created in partnership with regional development agencies; 2) Create opportunities for better communications and interaction between telecommunications companies and economic development professionals; 3) Better educate rural leaders in government, education, and key industries about telecommunications technologies and applications Include the creation and funding of telecommunications strategies as an integral part of existing federal rural development programs.

National Broadband Task Force. (2001). *The New national dream: Networking the nation for broadband access*. Ottawa, ON: National Distribution Centre, Communications Branch, Industry Canada.

National Center for Small Communities. *National Center for Small Communities* [Home page]. Washington, D.C.: Author. Retrieved 2002 from <http://www.natat.org/ncsc/>

"The National Center for Small Communities (NCSC) is the only national, non-profit organization devoted exclusively to serving the leaders of America's smaller communities. The mission of the National Center for Small Communities is to provide the elected leaders of America's small communities with tools to govern effectively. The Center envisions a future where elected leaders of small communities have the skills and resources to: draw upon strengths and talents of the diverse members of their communities to solve local problems; expand local economies while preserving community character; protect local natural resources for future generations; and protect the health and welfare of their citizens" -- NSCS home page

National Commission on Libraries and Information Science. (1999). *Moving toward more effective public Internet access: The 1998 National Survey of Public Library Outlet Internet Connectivity*.

Report on public library access to and use of the Internet, 1998.

National Council for Urban Economic Development. (1992). *Telecommunications and rural economic development: Improving local competitiveness*. Washington, DC: U.S. Economic Development Administration.

National Exchange Carrier Association (2000). *NECA rural broadband cost study: Summary of results, NECA*.

National Exchange Carriers Association. (2000). *NECA's overview of universal service funds*. Washington, DC: Author. Retrieved 2002 from http://www.fcc.gov/Bureaus/Common_Carrier/Reports/FCC-State_Link/neca.html

National Exchange Carrier Association (2001). *NECA's middle mile broadband cost study*. Washington, DC, NECA.

National Exchange Carriers Association (NECA). (2001). *Paving the digital highway: NECA 2001 access market survey*. Whippany, NJ: Author.

National Library of Medicine: Closing the medical divide. (2000). *Information Retrieval & Library Automation*, 35, 1-2.

In February 2000, the National Library of Medicine (NLM) announced a number of projects intended to close the digital divide that deprives some US citizens from access to medical and health information. Briefly describes some of the 49 health information projects in 34 states that affect rural, inner city, and suburban areas in a variety of settings, from middle schools serving low-income students to shopping malls and senior centers. Many of the projects will place computers in community-based centers and teach computer skills to minorities and low-income populations. NLM partners in some of these projects include the University of Arkansas Medical Sciences Library, the Preuss School, the University of California-San Diego, Louisiana State University Health Sciences Center Library, Massachusetts General Hospital, the Omaha Area Health Information Consortium, St. Clare's Hospital Library, the Eccles Health Sciences Library, and the HIV/AIDS Resource Center and Library of Public Health-Seattle and

King County. Notes that the NLM Website (www.nlm.nih.gov) lists and describes each of the 49 projects and includes contact information. Total funding for the projects is more than \$1 million.

National Research Council, Committee on Broadband Last Mile Technology, Computer Science and Telecommunications Board, Division on Engineering and Physical Sciences. (2002). *Broadband: Bringing home the bits*. Washington, D.C.: National Academy Press. Retrieved 2002 from <http://books.nap.edu/books/0309082730/html/index.html>

"This report examines the technologies, economics, policies, and strategies associated with the broadband challenge (the 'first mile' or 'last mile' high-speed connectivity problem, depending on one's perspective) and makes recommendations aimed at fostering broadband's deployment and use" -- Abstract.

National Rural Development Partnership. (2002). Internet resources for rural America [Home page]. Retrieved June 26, 2002, from <http://www.rurdev.usda.gov/nrdp/resources.html>

Gateway to online resources related to rural issues in the United States. The resources are divided into eleven categories: 1) Internet Directories on Rural Issues, 2) Governmental/Extension Resources on Rural Issues, 3) Agricultural Issues, 4) *Rural Telecommunications*, 5) Rural Health, 6) Rural Education, 7) Rural Economic Development Resources, 8) Smart Growth 9) Welfare Information, 10) Workforce Development, 11) Transportation Resources

United States. National Telecommunications and Information Administration *National Telecommunications and Information Administration [Web site]*. Retrieved from <http://www.ntia.doc.gov/>

"The National Telecommunications and Information Administration (NTIA), an agency of the U.S. Department of Commerce, is the Executive Branch's principal voice on domestic and international telecommunications and information technology issues" -- NTIA Facts (<http://www.ntia.doc.gov/ntiahome/ntiafacts.htm>)

National Telecommunications and Information Administration. (1995, July). *Falling through the net: A Survey of the "have nots" in rural and Urban America*. Washington, DC: U.S. Dept. of Commerce. Retrieved from <http://www.ntia.doc.gov/ntiahome/fallingthru.html>

This report has developed a more expansive profile of universal service in America - a portrait that includes computers and modems as well as telephones. The data in this report provide fresh insights into the make-up of those who are not connected to the National Information Infrastructure ("NII"). More particularly, this research has explored the characteristics of the "have-nots" in rural versus urban settings. In addition, the agency has gained new insights about the "information disadvantaged" in America's central cities, enabling policymakers for the first time to array these characteristics against rural and urban profiles. NTIA's examination reveals the usage habits of PC/modem users in accessing on-line services, an important input for policy development in the nascent Information Age.

United States. National Telecommunications and Information Administration [*Falling through the Net 2000 Charts and other statistical materials*]. Retrieved from <http://www.ntia.doc.gov/ntiahome/ftn00/charts00.html>

Charts included with the *Falling through the Net 2000* report as well as additional graphics, etc. on the topic.

National Telecommunications and Information Administration. (1995, September). *Survey of rural information infrastructure technologies* (NTIA Special Publication 95-33). Retrieved from <http://www.its.bldrdoc.gov/its/spectrum/rural/ruralrep.html>

Communication and information technologies can reduce the barriers of distance and space that disadvantage rural areas. This report defines a set of distinct voice, computer, and video telecommunication services; describes several rural information applications that make use of these services; and surveys various wireline and wireless systems and technologies that are being used or might be used to deliver these services to rural areas. Rural information applications require a wide range of telecommunication services, but no current system or technology is capable of delivering all of these services to all areas.

This report concludes that there are many technologies suitable for providing voice telecommunication services in rural areas. It is also technically feasible to provide advanced computer networking and video capabilities to even relatively small towns in rural areas. No technology was found capable, however, of economically providing these broadband capabilities to the most isolated farms, ranches, and homes. It is expected that new wireless technology will need to be developed to accomplish this. Government regulations and policies will also play an essential role in the development of the Rural Information Infrastructure. Different regulations and policies will likely be required in rural areas than in urban areas.

National Telecommunications and Information Administration. (1998, July). *Falling through the net II: New data on the Digital Divide*. Washington, DC: U.S. Dept. of Commerce. Retrieved from <http://www.ntia.doc.gov/ntiahome/net2/falling.html>

This is the second profile of telephone and consumer penetration released by NTIA. In the first profile, published in "Falling Through the Net: A Survey of the 'Have Nots' in Rural and Urban America" (July 1995), NTIA surveyed trends in telephone subscribership, as well as ownership and usage of personal computers (PCs) and modems, using 1994 data. NTIA obtained this data by contracting with the U.S. Census Bureau to add questions on PC/modem ownership and usage in its November 1994 "Current Population Survey" ("CPS"). As we explained in that report, this data constituted the first census survey of its kind regarding PC/modem ownership.

The present survey updates those results, using similar data compiled by the Census Bureau in October 1997. The Census Bureau compiled this data through 48,000 door-to-door surveys. As in 1994, the Census Bureau has cross-tabulated the information gathered according to specific variables, such as income, race, age, educational attainment, as well as geographic categories (i.e., rural, urban, and central city, as well as by state and region). These tabulations permit insights into the characteristics of Americans that have access to the information infrastructure, and those that do not.

National Telecommunications and Information Administration. (1999). *Falling through the Net III: Defining the digital divide : A report on the telecommunications and information technology gap in America*. Washington, DC: U. S. Dept. of Commerce. Retrieved from <http://www.ntia.doc.gov/ntiahome/fttn99/FTTN.pdf>

Report on household access to telephones, computers, and the Internet, and computer use among individuals, 1998 with trends from 1984 [short summary].

This is NTIA's third report examining which American households have access to telephones, computers, and the Internet, and which do not. Part I of this report surveys household access to telephones, computers, and the Internet, updating the surveys in our previous two reports: *Falling Through the Net: A Survey of the "Have Nots" in Rural and Urban America* (July 1995) and *Falling Through the Net II: New Data on the Digital Divide* (July 1998). We find that, although more households are connected, certain households are gaining access to new technologies far more quickly, while others are falling further behind.

Part II provides significant new information on individual Internet usage. Among other things, we look at how people are connected to the Internet; where people access the Internet outside the home (such as at work, school, a library, or a community center); how Americans choose to spend their time online; and why some people are not connected. We find that certain people are more likely to have Internet access, especially at home or work. Some of those who lack such access, however, are using the Internet at public facilities, including schools and libraries, and are using the Internet in ways that will help them advance economically and professionally.

Part III discusses the challenges ahead in solving the digital divide and highlights the significance of several key policies in promoting access. In the Appendix to this report, we also provide a "Trendline Study" depicting the trends in household telephone, computer, and Internet access at various points since 1984. This historic survey adds critical information regarding how far we have come in the last fourteen years, and how far we have yet to go in connecting Americans to critical information resources.

National Telecommunications and Information Administration. (2000). *Falling through the net IV: Toward digital inclusion: A report on Americans' access to technology tools*. Washington, DC: Author. Retrieved from <http://search.ntia.doc.gov/pdf/fttn00.pdf>

Report on household access to computers and the Internet, and computer use among individuals, 2000 with trends from 1994 [Brief summary].

This is the fourth report in the Commerce Department series of studies, *Falling Through the Net*. The previous three were focused on the theme of the "Digital Divide," the concept that the society should not be separated into information haves and information have-nots. With this report, we move into a new phase of our information-gathering and policy-making by recognizing the phenomenal growth that has taken place in the availability of computing and information technology tools, tempered by the realization that there is still much more to be done to make certain that everyone is included in the digital economy. Thus, the theme for this year, *Toward Digital Inclusion*, recognizes each element of the equation -- the progress made and the progress yet to be made. Measuring the growth and use of the Internet is, like the Internet itself, a complex endeavor. This report reflects our attempt to capture three of the key benchmarks.

Part I looks at Internet and computer access of households. We do this because the household is the traditional standard by which access is defined, in the United States and around the world. The examination of household access includes such factors as geography, income,

race, and household type. In looking at the results and trying to determine the progress from year to year, it is important to understand that there is more than one way to interpret the results. When looking at computer and Internet access, it is clear that certain groups have far higher levels of Internet access and computer ownership. These groups have generally exhibited greater percentage point changes in their penetration rates from one survey to the next. On the other hand, they exhibit slower expansion rates from one survey to the next. At the same time, groups with lower penetration rates are exhibiting smaller percentage point changes but higher expansion rates because they are starting from a much lower base and have more opportunity for rapid and greater expansion. Part I also includes a new facet to the survey. For the first time, we survey household access to high-speed Internet services, primarily through cable TV and Digital Subscriber Line services. There are large differences in high-speed access based on income and other variables, and these initial data will enable us to track the increases and diffusion of high-speed access as broadband infrastructure is widely adopted.

Part II provides a different way of looking at the penetration of Internet access and computers. Instead of looking at households, this section of the report examines computer and online access by individuals. Many households, for example, include people who do not use the Internet, and the rate or degree at which this occurs differs among groups. By focusing on individuals, we are also able to capture important differences in Internet use based on people's age, gender, and labor force status. We can also look at how people use the Internet, for example, for e-mail or to look for a job, as well as where they use it, whether at home or at a library, for example.

Part III, for the first time, examines the use of computers and the Internet among people with disabilities that adversely affect their ability to walk, to see, to hear, to use their hands and fingers, or to learn. In general, Internet access is half as common among people with disabilities as among other people, and computer access is even more skewed. To some degree this may reflect the fact that on average, disabled people are older and less likely to be employed, and also have lower incomes than people without disabilities. All of these variables are associated with lower computer and Internet use.

National Telecommunications and Information Administration and Rural Utilities Service. (2000, April). *Advanced Telecommunications in rural America: The challenge of bringing broadband services to all Americans*. Washington, DC: U.S. Dept. of Commerce & U.S. Dept. of Agriculture. Retrieved from <http://www.ntia.doc.gov/reports/ruralbb42600.pdf>

Advanced Telecommunications in Rural America is a response by the National Telecommunications and Information Administration (NTIA) and the Rural Utilities Service (RUS) to a request by ten U.S. Senators on the status of broadband deployment in rural versus non-rural areas in the United States. This report also responds to a call by President Clinton and Vice President Gore to bridge the digital divide and create digital opportunities for more Americans. The rate of deployment of broadband services will be key to the future economic growth of every region, particularly in rural areas that can benefit from high-speed connections to urban and world markets.

This report finds that rural areas are currently lagging far behind urban areas in broadband availability. Deployment in rural towns (populations of fewer than 2,500) is more likely to occur than in remote areas outside of towns. These latter areas present a special challenge for broadband deployment.

The primary reason for the slower deployment rate in rural areas is economic. For wireline construction, the cost to serve a customer increases the greater the distance among

customers. Broadband service over cable and DSL is also limited by technical problems incurred with distance and service to a smaller number of customers. Both technologies, however, promise to serve certain portions of rural areas. Cable operators promise to serve smaller rural towns, and smaller, independent telecommunications companies and competitive providers may soon be able to offer DSL to remote rural customers on a broader scale.

Advanced services in rural areas are likely also to be provided through new technologies, which are still in the early stages of deployment or are in a testing and trial phase. Satellite broadband service has particular potential for rural areas as the geographic location of the customer has virtually no effect on the cost of providing service. Several broadband satellite services are planned. Their actual deployment remains uncertain, especially in light of the recent entry into Chapter 11 bankruptcy of two satellite service companies.

Wireless broadband services are also planned for rural areas. More immediately, multipoint-multichannel distribution system (and potentially local-multipoint distribution system) fixed service capabilities may provide a solution for some rural areas. In as little as five years, third generation mobile wireless services providing data rates as high as two megabits/second may be operational.

Policymakers should promote competition, where possible. Using the pro-competitive provisions of the Telecommunications Act, some competitive local exchange carriers have deployed advanced services in rural areas of the country. Some wireless carriers have also indicated an interest in providing voice and high rate data, especially if universal service policies can be reformed.

Competition leads to lower prices, more customer choice, rapid technological advances, and faster deployment of new services. Given unique challenges faced by rural Americans, however, other government policies must be considered as well.

In order to support advanced services in rural areas, NTIA and RUS recommend a number of actions. We recommend the continued support and expansion of those government programs, such as the E-rate program, that ensure access to new technologies including broadband services. We also urge the Federal Communications Commission to consider a definition of universal service and new funding mechanisms to ensure that residents in rural areas have access to telecommunications and information services comparable to those available to residents of urban areas. Support for alternative technologies will also be crucial to the deployment of advanced services in rural America. The Administration is committed to increasing investment in research and development to promote the next generation of broadband technologies. NTIA and RUS will also collect and disseminate "promising practices" that can promote private sector investment in rural broadband services.

Naylor, R (1999). Multimedia and uneven urban and regional development: The Internet industry in the Netherlands. In H. J. Braczyk, G. Fuchs, & H. G. Wolf (Eds.), *Multimedia and regional economic restructuring* (pp. 183-217). Routledge.

Nazem, S. M., Liu, Y. H., et al. (1996). Implementing telecommunications infrastructure: A rural America case. *Telematics and Informatics*, 13(1), 23-31.

Rural America, in the past, enjoyed telecommunications services at an affordable price. In recent years, however, the service in rural communities has deteriorated due to loss of its economic base and thus not able to upgrade to modern communication technology. This study examines ways of building an effective *Rural Telecommunications* network to facilitate rural

development in an information-intensive society. The reorganization of the service for rural communities around a set of "hub" cities is considered; an addition, it develops a procedure for selecting "hub" cities from a multicriteria perspective. This essentially maximizes the utilization of available facilities and services, such as education, healthcare, transportation, and economic opportunities to benefit the maximum number of rural residents. The proposed framework is shown to service as a positive aid in implementing rural area telecommunications infrastructure.

Nelson, A. C. (1998). Determinants of exurban industrialization with local economic development policy implications. *Economic Development Review*, 16(1), 30-.

" Manufacturing firms are moving into the exurban countryside, away from central cities and their suburbs. But because these firms still need markets, a labor supply, and transportation facilities, they tend to avoid remote areas. Exurban industrialization is a byproduct of important changes in manufacturing location. It offers new manufacturing growth opportunities to formally rural communities within an expanding urban field. It also creates new challenges for regions that are competing for manufacturing firms" (ProQuest abstract).

Subjects: Industrial development; Economic policy; Manufacturing; Rural development; Location of industry; Economic development

Newburger, E. C. (2001). *Home computers and Internet use in the U.S.: August 2000*. Washington, DC: U.S. Bureau of Census.

Report on computer availability and Internet use in the home, 2000. Data are from a supplement to the Aug. 2000 Current Population Report.

Nicholas, K. (2000). *Digital arroyo and imaginary fences: Assessing the impact of public policy, communication technologies and commercial investment on Internet access in rural Texas*. Austin, TX: University of Texas.

North Carolina Dept. of Commerce, Office of Information Technology Services, Telecommunications Services. (2000). *Commercially available high-speed Internet connectivity in North Carolina: Infrastructure and prices*. North Carolina: Author.

North Central Regional Center for Rural Development. (2002). *NCRCRD home page*. Ames, IA: Author. Retrieved 2002 from <http://www.ag.iastate.edu/centers/rdev/RuralDev.html>

Located at Iowa State University, the North Central Regional Center for Rural Development, is one of four regional centers coordinating rural development research and education throughout the United States. The Center's Web site provides information about and publications by the NCRCRD. The site also includes the Rural Researchers Network and links to other rural development resources.

Northeast Regional Center for Rural Development. (2001). *County economic development index for the rural Northeast US*. University Park, PA: Author. Retrieved 2002 from http://www.cas.nercrd.psu.edu/Publications/RDPAPERS/Cedi_final.pdf

"This report compiles in one place a consistent set of economic indicators about the non-metro northeastern US" -- p. 1.

Northeast Regional Center for Rural Development. (2002). *Northeast Regional Center for Rural Development* [Home page]. University Park, PA: Author. Retrieved June 27, 2002, from <http://www.cas.nercrd.psu.edu/>

The Northeast Regional Center for Rural Development is one of four regional rural development centers in the nation. The Northeast Regional Center focuses specifically on rural problems of the Northeast region. The Center's Web site includes information about the Center and provides access to the Center's Rural County Business Reports, newsletters, and other publications.

Oden, M., & Strover, S. (2002). *Links to the future: The role of information and telecommunications technology in Appalachian economic development*. Austin, TX: University of Texas.

Office of Educational Research and Improvement. (2001). *Condition of education, 2001: Instructional environment and conditions*.

[School characteristics include level, enrollment size, region, urban-rural location, minority share of enrollment, and percent of students eligible for free or reduced-price lunch.]
INTERNET USE [Data are for 1999.]

39.1. Percentage of public school teachers who reported using computers and the Internet for various activities at school, by how well prepared they felt to use computers or the Internet for instruction. (p. 160)

39.2. Percentage of public school teachers who reported assigning students various activities that use computers or the Internet, by how well prepared they felt to use computers or the Internet for instruction. (p. 160)

39.3. Percentage distribution of public school teachers who reported participating in professional development activities related to using computers or the Internet according to how well prepared they felt and according to hours of professional development, by level of preparedness. (p. 160)

39.4. Percentage distribution of public school teachers according to how well prepared they felt to use computers and the Internet for instruction, by number of years of teaching experience. (p. 161)

39.5. Percentage of public school teachers who reported various conditions were barriers to their using computers and the Internet for instruction, by extent to which they felt these conditions were barriers. (p. 161)

39.6. Percentage distribution of public school teachers according to how well prepared they felt to use computers and the Internet for instruction, by school characteristics. (p. 162)

O'Neil, D. (2002). Assessing community informatics: A Review of methodological approaches for evaluating community networks and community technology centers. *Internet Research*, 12(1), 76-.

"Community informatics can be defined as a strategy or discipline that focuses on the use of information and communication technologies by territorial communities. This paper analyzes the emerging community informatics evaluation literature to develop an understanding of the indicators used to gauge project impacts in community networks and community technology centers. This study finds that community networks and community technology center assessments fall into five key areas: strong democracy; social capital; individual empowerment;

sense of community; and economic development opportunities. The paper concludes by making recommendations for future community informatics evaluations" (ABI/INFORM Global abstract).

Subjects: Computer networks; Social impact; Community; Performance evaluation

Onwumehili. C. (2001). Dream or reality: providing universal access to basic telecommunications in Nigeria? *Telecommunications Policy*, 25(4), 219-231.

Nigeria has publicly announced its intentions to make basic telecommunications, specifically telephones, affordable and universally available to its people. However, several issues make this proposition especially difficult for countries such as Nigeria. For instance, Nigeria's population is large at 110 million with less than 1% presently able to access telephones. Furthermore, over 70% of Nigerians, the majority of them poor, live in rural areas where telephone lines do not presently exist. This paper studies the universal service proposition viz a viz these conditions by analyzing Nigeria's attempts to provide telephone service since the country's independence in 1960. The paper notes impending problems with Nigeria's attempts to achieve critical mass, which is essential for universal access. Ultimately, it suggests various strategies that the country should use to stimulate critical mass and achieve universal access.

Organization for Economic Cooperation and Development. (2001). *Information and communication technologies and rural development*. Paris: Author.

Organization for Economic Cooperation and Development. (2001). *Science, technology and industry outlook 2001: Special edition. Drivers of growth: Information technology, innovation and entrepreneurship*. Paris: Author.

Biennial report on industrial and technological performance trends and policies in OECD countries, mostly varying periods 1988-2000 or undated.

Organization for Economic Co-operation and Development. (2003, October). *Broadband driving growth: Policy responses* (DSTI/ICCP(2003)13/FINAL). Retrieved from <http://www.oecd.org/dataoecd/18/3/16234106.pdf>

Broadband connectivity is a key component in ICT development, adoption and use. It is of strategic importance to all countries because of its ability to accelerate the contribution of ICTs to economic growth in all sectors, enhance social and cultural development, and facilitate innovation. Widespread and affordable access can contribute to productivity and growth through applications that promote efficiency, network effects and positive externalities, with benefits for business, the public sector, and consumers. Broadband networks are an important platform for the development of knowledge-based global, national, regional, and local economies. For the private sector, broadband is an enabler of e-business and new market opportunities, allowing firms, including small and medium-sized enterprises (SMEs), to realize growth through productivity increases stemming from improved information exchange, value chain transformation, and process efficiency. Broadband can improve the efficiency, availability and reach of public sector services in areas of high government interest, such as health, education and government services, and have important demonstration effects in other economic sectors. For consumers, broadband can enhance the quality of life through economic, social and cultural, development. For small, rural and remote communities it can be an enabler for economic and social inclusion; especially, it can facilitate access to new and advanced goods and services, as

well as opportunities to participate in the digital economy and information society. However, geography poses challenges, particularly in countries with low population densities, in extending broadband to all communities.

Panzar, J. C. (2000). A methodology for measuring the costs of universal service obligations. *Information Economics and Policy*, 12(3), 211-220.

Compensating incumbents for the costs of assuming a Universal Service Obligation (USO) contribution is a controversial policy issue. Part of the difficulty is the mistaken view that USO costs can be defined without reference to overall market conditions, including the extent of competition. This paper develops a methodology for calculating USO costs that takes explicit recognition of the competitive environment under which the USO is to be provided.

Parapak, J. L. (1993). The Missing link and Vision 2000. *IEEE Communications Magazine*, 2(2), 40-41.

This article profiles the telecommunications sector in Indonesia, noting that Indonesia recognizes telecommunications as essential for national development and to maintain competitiveness in the global economy. The nation's goal is a well-developed telecommunications infrastructure that provides high-quality service at affordable rates and is easily accessible by everyone, including people in rural areas. The article outlines the government's set of policies and strategies for telecommunications development. It also presents a set of goals that are incorporated into the Vision 2000 statement, which is designed to minimize or eliminate the "missing link" that otherwise prevents Indonesia's full participation in the global community.

Parker, E. B. (1982). Communication satellites for rural development. In J. R. Schement, F. Gutierrez, & M. A. Sirbu (Eds.), *Telecommunications Policy handbook* (pp. 3-9). New York: Praeger.

Parker, E. B. (1983). *Economic and social benefits of the Rural Electrification Administrations (REA) telephone loan program*. Geneva: International Telecommunication Union.

Parker, E. B. (1984). Appropriate telecommunications for economic development. *Telecommunications Policy*, 8(3), 173-177.

A substantial amount of evidence is available to support the contention that investment in telecommunications infrastructure can spur economic development in developing nations. Technology alone cannot bring about development. However, when put to proper use, it allows increased organizational and administrative efficiency in the conduct of economic activities and the identification and exploitation of new opportunities. For developing nations, expansion of telephone communications infrastructure is not the most effective route to economic development, since it requires substantial investment in transportation and electrification infrastructures to extend urban service to remote rural areas. A more appropriate infrastructure will support microprocessor-based digital satellite communications, for which costs are independent of distance, location, and volume. Small earth stations could be made available for under \$10,000. However, their development will be dependent upon lenders, borrowers, and manufacturers achieving a consensus about their benefits and potential for mass marketing.

Parker, E. B. (1985). Financing and other issues in telecommunications development. *Telecommunications Policy*, 9(3), 185-188.

The implementation of telecommunications infrastructures throughout developing countries is a prerequisite to these nations' development. However, a fundamental issue is how these countries can pay for the capital investment in necessary telecommunications equipment. While internally generated funds may be available, much of this money may be centered on the needs of urban telecommunications systems. If funds remain for rural use, shortage of foreign exchange may prove an impediment. These nations need to develop institutional structures that can stimulate lower cost and innovative *Rural Telecommunications* technologies. However, these structures must not impose excessive risks on national telecommunications monopolies. It may be that private enterprises should be permitted to try and bring needed telecommunications services to areas that the monopolies are not serving. Once there are some successful project models of this sort to follow, it will be easier to reach a consensus among developing country borrowers, lenders, and telecommunications manufacturers.

Parker, E. B. (1990). *Communications investment to promote economic development. In Infrastructure Investment and Economic Development: Rural Strategies for the 1990s*. Rockville, MD: Economic Research Service-U.S. Department of Agriculture, Agriculture and Rural Economy Division.

This report investigates the development of infrastructure, such as transportation, telecommunication, and water and wastewater facilities, and the effect which this infrastructure will have on rural America's economy. This report contains four chapters which are titled: Infrastructure Investment and Economic Development: An Overview; Transportation Investment to Promote Economic Development; Communications Investment to Promote Economic Development, and Water and Wastewater Investment to Promote Economic Development.

Parker, E. B. (1992). Developing third world telecommunications markets. *The Information Society*, 8(3), 147-167.

There are a number of barriers to be overcome in order to succeed in developing Third World telecommunications markets. In the process, it is important to understand the way in which telecommunications contributes to Third World economic development. Investment in telecommunications infrastructure does not guarantee development but is a necessary complement to most development activities. In order to make possible these development benefits and, in the process, benefit from this opportunity, it is necessary to develop and market technology appropriate to providing solutions to Third World problems. In order to ensure installation and operation in Third World countries, it may be necessary to use innovative institutional arrangements in addition to selling to the traditional voice telephone company. One of the huge barriers to be overcome is the Third World debt crisis, a partial solution to which may be necessary if large Third World markets are to be developed. The global payoff for overcoming these barriers and getting expanded Third World networks operational is huge.

Parker, E. B. (1996, May). *Telecommunications and rural development: Threats and opportunities*. Paper prepared for TVA Rural Studies. Lexington: University of Kentucky. Retrieved from http://www.rural.org/workshops/rural_telecom/parker/1.htm

The Information Superhighway is now under construction in many rural communities in the United States. The information services carried over these new digital superhighways will

transform rural economies as much as the interstate highway system and the railroads changed rural American communities in earlier times. There is one major similarity and one major difference between the information highways and the ribbons of concrete and steel that make up the physical transportation network. The US economy could not support bringing railroads and multi-lane interstate freeways to every rural community. Those rural communities with good access to the railroads and the interstate freeways became more prosperous than those communities left off the beaten paths. The similarity is that those rural communities with good access to the national and international information superhighways will have stronger local economies than those without good access. The difference is that it is economically feasible for every rural community in the United States, no matter how remote, to have good access to the information highways of the twenty-first century. Some communities will have better access or have it sooner. Which rural communities will benefit the most and the soonest will depend not on Federal or state information highway engineers (or Federal and state regulators), but on local action by local communities. The venue for action now shifts to local communities. Those rural communities wishing to take advantage of the exciting new potential for economic development or to protect themselves from being hurt by the changes should move ahead with local action plans. Competitive forces by themselves may be sufficient to create the inter-urban links and urban access lines for new high capacity digital networks. In rural communities the problem will be to bring together enough combined demand from government, business and residential users to ensure that at least one high capacity digital link is available to connect users in their community to the emerging information superhighway. There is so much economic opportunity in urban areas that the major telephone and cable companies are likely to focus their competitive attention there instead of on smaller rural markets. Local rural communities that fail to take action may be left behind. It is currently economically feasible to bring high capacity telecommunications networks to every community in the US. (This is not the same as a longer term goal of bringing high capacity networks to every rural household.) Rural communities that take advantage of the opportunities can remove the traditional barriers of distance and small scale that were barriers to local economic improvement. With sufficiently improved communications, the competitive playing field, instead of being tilted in the urban direction, can now become level. Rural communities can use their environmental and social advantages in competition with urban rivals. Nevertheless, the telecommunications changes will be a two-edged sword. The information superhighways will permit travel in both directions. Small rural markets will no longer be insulated from urban rivals. Rural communities that fail to grasp the opportunities will be more economically disadvantaged than they are today.

Parker, E. B. (2000). Closing the digital divide in rural America. *Telecommunications Policy*, 24(4), 281-290.

The analysis presented here has focused directly on the problems of extending broad-band digital networks to rural areas in the US. Yet, the opportunity that broad-band digital communications can provide for rural economic development is not restricted to the US. Nearly every rural community in the world suffers communication disadvantages and could benefit enormously from Internet access opportunities. The appropriate technology will be different in different locations, sometimes fiber optics, sometimes cable, sometimes satellite and sometimes terrestrial wireless. The appropriate institutional arrangements will also be different in different locations. Even within a single country or single region of a county, it is unlikely that any single technical or policy recommendation will be appropriate for all locations. However, there are two

policy principles that are likely to be widely applicable across the world. First, governmental encouragement and support for local rural initiatives is likely to help rural economic development faster than bureaucratic top-down initiatives that might not be the best solution for all locations. Programs like the micro-loan program that helped rural Bangladesh entrepreneurs buy cell phones to provide service to rural villages otherwise without service is an excellent example of local creativity. Second, government policies should permit any commercial, cooperative or governmental entity to extend services (both basic and advanced) to rural communities provided only that they offer local public access. Government policies should mandate interconnection of all such rural initiatives to the pre-existing national telecommunications networks. The greater the participation and the connectivity, the greater the economic advantage for everyone.

Parker, E. B., Hudson, H. E., Dillman, D. A., & Roscoe, A. D. (1989). *Rural America in the Information Age: Telecommunications policy for rural development*. Lanham, MD: The Aspen Institute and University Press of America.

The authors of this book argue that telecommunications can play a catalytic role in rural economic development. Unlike other strategies that target specific industries or regions, enhanced telecommunications can help a broad array of industries in various rural regions. Just as in the past when a new highway or railroad link could boost the fortunes of remote towns, so today modern telecommunications services can help bolster and diversify the economic base of rural America.

Parker, E. B., & Hudson, H. E. (1992). Building electronic byways: How telcos can foster rural development. *Rural Telecommunications*, 11(6), 24-28.

For the telecommunications industry, investing time and money in rural development is a sound business practice. Stimulating the growth of businesses and information-related business activities will spur greater demand for telecommunications services. Recommendations for fostering rural development include: 1) Telephone carriers should upgrade their facilities to provide universal single-party touch-tone service with quality levels suitable for reliable data and facsimile transmission. 2) Telecommunications equipment and service providers should design and promote equipment and services to meet the needs of rural users. 3) Telecommunications providers should market their products and services effectively. 4) The telecommunications industry should offer telecommunications training for the current and future work force. 5) Telephone carriers should help local entrepreneurs and economic development projects obtain financing.

Parker, E. B., Hudson, H. E., Dillman, D. A., Strover, S., & Williams, F. (1995). *Electronic byways: State policies for rural development through telecommunications* (2nd ed.). Boulder, CO: Westview Press.

This book is intended for those who want information on rural communities as they begin to build a new economic and community vision. The book focuses on the issue of telecommunications in rural areas as it relates to the difficulty of building this new economic and community vision. Further, this book explains how goals such as enhancing public education, growing businesses and improving government and social services can be achieved through state government policies designed to exploit telecommunications potential for rural development.

Parsad, B., & Westat, I. (2001). *Advanced telecommunications in U.S. private schools: 1998-99*. Washington, DC: Office of Educational Research and Improvement.

Report on telecommunications equipment and technology use, availability, and implementation in private elementary and secondary schools, 1998/99.

Peha, J. M. (1999). Tradable universal service obligations. *Telecommunications Policy*, 23(5), 363-374.

This paper proposes a novel policy to motivate private-sector operators of basic infrastructure to expand infrastructure into previously unserved regions. It is particularly useful when resources are transferred to the private sector, as occurs during the privatization of a state-owned telecommunications carrier, the introduction of competition, the release of spectrum, or the allocation of cash subsidies for this purpose. Firms receive tradable universal service obligations in the form of milestones that must be met, and commitments to meet specific deadlines. By exchanging its commitments, a firm can increase or decrease the rate at which it must expand infrastructure. By exchanging milestones, a firm can change where it must expand infrastructure. Making milestones and commitments independent and fully tradable allows each firm to develop the most cost effective business strategy possible, and to adapt that strategy as technology and demand evolve over time. The exchange of milestones and commitments does not diminish the obligations that must be met by industry as a whole, insuring the timely expansion of infrastructure. This paper focuses on telecommunications, but the approach is also applicable to other forms of infrastructure, such as electric power.

Pennsylvania Public Utility Commission. (1999). *Global telephone order*. Harrisburg, PA: Author. Retrieved 2002 from

http://puc.paonline.com/Telephone/Global/Global_Telephone_Order.asp

Pew Research Center. (2002). *Pew Internet & American Life Project* [Home page]. Washington, D.C.: Author. Retrieved June 26, 2002, from <http://www.pewinternet.org/index.asp>

"The Pew Internet & American Life Project will create and fund original, academic-quality research that explores the impact of the Internet on children, families, communities, the work place, schools, health care and civic/political life. The Project aims to be an authoritative source for timely information on the Internet's growth and societal impact, through research that is scrupulously impartial. The basic work-product of the center will be phone and online surveys ... " -- Our mission (<http://www.pewinternet.org/about/about.asp?page=4>)

Pew Research Center. (2002). *The Broadband difference: How online Americans' behavior changes with high-speed Internet connections at home*. Washington, DC: Author. Retrieved June 23, 2002, from <http://www.pewinternet.org/reports/toc.asp?Report=63>

"This report focuses on the nature of broadband use in American homes" -- Summary of findings.

Photo Marketing Association International. (2000). *2000 DIMA consumer digital imaging survey*. Photo Marketing Association International.

Recurring survey report on consumer market for digital imaging equipment and services, 1999, with selected comparisons to 1996.

Pierce, W. B., & Jequier, N. (1983). *Telecommunications for development*. Geneva: International Telecommunication Union.

Pool, I. S., & Steven, P. M. (1983). Appropriate telecommunications for rural development. In I. B. Singh (Ed.), *Telecommunications in the year 2000: National and international perspectives*. Norwood, NJ: Ablex.

Premkumar, G., & Roberts, M. (1999). Adoption of new information technologies in rural small businesses. *Omega-International Journal of Management Science*, 27(4), 467-484.

The media discussion on 'information superhighway', 'Internet' and 'national information infrastructure (NII)' has highlighted the potential of information technology in modern society. The changes in information and communication technologies provide both opportunities and threats to small businesses located in rural communities. The objective of this study is to identify the state of use of various communications technologies and the factors that influence the adoption of these technologies in small businesses located in rural communities in the US. A research model is postulated that contains 10 independent variables under three broad categories — innovation, organizational and environmental characteristics. The dependent variable, adoption of information and communication technologies, is measured as the degree of adoption of four modern communication technologies by the organization. Data from 78 organizations were collected using a structured interview process. The results of data analysis using discriminate analysis indicate that relative advantage, top management support, organizational size, external pressure and competitive pressure are important determinants of adoption.

Press, L. (2000). The State of the Internet: Growth and gaps. In *The State of the Internet: Proceedings of INET 2000, International Networking Conference*. Reston, VA: The Internet Society. Retrieved 2002 from http://www.isoc.org/inet2000/cdproceedings/8e/8e_4.htm

Pressler, L., & Schieffer, K. V. (1988). A Proposal for universal telecommunications service. *Federal Communications Law Journal*, 40(3), 351-375.

The information age of computers and telecommunications has excluded the sparsely populated rural areas of the US in which it is not profitable to provide telecommunications service. The goal of universal service in US *Telecommunications Policy* is the provision of service to all people of the US. Congress has yet to resolve public policy issues necessary for long-range planning and clearly define "universal service." The primary responsibility of the Federal Communications Commission is implementation of the Communications Act of 1934. Public policy should require that information services be made as widely available as possible, similar to basic telephone service. Long-distance suppliers should be required to subsidize local lines either as a component of the existing pro rata pooling process or as an additional payment into the universal service fund. Bypass of the system should be discouraged by legislation.

Preston, P., & Flynn, R. (2000). Rethinking universal service: Citizenship, consumption norms, and the telephone. *The Information Society*, 16(2), 91-98.

One of the reasons the proponents of expanded universal service have not made much headway is that they have not been able to provide a coherent justification for the major resource and policy commitments it requires. The lack of consensus on the very meaning of the term "universal service" has added to the confusion. This article argues that it is critically important to

articulate a clear justification for universal service before we discuss what it should include and how it should be funded, the two main preoccupations of the current debate. It answers the "why" question by drawing on the literature on consumption norms and citizenship rights and thereby provides a cogent justification for universal service. A clear articulation of the rationale for universal service should reduce some of the confusion in the current debate and bring greater clarity to the ongoing debate on this important public policy issue.

Prieger, J. (1998). Universal service and the Telecommunications Act of 1996 - The fact after the act. *Telecommunications Policy*, 22(1), 57-71.

Three goals of the 1996 Telecommunications Act are competition, efficiency, and explicit mechanisms to further universal service. The new universal service policies violate these goals. I review the policies (support for high-cost and rural areas, low-income subscribers, and educational and medical institutions, and the funding mechanism) and detect the influence of various interest groups and the regulators' desire to protect their policies from public scrutiny. The new policies will require \$4-12 billion per year to fund and create inefficiency of \$1.2-4.0 billion per year from revenue taxation. A more efficient tax scheme would increase total surplus.

Prieger, J. E. (2003). The supply side of the digital divide: is there equal availability in the broadband Internet access market? *Economic Inquiry*, 41(2), 346-363.

The newest dimension of the digital divide is access to broadband (high-speed) Internet service. Using comprehensive U.S. data covering all forms of access technology (chiefly DSL and cable modem), I look for evidence of unequal broadband availability in areas with high concentrations of poor, minority, or rural households. There is little evidence of unequal availability based on income or on black or Hispanic concentration. There is mixed evidence concerning availability based on Native American or Asian concentration. Other findings: Rural location decreases availability; market size, education, Spanish language use, commuting distance, and Bell presence increase availability.

Pulver, G. C. (1988). The changing economic scene in rural America. *Journal of State Government*, 61(1), 3-8.

Puma, M. J., Chaplin, D. D., & Pape, A. D. (2000). *E-Rate and the Digital Divide: A preliminary analysis from the Integrated Studies of Educational Technology*. The Urban Institute. Retrieved from http://www.ed.gov/offices/OUS/PES/erate_fr.pdf

The key findings from this study are as follows: 1) Public Schools Have Taken The Most Advantage Of The E-Rate Program. In the first two years, the E-Rate has committed 3 nearly \$4 billion (and 3rd year requests alone have exceeded this total), with 84 percent going to the nation's public schools. In part, this is due to differences in the program's penetration—more than three-fourths of all public districts and schools applied for E-Rate funds, compared to about half of public libraries and 15 percent of private schools. Thus, there were about 13,000 public school districts, 70,000 public schools, 5,000 private schools, and 4,500 library systems participating in the 2nd year of the E-Rate program. 2) The E-Rate Has Targeted Poor Communities. Given the intent of the E-Rate it is important to see that it has met its goals by encouraging higher rates of application from the poorest communities and getting funds to the places with the greatest need. For example, per student funding to school districts increases dramatically with poverty, and the most disadvantaged districts receive almost ten times as much

per student as the least disadvantaged. Similar patterns hold for application rates, total funding, and other types of entities (schools and libraries).³ Digital Divide. Application rates of the most impoverished public school districts were lower than those of most other school districts in the first year of the program. This may be a consequence of lower capacity in these communities. However, application rates rose for all types of entities in the second year of the program,⁴ and by even more for high-poverty districts than for other types of districts. 4) Size Matters. Larger districts, schools, and libraries are more likely to apply for E-Rate discounts, and when approved receive the largest total amount of E-Rate funds and higher average funding per student (or person). This pattern also holds for application rates even after controlling for poverty or urban location, suggesting that larger organizations may have more of the human, technical, and fiscal capacity needed to apply for, and make effective use of, the E-Rate program.

Pye, R., & Lauder, G. (1987). Regional aid for telecommunications in Europe: A Force for economic development. *Telecommunications Policy*, 11(2), 99-113.

A review is presented of research work on telecommunications and economic development that can be applied to the problems faced in the less favored regions of Europe. Attention is focused on the work carried out under the auspices of the Commission of the European Communities into the disadvantages these regions face in telecommunications supply and use and the benefits that would result from investment. The priorities for regional aid to telecommunication and recommended actions for a European Economic Community program are addressed as well. It is concluded that the emphasis should be on the provision of advanced business services and the stimulation of demand for those services in order to promote economic growth. General network infrastructure digitalization should be left to the PTTs to undertake as part of their normal investment program.

Rainey, D. V., Robinson, K. L., Allen, I., & Christy, R. D. (2003, August). Essential forms of capital for sustainable community development. *American Journal of Agricultural Economics*, 85(3), 708-.

Rainey et al present the foundation rural communities' need to develop sustainable economic growth in a global economy. Sustainable development encompasses a set of policies and activities that work together to create economic vitality, environmental stewardship, and social equity, and its process implies educational training that prepares current and future laborers to meet their current employer's needs and to be rapid adapters to new technology and capable of becoming entrepreneurs. For rural communities to succeed in the global economy, rural communities must be able to compete not only with other rural communities both at home and abroad but also with urban areas.

Subjects: Sustainable development, global economy, social capital, rural development, economic policy

Ramírez, R. (2001). A model for rural and remote information and communication technologies: A Canadian exploration. *Telecommunications Policy*, 25(5), 315-330.

While Canada boasts one of the most advanced information and communication technology (ICT) infrastructures, its rural and remote areas are lagging behind. Rural and remote ICTs development is presented as an uncharted domain. A model for rural and remote ICTs is proposed describing the interrelationships among policy, organizational, community, and technological dimensions. The model served as a guide to prepare three case studies that are

briefly described. Several principles are described as strategic policy and organizational insights into how rural and remote communities can harness ICTs. The article concludes with a hypothesis highlighting the role of mediating organizations to secure affordable and relevant ICT services and applications for rural and remote communities.

Ranck, S. D. (2001). *Exploring the potential impact of E-commerce in Pennsylvania downtowns*. Business Administration. Lewisburg, PA: Bucknell University.

Explores many of the issues relevant to e-commerce and downtowns in Pennsylvania.

Rao, M., S. R. Bhandari, et al. (1999). Struggling with the digital divide: Internet infrastructure, policies and regulations. *Economic and Political Weekly*, 34(46-47), 3317-3320.

This paper provides an overall framework for analyzing the ISP market in south Asia, compares and contrasts the scenario in member countries, and concludes with a set of progressive recommendations. The regulatory climate in south Asia has only recently welcomed private sector ISPs, but a key challenge lies in creating a level playing field between government-owned and private sector ISPs. Work has begun on initiatives to extend the Net beyond urban concentrations to rural areas via Internet kiosks, community centers, wireless delivery and non-PC devices, but much innovation and investment is still called for here. From the ability to improve software and education to boosting handicrafts and human rights, the Net has a lot to offer to a wide array of humanity in south Asia. But without a progressive ISP environment, the Internet will continue to exacerbate the digital divide between rural and urban, non-English and English-speaking south Asia.

Read, W. H., & Youtie, J. L. (1996). *Telecommunications strategy for economic development*. Westport, CT: Praeger.

Strategies linking the dynamic and changing world of telecommunication to local desires for economic growth are at the heart of this important book. In the age of information, grass roots political leaders have discovered telecommunications as they seek to boost local employment and community well-being. Taking the cases of Richardson, Texas, a Dallas suburb that has attracted over 50,000 high-tech jobs, city-state Singapore, which has successfully upgraded its telecommunications infrastructure to lure information-intensive companies, Atlanta, using the 1996 Olympics to advance its information-technology base, and others, the authors critically examine the successes and failures of each. Their conclusions will be invaluable to planners, politicians, and scholars who want to know whether and how advanced telecommunications infrastructure leads to accelerated economic development.

Renkow, M. (2003, May). Employment growth, worker mobility, and rural economic development. *American Journal of Agricultural Economics*, 85(2), 503-.

"A county-level labor market model is estimated for North Carolina. The model accounts for inter-county commuting, migration, and within-county adjustments to labor demand shocks. Econometric results indicate that most employment growth (70-80%) during the 1980s was accommodated by changes in commuting flows. Evidence is also presented indicating that labor force growth-and, by extension, population growth and associated fiscal impacts-in rural counties is sensitive to employment growth in nearby urban counties. These results highlight two opposing forces related to spatial spillovers that are usually neglected in analyses of the economic and fiscal impacts of employment growth" (ProQuest abstract).

Richardson, D. (1996). *The Internet and rural development: Recommendations for strategy and activity*. Rome, Italy: Sustainable Development Department of the Food and Agriculture Organization of the United Nations. Retrieved from <http://www.fao.org/waicent/faoinfo/sustdev/Cddirect/CDDO/contents.htm>

This report outlines the elements of a communication for development approach applied to the Internet and rural development, together with recommendations for strategy and activity, and an overview of Internet activities in developing countries. A key recommendation for FAO is an Internet and development strategy focused on rural and agricultural communities and the intermediary agencies that serve those communities with advice, project support, research, extension, and training. The cornerstone of this strategy is capacity building activities for rural and agricultural organizations in order to create and enhance locally managed Internet use, tools and resources.

The recommendations and project ideas in this report may be of interest to other development agencies which have or are interested in supporting activities focused on developing Internet infrastructure and applications in developing countries. Collaboration among agencies supporting Internet and development initiatives can achieve important “multiplier” effects as agencies harmonize their efforts while insuring that their particular constituencies are served. The goal is for development agencies, in partnership with stakeholders, to make full use of Internet tools such as the World Wide Web and interactive discussion tools to assist rural development efforts.

Richardson, D. (1997). *The Internet and rural and agricultural development: An Integrated approach* (Communication for Development Publication Series). Rome, Italy: Food and Agriculture Organization of the United Nations.

This book recommends an integrated approach to facilitating Internet services and applications that will benefit rural communities and agricultural organisation. This approach begins with the needs of rural people and grassroot agricultural organizations and works to establish vertical and horizontal channels of communication. In this way, rural people and farmers can open new communication channels to enhance relationships with one another, and they can participate in dialogue and information exchange with decision-makers, planners, researchers and others who may reside far beyond rural communities. Pilot projects linked to rural and agricultural organizations can help ensure that rural communities and agricultural organizations remain part of regional and national Internet initiatives. The paper includes recommendations for strategies, funding mechanisms and support systems, together with examples of innovative approaches in Mexico and Chile. It concludes with a call for action and better ways for donor agencies to work together and share lessons learned in this rapidly moving area of international development.

Richardson, D., & Paisley, L. (Eds.). (1998). *The First mile of connectivity: Advancing telecommuncations for rural development through a participatory communication approach*. Rome: FAO.

This book is published by the Communication for Development department of the FAO and contains a collection of papers reflecting international experience and proposals for promoting telecommunications infrastructure in rural communities using participatory approaches. The book is separated into five main sections dealing with the rural context (first mile), comparable participatory approaches using other media such as radio and video, practical

approaches to *Rural Telecommunications* markets, integrated tools to support rural knowledge systems and the policy context. recognizing the enormous challenges of developing *Rural Telecommunications* initiatives that can meet these goals a number of lessons from international experience are highlighted which include: 1) Start working with community organization leaders who instantly see the benefits of rural telecommunication services. Work with organizational leaders who are predisposed to collaborative, open and participatory communication approaches to community development. Do not expend too much time and energy attempting to convince organizational leaders who are predisposed to 'turf wars' and 'empire-building' and who demonstrate little regard for public participation processes. Their participation will follow, in due time, as rural telecommunication services gain popularity. 2) Provide many opportunities for women and young people to actively participate and volunteer their time and energy for practical and identifiable tasks that support rural telecommunication systems. Recognize and reward their efforts at every opportunity, and provide mechanisms to ensure that they can participate in key management or advisory roles. 3) Continuously remind all involved that, at its core, a *Rural Telecommunications* service has the dual goals of sustaining itself through revenue generation and supporting rural development. 4) Recognize that telecommunication policies seldom contain the elements that actively and effectively enable the creative conditions, ownership models, interconnection agreements, and pricing arrangements that foster rural telecommunication services. Stakeholder engagement is one strategy to help change that if stakeholders can assume policy advocacy roles.

Richardson, R., & Belt, V. (2001). Saved by the bell? Call centres and economic development in less favoured regions. *Economic and Industrial Democracy*, 22(1), 67-98.

Richardson, R., & Gillespie, A. (2000), The economic development of peripheral rural areas in the information age. In Wilson, M. I. & K. E. Corey (Eds.), *Information techtonics: Space, place and technology in an Information Age* (pp. 199-217). Chichester: Wiley.

Ricketts, T. C., Johnson-Webb, K. D., et al. (1998). *Definitions of rural: A Handbook for health policy makers and researchers*. Bethesda, MD: U. S. Dept. of Health and Human Services, Health Resources and Services Administration, Office of Rural Health Policy. Retrieved 2002 from <http://www.shepscenter.unc.edu/research%5Fprograms/Rural%5FProgram/ruralit.pdf>

Rockefeller, J. (2000). Beyond the e-rate. *Rural Telecommunications*, 19(2), 10-.

A commentary discusses the E-rate program, which provides significant discounts to schools and libraries for advanced telecom services. Congress designated the E-rate program to help connect classrooms and libraries, but special emphasis was placed on rural regions. Programs like the E-rate are making promising strides.

Roepke, H. G. (2001, Winter). Industrial possibilities for non-metropolitan areas. *Economic Development Review*, 17(3), 105-.

"A reprint of a 1973 article is presented. The types of industry which might be attracted to rural areas and the kinds of programs need to attract them may be susceptible of rational analysis. The desirability of industry is a value judgment which depends on different arguments. Types of industries most likely to be attracted to rural areas are identified. The types of rural areas most likely to attract industry are examined and some ways of overcoming their handicaps

are suggested. The results of some research into those industries which are not moving into rural areas are presented" (ProQuest abstract).

Subjects: Rural development; Industrial development

Rogers, E. M. (1995). *Diffusion of innovations* (4th ed.). New York, NY: The Free Press of Glencoe.

Now, in the fourth edition, Rogers presents the culmination of more than thirty years of research that will set a new standard for analysis and inquiry. The fourth edition is (1) a revision of the theoretical framework and the research evidence supporting this model of diffusion, and (2) a new intellectual venture, in that new concepts and new theoretical viewpoints are introduced. This edition differs from its predecessors in that it takes a much more critical stance in its review and synthesis of 5,000 diffusion publications. During the past thirty years or so, diffusion research has grown to be widely recognized, applied and admired, but it has also been subjected to both constructive and destructive criticism. This criticism is due in large part to the stereotyped and limited ways in which many diffusion scholars have defined the scope and method of their field of study. Rogers analyzes the limitations of previous diffusion studies, showing, for example, that the convergence model, by which participants create and share information to reach a mutual understanding, more accurately describes diffusion in most cases than the linear model. Rogers provides an entirely new set of case examples, from the Balinese Water Temple to Nintendo videogames, that beautifully illustrate his expansive research, as well as a completely revised bibliography covering all relevant diffusion scholarship in the past decade. Most important, he discusses recent research and current topics, including social marketing, forecasting the rate of adoption, technology transfer, and more. This all-inclusive work will be essential reading for scholars and students in the fields of communications, marketing, geography, economic development, political science, sociology, and other related fields for generations to come.

Rogers, E. M. (1986). *Communication technology: The New media in society*. New York, NY: The Free Press of Glencoe.

"Communication Technology introduces the history and uses of the new technologies and examines basic issues posed by interactive media in areas that affect intellectual, organization, and social life. Author and series co-editor Everett M. Rogers defines the field of communication technology with its major implications for researchers, students, and practitioners in an age of ever more advanced information exchange.

Rolland, K., & Monteiro, E. (2002). Balancing the local and global in infrastructural information systems. *The Information Society*, 18(2), 87-100.

A considerable body of literature has demonstrated – empirically as well as analytically – that information systems need to be situated to the local context of use. Yet, for infrastructural information systems that span numerous contexts spread out globally, this is literally prohibitive. For these systems to work, it is necessary to strike a balance between sensitiveness to local contexts and a need to standardize across contexts. We analyze a key element in this, namely spelling out the (largely invisible) “costs” that the different actors pay to achieve working solutions. Empirically, we draw from an ongoing case study. We analyze the attempts of a maritime classification company with 5500 employees located in 300 sites in 100 countries to develop an infrastructural information system to support the surveying of ships globally. We

elaborate design implications and concepts relevant to developing information infrastructures that also apply to the context of developing countries.

Rosston, G. L., & Waterman, D. (1996). *Interconnection and the Internet: Selected papers from the 1996 Telecommunications Policy Research Conference*. Mahwah, NJ: Lawrence Erlbaum.

Rosston, G. L., & Wimmer, B. S. (2000). The "state" of universal service. *Information Economics and Policy*, 12(3), 261-283.

The introduction of competition forces regulators to address the historical practice of using of implicit cross subsidies to maintain uniformly low local telephone service rates. The Federal Communications Commission recently adopted rules to remove a portion of these implicit subsidies by adopting an explicit universal service program. This program, however, only addresses a small portion of the problem and leaves to the states problems associated with intrastate cross subsidies. In this paper we examine several alternative universal service programs that states may adopt. Overall, we find that universal service programs that base subsidy dollars on the cost of providing service have little effect on telephone penetration rates and result in large taxes, which distort market outcomes and drive those paying into the system from the network. Large universal service programs also cause competitive distortions. Furthermore, we find that cost-based mechanisms do an equally poor job when we use normative criteria, such as the effect the programs have on the distribution of income.

Rowe, B. (2003, May). Rural technology deployment and access: Successes upon which to build. *Government Information Quarterly*, 20(2), 85-93.

"1. Is this the best of times or the worst of times for *Rural Telecommunications* and technology deployment and access? 2. Are we still staring across the "digital divide," falling into a digital precipice, or crossing a "digital bridge"? 3. Is an absence of high capacity deployment still the main problem? 4. Are the accomplishments to-date sustainable and sufficiently supported? 5. Is underutilization of facilities that have been deployed really the problem? 6. Is there in fact a problem at all?" (Copyright 2003 Elsevier Inc. All rights reserved).

Rowe, B., Bluhm, P., et al. (1999). Universal service: The case for rural America. *Public Utilities Fortnightly*, 137(14), 48-53.

The 1996 Telecommunications Act declared telecommunications competition and universal service to be twin national policies. The act codified an expansive definition of universal service. It declared universal service to be an evolving concept. Congress recognized that universal service has important elements in both rural and urban America. The rural high-cost element of universal service, which is the concept's historic lodestar, is examined. Existing support mechanisms for service to rural America and the benefits that accrue directly to rural citizens and indirectly to urban citizens are described. The specific universal service requirements of the Telecommunications Act and the possible effects of competition on universal service to rural America are discussed.

Rowley, T. D. (1999, October). Overcoming obstacles to rural telecommunications. *Community Economics Newsletter* (Center for Community Economic Development, University of Wisconsin-Extension), 276. Retrieved November 5, 2003, from <http://www.aae.wisc.edu/www/pub/cenews/ce276.txt>

Rowley, T. D., & Porterfield, S. L. (1993). Can telecommunications help rural areas overcome obstacles to development? *Rural Development Perspectives*, 8(2), 2-6.

Rural access to technology: Connecting the last American frontier ; hearing before the Subcommittee on Technology of the Committee on Science, House of Representatives, One Hundred Sixth Congress, second session, October 5, 2000. (2001). Subcommittee on Technology of the Committee on Science. Washington, DC: U.S. G.P.O.

Hearing that examined issues related to rural access to technology.

Rural Development Commission. (1989). *Telecommunications in rural England* (Rural Research Series).

Rural Policy Research Institute. (1999). *Rural policy context: Defining rural : Definitions of rural areas in the United States.* Columbia, MO: Author.

Rural Policy Research Institute. (1999). *Rural policy context: Metropolitan and non-metropolitan counties.* Retrieved November 11, 2002, from <http://www.rupri.org/policyres/context/omb.html>

Discusses the distinctions between metropolitan and non-metropolitan counties.

Rural Policy Research Institute, National Research and Policy Center and Kauffman Center for Entrepreneurial Leadership. (2002). *Helping rural America realize* [Center for Rural Entrepreneurship Home Page]. Center for Rural Entrepreneurship. Retrieved June 26, 2002, from <http://www.ruraleship.org/>

"The Center for Rural Entrepreneurship (Center) is a Rural Policy Research Institute (RUPRI) National Research & Policy Center with major support from the Kauffman Center for Entrepreneurial Leadership (KCEL) within the Ewing Marion Kauffman Foundation of Kansas City. The Center is an outgrowth of the Rural Entrepreneurship Initiative formerly supported by KCEL, the National Rural Development Partnership, Partners for Rural America and the Nebraska Community Foundation" -- About the Center (http://www.ruraleship.org/about_the_center.htm)

Rural satellite and cable systems loan guarantee proposal and the digital divide in rural America : Hearing before the Committee on Agriculture, Nutrition, and Forestry, United States Senate, One Hundred Sixth Congress, second session ... February 3, 2000. (2000). Committee on Agriculture, Nutrition, and Forestry. Washington, DC: U.S. G.P.O. For sale by the U.S. G.P.O. Supt. of Docs. Congressional Sales Office: iii, 98 p.

Rural Task Force. *Welcome to the Rural Task Force Web site.* Retrieved December 24, 2003, from <http://www.wutc.wa.gov/rtf/rtfpub.nsf?open>

Rural Task Force. (1999, September 14). *Rural Task Force mission and purpose* (White Paper #1). Retrieved December 24, 2003, from <http://www.wutc.wa.gov>

Rural Task Force. (2000, January 24). *The Rural difference* (White Paper 2).

Retrieved December 24, 2003, from

[http://www.wutc.wa.gov/rtf/rtfpub.nsf/0/4951d0c8d59b2d4d8825687000826423/\\$FILE/Rtfwp2.pdf](http://www.wutc.wa.gov/rtf/rtfpub.nsf/0/4951d0c8d59b2d4d8825687000826423/$FILE/Rtfwp2.pdf)

There is a substantial “rural difference” between the operational scope and markets in the approximately 1,300 study areas served by Rural Carriers and their non-Rural Carrier counterparts. These operational and market distinctions underlie sections of the 1996 Act which explicitly apply different regulatory standards to Rural Carriers for universal service, designating Eligible Telecommunications Carriers, interconnection and competitive entry. Indeed, the fact that the operations of Rural Carriers and the markets they serve are distinct from those of large, urban oriented non-Rural Carriers underlies the rationale for the formation of this Rural Task Force.

While the “rural difference” is generally recognized, it is largely undocumented. White Paper 2 describes data assembled for the first time on a national basis, systematically comparing and contrasting Rural Carriers and non-Rural Carriers. Equally important, the analysis presented here also documents a substantial diversity among Rural Carriers themselves. An understanding of differences between Rural Carriers and non-Rural Carriers, and diversity among Rural Carriers is key to designing appropriate mechanisms and policies necessary to achieve the universal service principles required by the 1996 Act.

Note: PDF version of paper saved in *Rural Telecommunications* Articles and Documents folder under filename, RuralTaskForceWhpap2.pdf. PDF version of Appendix 2 saved as RuralTaskForceWhpap2ap.pdf.

Rural Task Force. (2000, September 29). *Rural Task Force recommendation to the Federal-State Joint Board on Universal Service*. Washington, DC: Federal Communications Commission.

Retrieved February 25, 2003, from

http://www.fcc.gov/Bureaus/Common_Carrier/Notices/2001/fcc01008.txt

Rural Telecommunications Congress. *Rural Telecommunications Congress home page*.

Colorado: Colorado Mountain College. Retrieved June 26, 2002, from <http://ruraltelecon.org/>

"RTC is the national membership organization dedicated to helping rural communities and residents in the United States access the information and support they need to obtain and use advanced telecommunications services, particularly broadband digital communications, for community and economic development" -- RTC Home page. Site includes links to related events around the US, links of interest, grant opportunities, chat room, conference, and other shared documents.

Rural Telecommunications Task Force. (1997, April). *Critical rural considerations regarding joint Board recommendations to the FCC concerning Section 254 of the Telecommunications Act of 1996* (The Rural Policy Research Institute, P97-4). Retrieved from

<http://www.rupri.org/publications/archive/old/telecomm/P97-4.html>

This analysis outlines the RUPRI *Rural Telecommunications* Task Force assessment of the Joint Board's recommendations to the FCC regarding Section 254 of the Telecommunications Act of 1996, and is intended as an overview primer regarding the rural implications of this section. The Task Force limited this assessment to those areas within these recommendations which contain possibly adverse or unintended rural consequences, as well as recommendations

which warrant continuing assessment regarding rural impacts, should such recommendations be implemented.

In future work, it is our intent to draw out these issues and to continue to research, monitor, and provide useful information to the policy development process through ongoing substantive data collection and analysis. These issues will provide the basis for the continuing research agenda of this Task Force, to assure that implementation of Section 254 of this Act takes fully into account an informed understanding of the unique rural implications in providing equitable, affordable access to telecommunications services.

In these analyses, critical rural components of the Joint Board recommendations are listed, followed by an articulation of the issue involved, a brief background overview, and the specific rural concern or consideration which must be addressed in this context.

Rural Utilities Service. (2003). Rural broadband access loans and loan guarantees. *Federal Register*, 68(20), 4684-4692.

The Rural Utilities Service (RUS) is amending its regulations in order to establish the Rural Broadband Access Loan and Loan Guarantee Program as authorized by the Farm Security and Rural Investment Act of 2002 (Pub. L. 101-171) (2002 Act). Section 6103 of the Farm Security and Rural Investment Act of 2002 amended the Rural Electrification Act of 1936, as amended (RE Act), to add Title VI, Rural Broadband Access, to provide loans and loan guarantees to fund the cost of construction, improvement, or acquisition of facilities and equipment for the provision of broadband service in eligible rural communities. This final rule prescribes the types of loans available, facilities financed, and eligible applicants, as well as minimum credit support requirements to be considered for a loan. In addition, the rule prescribes the process through which RUS will consider applicants under the priority consideration and the state allocations required in Title VI.

Sarrocco, C. (2002). *Improving IP connectivity in the least developed countries*. Geneva: International Telecommunications Union. Retrieved from <http://www.itu.int/osg/spu/ni/ipdc/study/Improving%20IP%20Connectivity%20in%20the%20Least%20Developed%20Countries1.pdf>.

Since 2000, each of the 49 Least Developed Countries (LDCs), have had a direct connection to the global Internet. Nevertheless, the number of Internet users in those countries remains extremely modest: in 2000, there were only about 580 000 estimated Internet users in the LDCs, representing less than one per cent of the population and 0.16 per cent of global Internet users. The growth rate is also relatively low, falling from 234 per cent in 1999 to just 56 per cent in 2000, not much higher than the global growth rate, which has been assessed at 49 per cent.

This suggests the existence of certain bottlenecks that are affecting development, notably the lack of infrastructure, unfavorable regulatory environment, high pricing, and uncompetitive market structure. These elements together form what can be called a “vicious circle”, which cannot be broken without decisive intervention on one or more of the above-mentioned elements.

The questions that need to be answered before planning such an intervention are: which elements can be changed? What nature of intervention will be necessary to make a difference? It may not be possible to apply actions directly on the demand for services or change the market structure, and issues of regulatory policy are a matter of national sovereignty, where good advice might not be followed. However the figure below suggests that all the elements are

interconnected and that it could be sufficient to impact one of them in order to influence the evolution of the others.

It is unrealistic to expect significant benefits just from the liberalization of LDCs' Internet market: although a process towards commercialization of the services is necessary, it is not sufficient to ensure that allowing competition telecommunication infrastructures will develop or that end-users will be able to afford Internet services. Some assistance will be necessary, at least for the initial phases of development, as has been the case in most industrialized countries, where telecommunications were still under public monopoly not so long ago and the Internet was subsidized by governments in its early years. Moreover, given that governments of LDCs are not able to invest large sums in telecommunications, an international intervention may be necessary.

Considering that Internet connectivity is a fundamental factor determining Internet access and use, it seems possible to promote Internet growth in the LDC market and overturn the current trend, increasing international Internet connectivity through an internationally funded project. The project could give momentum to other initiatives and could provide the necessary input to LDCs to enable them to sustain their growth independently within a few years.

Sarrocco, C. (2002). Improving IP connectivity in the least developed countries: Breaking the vicious circle. *The Journal of Policy, Regulation, and Strategy for Telecommunications*, 4(3), 14-28.

The Internet, with its requirement for high-quality, high-speed connections, places heavy demands on telecommunication infrastructure. In most LDCs, however, national and international Internet connectivity is in short supply: optical fibres may not be available, satellite links are limited and expensive, and internal telecommunication infrastructures are typically concentrated in a few main cities and present severe shortcomings in rural areas. These obstacles, together with lack of clear telecommunication policies and regulations and an internal market that is often closed to competition, result in a lack of investment and highly-priced services, all of which impede Internet penetration. All the above-mentioned elements are connected, and an intervention on one of them could positively impact on all the others. Improved, low-cost, international Internet connectivity could transform this "vicious circle" in a "virtuous [Internet] circle"?

Saunders, J., Warford, R., & Wellenius, B. (1983). *Telecommunications and economic development*. Baltimore, MD: The Johns Hopkins University Press.

This book reviews the available evidence on the role of telecommunications in economic development, and outlines principles of economic analysis that can be used in allocating telecommunications investment in developing countries and rural and inner-city areas in industrialized countries. It also covers assessment of the effects of investment, pricing and tariff policies, and restructuring the telecommunications sector. This revised edition updates statistical tables and expands material on technology and costs.

Saunders et. al. (1994). *Telecommunication and development*. Second Edition. Washington: World Bank.

Sawhney, H. (1992). Demand aggregation strategies for rural telephony. *Telecommunications Policy*, 16(2), 167-178.

The problematic factor in the economic topography of rural areas is the widely dispersed pockets of demand. Each pocket in its isolation is not sufficient to support the investment required to access it. However, technological developments have opened possibilities for aggregating isolated pockets of demand to a level which is serviceable as a viable market. The Demand Aggregation Model is presented as a conceptual framework for developing innovative network strategies. The model conceptualizes 3 kinds of demand: dispersed, fragmented and latent. This conceptualization suggests that rural demand can be aggregated to commercially attractive levels through innovative network strategies.

Sawhney, H. (1992). Rural telephone companies: Diverse outlooks and shared concerns. *Telecommunications Policy*, 16(1), 16-26.

In rural America the basic telecommunications infrastructure is already in place. The issue is not of building from scratch but of upgrading it. This can be done only through the active participation of more than 1200 small telcos that serve rural America. A better understanding of these companies is clouded by the fact that they have historically been lumped together in the category 'independents'. This article attempts to go beyond the anonymity created by this simple categorization. By taking a closer look at this group it tries to capture the individual characteristics of its membership.

Sawhney, H. (2000). Universal service: Separating the grain of truth from the proverbial chaff. *The Information Society*, 16(2), 161-164.

The prevailing notions of information egalitarianism impel us to seek uniform solutions for all those who lack adequate access to information and communication resources. However, a careful separation of the symbolism of universal service from the real issues reveals that uniform solutions make sense for some resources and not others. This article proposes that uniform solutions should be formulated for resources used in the communication mode, but a segmented approach should be adopted for those used in the information access mode.

Sawhney, H. (2001). Dynamics of infrastructure development: The role of metaphors, political will and sunk investment. *Media, Culture & Society*, 23(1), 33-51.

This article explores how infrastructure networks get created in spite of the uncertainties in their development process. It focuses on the development of the Iowa Communications Network and North Carolina Information Highway, which represent two very different models of state-wide networking.

Schaeffler, J. (2000). Crossing the digital divide. *Satellite Communications*, 24(6), 24.

Although it is claimed that the technological boom transforming life in U.S. cities is also affecting rural areas, the danger of the so-called digital divide remains a real possibility unless competitive satellite-based broadband services find a way into the millions of homes without digital cable, telephony, or wireless cable. U.S. schools must have access to broadband services; it is the first step toward connecting all Americans, be they rural, urban, or suburban. The activities of some companies attempting to address these needs are described.

Schaeffer, P. V., & Loveridge, S. (Eds.). (2000). *Small town and rural economic development: A Case studies approach*. Westport, CN: Praeger.

Contents: An introduction to building community capacity / Cornelia Butler Flora, Vicki Luther -- Capacity building and leadership in Yuma, Colorado / Vicki Luther, Cornelia Butler Flora -- Catalyzing local leadership and infrastructure development / Scott Loveridge, L. Christopher Plein -- The case of the Community Collaborative, Inc. / Rachel B. Tompkins -- Identifying community needs and preferences: community forums as an emerging option / Drew Hyman -- Community well-being and local activeness / Lumane P. Claude, Jeffrey C. Bridger, A.E. Luloff -- Studying a controversial local issue / Beth Walter Honadle -- Introduction: Maintaining and enhancing the community economic base / Scott Loveridge -- Building a healthy retail community: lessons from two towns / David L. Darling -- Local economic and fiscal impacts of a planned retirement community in South Carolina / David L. Barkley, Mark S. Henry -- Failures lead to success in dairy business retention and enhancement programs / George W. Morse, William Lazarus -- Community leadership and vision pay off for Blue Mound, Illinois / Steven Kline -- Developing agricultural and nature-based tourism in eastern Connecticut / Norman K. Bender, Nini Davis -- Recreational and tourism development vs. the decline of agriculture in southern Utah / Don E. Albrecht -- Agricultural processing facilities as a source of rural jobs / F. Larry Leistriz -- Educating for industrial competitiveness and rural development / Stuart A. Rosenfield -- Introduction: Attracting large-scale industry / Peter V. Schaeffer -- Industrial attraction: The experience of the Crawford County (Ohio) Development Board / Greg Davis, Jerold R. Thomas -- Is the city really a growth machine? A case study of Forestville, Alabama / Adrew A. Zekeri -- Economic development agendas and the rhetoric of local community action: locating Mercedes Benz in Vance, Alabama / Ralph B. Brown, Clark D. Hudspeth, Janet S. Odom -- The development by a community and its part ownership of an investor-owned manufacturing plant / David Zimet -- Local capacity and industrial restructuring in the periphery of Belgium and France / Bruno Henry de Fraham, Pierre Dupraz, Beatrice Van Haeperen -- Introduction: public-vs. private-sector roles / Peter V. Schaeffer -- Ua Mau Na Po'e 'O Wai'anae community cultural festival: an experience in community collaboration / Linda J. Cox, Dolores Foley, Joseph Lapilio -- A small town creates new alliances for community and economic development / Steven Kline -- Private cooperation for the public good / Maureen Kilkenny -- Welfare to microenterprise: a community-based approach to sustainable enterprise / Anthony E. Smith -- Developing services in sparsely populated municipalities in Nordic countries / Knut Ingar Westeren -- Introduction: successful rural business / Scott Loveridge -- Adapting to foreign competition: the textile and clothing industry in the Herning-Ikast area of Jutland, Denmark / Sven Illeris -- Fragile virtue: rural labor market response to a new competitive environment / Timothy R. Wojan -- Tale of a successful small business in a rural community / Ram L. Chugh -- The impact of an entrepreneurial business in rural Oklahoma / Mike D. Woods, Tom Seth Smith.

Schechter, P. B. (1996). Customer ownership of the local loop; A solution to the problem of interconnection. *Telecommunications Policy*, 20(8), 573-584.

Interconnection is necessary for competition in telephony, but interconnection agreements are difficult to negotiate. With local service competition, entrants usually cannot duplicate the local loop, so interconnection also involves 'renting' the incumbent's local loops. An incumbent may object to being asked to permit use of its infrastructure by its competitors, in order to allow its competitors to compete with it. If customers own their local loops, however,

the problems of interconnection virtually disappear: customers will determine whose traffic their loops carry, and incumbents will not have to supply competitors with the means of competing with them.

Schement, J. R. (1995). Beyond universal service: Characteristics of Americans without telephones, 1980-1993. *Telecommunications Policy*, 19(6), 477-485.

This paper explores the characteristics of Americans who lack home telephone service by drawing on FCC and Census data covering the period 1980-93. It focuses on groups who have experienced lower than average telephone penetration per household - the elderly, the poor, women and children, blacks and Hispanics, and rural Americans. Income was found to be the single most influential factor in predicting the presence of a telephone in the home, although strong mitigating factors were also identified. Low penetration rates were found among women single heads of households. Low rates were also found among the two minorities studied in comparison with the white majority, even when controlled for income. Finally, the elderly, once thought to suffer from isolation, were found to enjoy higher than average telephone penetration rates. The paper concludes with a brief discussion of lingering questions and proposes considerations for policies that might lead to higher levels of participation.

Schement, J. R. (2001). Imagining fairness: Equality and equity of access in search of democracy. In N. Kranich (Ed.). *Libraries: The cornerstone of democracy*. Chicago, IL: The American Library Association.

Schement, J., & Forbes, S. (2000). Identifying temporary and permanent gaps in universal service. *The Information Society* 16(2), 117-126.

This article examines the nature of the gap in household telephone penetration among Whites, Blacks, and Hispanics. By analyzing historic and current penetration levels of the radio, television, and telephone, it suggests that most information technology gaps are amalgamations of smaller socioeconomic trends and can be discerned and reduced only with careful historical analysis of both technology choices and living patterns. It proposes localized universal service strategies, since the penetration gaps are affected by a complex array of factors more particular to localities than to the country as a whole and as such must be investigated with rigor and caution if progress toward the elimination of penetration gaps is to occur.

Schement, J. R., & Lievrouw, L. (Eds.). (1987). *Competing Visions, complex realities: Social aspects of The Information Society*. Norwood, NJ: Ablex.

This book examines social aspects of information-oriented society in the United States. Each contributor focuses on a specific and significant social aspect of the information-oriented society. Areas covered include: understanding the extent of information work in the United States; analyzing information work in the health care industry; defining information in an information-oriented society; the evolution of the concept of information in the courts; the corporatization and privatization of information in the economy; information and the restructuring of the family environment; information in the rural sector; the emergence of Silicon Valley; and social attitudes and values toward information technology.

Schement, J. R., & Tate, M. A. (2003). *Rural America in the Digital Age: A preliminary assessment of the state of the information/telecommunications infrastructure in ten counties of North Dakota and Pennsylvania*. The Rural Policy Research Institute.

Retrieved from http://www.rupri.org/Telecomm/publications/Schement_RUPRI_paper03.pdf

In this paper, authors examine the conditions under which ten rural counties experience the information age. The paper presents a statistical description of the information infrastructure in each county (five counties in North Dakota and five in Pennsylvania), with the goal of providing a framework for the development of policy research agendas seeking to identify and serve the information needs of rural America.

Schmandt, J., Williams, F., & Wilson, R. H. (Eds.). (1989). *Telecommunications policy and economic development: The new state role*. New York, NY: Praeger.

Written for communications specialists and policy makers, this book is a penetrating examination into the rapidly changing approach of states to telecommunications regulation and planning since the divestiture of AT&T in January 1984. Following a discussion of the major issues surrounding telecommunications regulation and an exploration of the links between telecommunications and economic development, the experiences of nine states are considered in separate chapters.

Schmandt, J., Williams, F., Wilson, R., & Strover, S. (1990). *The New urban infrastructure: Cities and telecommunications*. New York: Praeger.

Traditionally, city governments have played an active role in the administration of public works that were necessary to the economic survival of the community. However, a major element of the new urban infrastructure, advanced telecommunications networks, are developing in such a way that the municipal role in its development is minimal. This book presents new information on the rapidly changing configuration of urban telecommunications. The editors examine important planning data illustrating how major metro areas are dealing with new opportunities in telecommunication. They describe the interplay among current stakeholders in this area: public utility commissions, city planners and service providers, state governments, telecommunications users (especially large businesses), and consumer groups. The book provides case studies of major U.S. cities, one Canadian city, a metropolitan area on the U.S.-Mexican border, as well as smaller cities that have positioned themselves for international economic trade whereby telecommunications will play a major role.

The contributors find that cities need to be more involved in understanding how telecommunications systems are changing and in planning how they can best exploit new opportunities afforded by these systems. They contend that while telecommunication may not cause economic development, it seems to be a necessary condition for it. The book offers clear illustrations of the extent to which business users depend on communications. The ability of business and government to bypass the local carrier has important implications for the public network and for cities in their use of telecommunication.

Schmandt, J., Williams, F., Wilson, R.H., & Strover, S. (Eds.). (1991). *Telecommunications and rural development: A study of private and public sector innovation*. New York: Praeger Publishers.

This study assesses the potential that telecommunications advances hold for rural America and is the outcome of the third in a series of policy research projects into issues relating

Telecommunications Policy and economic development undertaken by research teams of faculty and students at the Lyndon Baines Johnson School of Public Affairs and College of Communication, University of Texas at Austin. All three projects have been concerned with telecommunications at two levels: the effects of telecommunications advances on our economy and society and the policy framework that has resulted from divestiture of AT&T. The first project studied state telecommunication policy and resulted in the publication of *Telecommunications Policy and Economic Development: The New State Role* (Praeger, 1989); the second, which dealt with cities and large telecommunications users, produced *The New Urban Infrastructure: Cities and Telecommunications* (Praeger, 1990). Telecommunications and rural development has been much more frequently researched in Third World countries than in advanced industrialized ones and this volume represents a significant contribution to the literature on the subject.

The findings are divided into four general research areas. Following an introduction, Chapter Two looks at some fascinating telecommunications applications in American rural businesses from Wal-Mart, to traditional rural businesses like the lumber industry, to the opening of new businesses like telemarketing. Chapter Three assesses the use of telecommunication for delivery of public services from the U.S. Department of Agriculture to health care and distance education. Chapter Four asserts that many of the benefits of telecommunications for rural America will only be realized if the small independent or cooperative telephone companies remain healthy and progressive. The substantial contribution to community development, from community revitalization and regional cooperation to infrastructure upgrading, is the focus of Chapter Five. A final chapter offers conclusions. This is required reading for students, scholars, and practitioners in the fields of communications/telecommunications and government.

Schmidt, J. (Ed.). (1997). *Rural infrastructure as a cause and consequence of rural economic development and quality of life* (SRIEG-16 Publication No. 5; SRDC Publication No. 207). Mississippi State University, Southern Rural Development Center. Retrieved from <http://srdc.msstate.edu/publications/207.pdf>

Declining rural communities, fewer jobs, limited access to information and services and out-migration of youth have forced rural America to rethink its future. Future sustainability of rural communities depends in significant measure on their capacity to deploy financial, physical and intellectual assets efficiently and effectively. Communities need to plan for modernization of infrastructure that enhances future development opportunities.

The 1997 session of the Southern Extension/Research Activities Information Exchange Group-16 (SERA-IEG-16) focused on theory, research and educational models pertaining to community sustainability. Educational and research models were presented defining sustainability along with overviews of selected efforts to foster community viability. Papers and ideas discussed at this meeting provided insight into the concept of community sustainability. A model used in Virginia was presented that assists community decision-makers evaluate fiscal impacts of changes in the local economy. Preliminary results and observations of a multi-state Communities in Economic Transition pilot were presented along with a national overview of this National Initiative.

Scope Communications Group. *NUA Internet surveys* [Home page]. Retrieved June 27, 2002, from <http://www.nua.ie/surveys/about/index.html>

Nua.com is an online source for information on worldwide Internet demographics and trends. The Nua "database contains over four years of freely accessible information gathered and collated by Nua, and our weekly editorial articles, which have put topical events into context since 1997" -- NUA home page.

Senkevitch, J. J., Wolfram, D. et al. (1994). *Rural libraries and internetworking: Proceedings of the Internetworking Rural Libraries Institute, held in May 1994 at the University of Wisconsin-Milwaukee*. Metuchen, NJ: Scarecrow Press.

Affording Internet access is a major problem for rural communities. Even though the Clinton administration has pledged support for universal access, the dominant role of the private sector in developing the National Information Infrastructure (NII) is cause for concern among libraries and schools. Options for connectivity include full Internet node, Dial SLIP or PPP access, dial access to a college or university, and dial access to a BBS or commercial Internet provider. Costs for getting access include costs for hardware/software, costs charged by the Internet provider, and costs associated with telecommunications. Concrete suggestions for rural library implementation of access are offered.

Share, P. (1997). Telecenters, information technology and rural development: The Australian experience. *Bulletin of the American Society for Information Science*, 23(6), 23-26.

Compared with the U.S. or the European Union, Australia has done little to develop a specific rural development policy. This results largely from the historical relationship between the federal government and the states. Federal policies toward regional development have oscillated between top-down and bottom-up approaches. The federal government has played a key role in rural community development through provision of telecommunications infrastructure and services. A key challenge is to stimulate interest among rural people in the benefits that might accrue to them through involvement and investment in advanced communication and online technologies. Implementation of the Australian telecenter program is described. A telecenter is a publicly accessible space fitted with a range of computing and communications equipment, including computers, satellite dishes, faxes, scanners, printers, Internet connections, videoconferencing equipment, photocopiers, and other office fittings. Telecenters have sought to realize the positive potential of rural Australia via technology transfer, aggregation of demand, support for small business initiatives, help in attracting additional external funding, agricultural and environmental development, and promotional activity.

Schwartz, G. (1990). Telecommunications and economic development policy. *Economic Development Quarterly*, 4, 83-91.

Scope Communications Group *NUA Internet surveys*. (2002, June 27). Retrieved from <http://www.nua.ie/surveys/about/index.html>

Nua.com is an online source for information on worldwide Internet demographics and trends. The Nua "database contains over four years of freely accessible information gathered and collated by Nua, and our weekly editorial articles, which have put topical events into context since 1997" -- NUA home page.

Sell, R. S., Leistriz, F. L., & Allen, J. C. (1998). Impact of the Telecommunications Act of 1996 for rural areas. *Rural Development Perspectives*, 13(3), 45-48.

The goals of the Telecommunications Act of 1996 include lower prices and higher quality services for customers. However, representatives of small telephone companies are concerned that rural areas will bear the brunt of the costs of a more competitive communications sector but receive few of the benefits. About 90 percent of 127 small telephone companies that responded to a nationwide survey believed that rural customers would benefit very little or not at all from the act's provisions. Rather, they believed the major benefits will accrue to business, high-toll (typically high-volume users), and urban customers, and to large telecommunications companies. State governments and public utility commissions may need to take action to ensure that rural residents have reasonably priced access to advanced telecommunications services.

Senkevitch, J. J., et al. (1994). *Rural libraries and internetworking: Proceedings of the Internetworking Rural Libraries Institute, held in May 1994 at the University of Wisconsin-Milwaukee*. Metuchen, NJ: Scarecrow Press.

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Senkevitch, J. J., & Wolfram, D. (1995). Equalizing access to electronic networked resources: A model for rural libraries in the United States. *Library Trends*, 42(4), 661-675.

The availability of network access could bridge the distance between rural libraries, which usually have a limited access to information, and their metropolitan counterparts. An overview of the current state of networking technology in rural libraries is provided, and a model for educating rural librarians in new technologies that will enhance library service to rural communities is described.

Share, P. (1993). Telecommunications and rural and remote development. *Rural Society*, 3(3), 1-6.

Everybody and her/his dog knows that *The Information Society* is upon us. It is another matter entirely to work out what this is going to mean for ordinary people in the street / paddock / classroom / kitchen / office / factory. The social and economic consequences of the information revolution are only beginning to be explored in a serious way. There is little available which examines the issues from a rural perspective. The reports discussed here are a useful and easily accessible introduction to some of the questions at stake for country people. Heather Hudson suggests that telecommunications may serve as a catalyst at certain stages of the rural development process, becoming particularly important when other innovations are introduced such as improved farming practices, lines of credit, incentives for decentralisation and diversification of the rural economic base. These are the sorts of issues and debates that are intimately tied up with the future of rural Australia. *Telecommunications Policy* and practice incorporates them all: innovation; equity; participation; power; attitudes; employment;

education; privatization; market niches; population change; new technology. Rural Australia has always been significantly shaped by technological change, not least in the field of communications.

Share, P. (1997). Telecenters, information technology and rural development: The Australian experience. *Bulletin of the American Society for Information Science*, 23(6), 23-26.

Compared with the U.S. or the European Union, Australia has done little to develop a specific rural development policy. This results largely from the historical relationship between the federal government and the states. Federal policies toward regional development have oscillated between top-down and bottom-up approaches. The federal government has played a key role in rural community development through provision of telecommunications infrastructure and services. A key challenge is to stimulate interest among rural people in the benefits that might accrue to them through involvement and investment in advanced communication and online technologies. Implementation of the Australian telecenter program is described. A telecenter is a publicly accessible space fitted with a range of computing and communications equipment, including computers, satellite dishes, faxes, scanners, printers, Internet connections, videoconferencing equipment, photocopiers, and other office fittings. Telecenters have sought to realize the positive potential of rural Australia via technology transfer, aggregation of demand, support for small business initiatives, help in attracting additional external funding, agricultural and environmental development, and promotional activity.

Shields, P., Dervin, B., Richter, C., & Soller, R. (1993). Who needs 'POT-plus' services: A comparison of residential user needs along the rural-urban continuum. *Telecommunications Policy*, 17(8): 560-587.

US policy makers are debating the upgrading of the public switched telecommunications network (PSTN) with little or no empirical evidence concerning residential users' use of POTS-plus services. A study compared residential user needs along a rural-urban continuum in Ohio, guided by 2 critical assumptions: 1) Urban and rural residential users alike will desire the same POTS-plus - other than the plain old telephone - products and services. 2) Residential users will be interested mainly in those products and services supplied or delivered by the LECs over the upgraded PSTN. Using Dervin's actor-centered, sense-making methodology, quantitative and qualitative results were generated that illuminate the complexity of the telecommunications needs of urban and rural users. Little evidence is found to support the claim that the US is being polarized in terms of telecommunications haves (urban) and have nots (rural). The findings suggest there is little interest among residential users for POTS-plus services.

Shuler, J. A. (1999). A critique of universal service, E-rate, and the chimera of the public's interest. *Government Information Quarterly*, 16(4), 359-369.

This essay argues that Federal Communication Commission's implementation of the universal service requirements mandated by federal law fails to meet any measurable means of reducing the gap between the information haves and have-nots. It is primarily an information poverty reduction program. Introducing the idea of community-based universal service, along with a federally-funded entitlement program for specific local and state organizations, introduces several unsettling and untested aspects to the social equity equation. Gathering better measurements about participants in the program and specific research directions could go a long

way toward reducing this uncertainty.

Sieghart, P. (1981). The international implications of the development of microelectronics. *The Information Society*, 1(1), 1-15.

Silverstein, K. (1999). Technology crops up in rural America. *Utility Business*, 2(7), 55-60.

The telecommunications revolution is sprouting in rural America. New services created to win over urban customers are finding their way into smaller communities. And the growing promise of wireless communications is likely to further spread the benefits of new technology. Congress committed in the 1996 Telecommunications Act to deregulating the telecommunications industry and ensuring rural Americans continued access to modern technology. Lawmakers reaffirmed their commitment to the universal service provisions of the Communications Act of 1934, which assures that there is quality phone service at affordable rates for all Americans, no matter where they live. Essentially, the government has kept that promise by giving rural carriers a subsidy, which, when combined with access charges against other telephones that use their exchanges, accounts for 2/3 of their revenue. The Federal Communications Commission is equally committed to spurring competition in rural communities.

Simpson, L., Daws, L., Pini, B., & Wood, L. (2003). *Rural telework: Case studies from the Australian outback*. *New Technology, Work, and Employment*, 18(2), 115-26.

This paper examines the effects of infrastructure and isolation on rural telework, and the potential of telework for rural communities. It draws on findings from two Australian case studies: a government initiative and a community-initiated training project. Differences between the experiences of rural and urban teleworkers are highlighted.

Skogerbo, E., & Storsul, T. (2000). Prospects for expanded universal service in Europe: The cases of Denmark, the Netherlands, and Norway. *The Information Society*, 16(2), 135-146.

In Europe, universal service developed within a public-service-oriented institutional framework. The historical conflicts that produced these institutional arrangements are still important for national policymaking. Furthermore, the level of technological development and integration in the European Union forms the context in which decisions concerning universal service are made. Our analysis of telecommunications policies in three small European countries - Denmark, the Netherlands, and Norway - shows that business actors are well networked and press for a minimal definition of universal services, whereas those actors promoting an extended definition seem to be less coordinated and therefore less successful. Hence it is unlikely that universal services will be defined more extensively in the future.

Slafky, A. (1999). Senator Byron Dorgan: A rural crusader on Capitol Hill. *Rural Telecommunications*, 18(6), 14-18.

Senator Byron Dorgan is a tenacious legislator who, throughout his career, has shown unflagging support for the people of rural America - and for small independent telcos. Dorgan is now fighting to ensure that rural Americans are not bypassed by the newest vehicle on the information superhighway: broadband. Dorgan fears that if advanced services are not supported through the universal service fund, the country will become a country of haves and have nots with respect to telecommunications ability, and that will predetermine what part of the country

has economic opportunity and development. While he considers it very unlikely that Congress will perform a major legislative revisit of the Telecommunications Act, Dorgan expects Congress to play a big role in the buildout of broadband services, particularly to rural areas.

Sloan, T. (1998). The Communication Act of 1934 and the promotion of local exchange competition. *Federal Communications Law Journal*, 50(2), 310-416.

The overriding goal of the Telecommunications Act of 1996 is to promote competition in all telecommunications markets. Section 271 of the Act addresses competition in the local telecommunications market. This section provides that, with appropriate competition in the local exchange market, Bell Operating Companies shall be allowed to offer in-region, interLATA services. Although Bell Operating Companies have applied to offer such services, the FCC has yet to grant a section 271 application. Through these denials, the Commission has begun to construe the frequently ambiguous text included in Track A and Track B of section 271. A further understanding of the section's Track A and Track B requirements is provided through a thorough examination of the text and legislative history. Obviously, section 271 is essential to Bell Operating Company entry into in-region, interLATA service. However, the Commission's evaluation of applications should include a forward-looking assessment of a prospective entry's effect on competition in a given local telecommunications market.

Smith, R. (2000, October 2). Overcoming regulatory and technological challenges to bring Internet access to a sparsely populated, remote area: a case study. *First Monday*, 5(10). Retrieved February 16, 2001, from http://www.firstmonday.org/issues/issue5_10/smith/index.html

Discusses the South African government's launch of a drive to provide "Telecentres" to communities and Internet access to schools, and particularly establishment of a Telecentre in Manguzi, a remote town in the KwaZulu Natal province; proposes that existing methods were insufficient in providing connectivity to such a remote area; since 1998.

Sorana, V. (2000). Auctions for universal service subsidies. *Journal of Regulatory Economics*, 18(1), 33-58.

The Telecommunications Act of 1996 requires that telephone service be available in high-cost areas at rates that are "affordable" and "reasonably comparable" to those charged in low-cost areas. It also requires that carriers serving high-cost areas at below-cost rates be compensated with explicit and sufficient subsidies. This paper analyzes an auction mechanism for the allocation of such subsidies. It shows that in a wide range of circumstances auctions are more efficient than traditional subsidy schemes. It also shows, however, that auction designs aimed at stimulating competition among several subsidized carriers may be particularly vulnerable to collusion.

Southern Growth Policies Board. *Southern Growth Policies Board* [Home page]. Research Triangle Park, NC: The Author. Retrieved December 21, 2003, from <http://www.southern.org/>.

"Mission: Southern Growth Policies Board is a non-partisan public policy think tank based in Research Triangle Park, North Carolina. Formed by the region's governors in 1971, Southern Growth Policies Board develops and advances visionary economic development policies by providing a forum for partnership and dialog among a diverse cross-section of the region's governors, legislators, business and academic leaders and the economic- and community-development sectors. This unique public-private partnership is devoted to

strengthening the South's economy and creating the highest possible quality of life" (About Southern Growth Policies Board, <http://www.southern.org/main/about.shtml>).

Southern Rural Development Center. (1999-). *Southern Rural Development Center -- Welcome!* [Home page]. Mississippi State, MS: The Author. Retrieved June 27, 2002, from <http://srdc.msstate.edu/>

"The Southern Rural Development Center (SRDC) has served the twenty-nine Land-Grant institutions of the thirteen Southern states, Puerto Rico, and the Virgin Islands since 1974. SRDC is one of four regional rural development centers supporting research and extension efforts to improve the lives of people living in non-metropolitan areas of the United States" -- SRDC home page. The site includes links to information about the SRDC, grant opportunities, RD research and education resources, land-grant contacts, SRDC publications and a wide array of other resources related to rural development.

Srinivasan, N., & Han, S. (2000). Facilitating the delivery of justice services to rural and remote communities. *International Review of Law, Computers, & Technology*, 14(2), 235-241.

There are many projects that facilitate the delivery of services to various cyber communities around the world. The major projects concentrate on helping the building up of these cyber communities and facilitating the training and awareness raising of these communities. The communities are educated on the use of technology and the importance of using Internet and multimedia based technology to enhance some or a few aspects of their lives. The delivery of health and justice related services require the development of overall technology infrastructure that incorporates the use of existing and planned telecommunications developments for remote and rural communities. The facilitation required for the delivery of these services to remote and rural areas requires that the government and private sector cooperate to provide the necessary environment. In the developed world this has been achieved by the governments providing generic funding for the advancement of the telecommunication carriers that in turn provide the infrastructure development to rural areas. In the developing world, the issues are very different and there is currently aid related funds being channeled to improve the telecommunication barriers faced by these countries. This paper attempts to outline a model to deliver justice services to remote and rural communities. The infrastructure issues that help to deliver such services effectively and an evaluation format for such a project will be outlined. The training issues involved in such a project will also be discussed. The paper will identify factors that help to provide these services to a larger proportion of the rural population.

Staihr, B. K. (2000). *Discussing the digital divide* [Videocassette tape]. Lincoln, NE: University of Nebraska, Cooperative Extension.

Brian K. Staihr, Senior Economist at the Center for the Study of Rural America, Federal Reserve Bank of Kansas City, defines "digital divide" and discusses the existence, or lack, of information and communication technology in the United States. Staihr then focuses on rural communities, outlining how the lack of a broadband infrastructure may limit the growth of business and services in these communities, while providing examples of Midwest communities benefiting from the presence of advanced technologies. Staihr also summarizes current legislation related to broadband access.

Staihr, B., & Novack, N. (2001, February). *The Success of the E-rate in rural America*. Kansas City, MO: Federal Reserve Bank of Kansas City. Retrieved February 25, 2003, from <http://www.kc.frb.org/RuralCenter/mainstreet/MainSt2001.htm>

Stammen, R. M. (1994). *Governance issues: State Educational Telecommunications Council*.

This paper describes North Dakota's distance-education telecommunications infrastructure, and examines the opinions of school administrators about technology needs, usage, and funding. In North Dakota, every school district has access to a computer-mediated telecommunications network, SENDIT, which is bridged to Internet connections through the statewide higher education network. The state government is currently installing a telephone interconnect system with nodes at county seats in order to increase capacity and speed for transferring data at rural locations and solve access problems due to overload. In addition, the 11 colleges and universities and a third of the secondary schools currently provide interactive video with two-way audio and multimedia capabilities. Also, three satellite uplink systems have been approved in the state. A 1993 survey of school district administrators was conducted to address problems about network connectivity and constituency concerns deemed important to members of the state's Educational Telecommunications Council. A 1994 in-depth follow-up study conducted by outside consultants attempted to resolve previously identified issues. Results of the two studies indicate strong statewide support for the university-based interactive video network as a means of expanding curricular offerings of rural and small schools. Included are the consultants' recommendations about telecommunications technological, infrastructural, and institutional alternatives and the underlying structural and organizational make-up of the Educational Telecommunications Council itself. A listing of course offerings over the High School Fully Interactive Television Networks in North Dakota and maps showing network structure and coverage are attached. (RAH)

State Science & Technology Institute (SSTI). (2002). *SSTI home*. Westerville, OH: The Author. Retrieved June 25, 2002, from <http://www.ssti.org/>

"SSTI is a national non-profit organization dedicated to improving government-industry programs that encourage economic growth through the application of science & technology. As the most comprehensive resource available for those involved in technology-based economic development, SSTI offers the services that are needed to help build tech-based economies" -- SSTI home page.

Stauber, K. N. (2001, Second Quarter). Why invest in rural America--and how? A critical public policy question for the 21st century. *Economic Review - Federal Reserve Bank of Kansas City*, 86(2), 57-.

"Public policy in rural America must produce three societal benefits: 1. Survival of the rural middle class, 2. reducing concentrated rural policy, 3. Sustaining and improving the quality of the natural environment. Five reasons to invest in rural America are given. They are: 1. To protect and restore the environment, 2. To produce high-quality, de-commodified food and fiber, 3. Rural America is a laboratory of social innovation, 4. To produce healthy, well-educated future citizens, and 5. To maintain population distribution and prevent overcrowding" (ProQuest abstract).

Subjects: Public policy; Rural development

Stenberg, P. L. (2002, June-July). Communications & the Internet in rural America. *Agricultural Outlook*, 292, 23-26.

Stenberg, P. L., Rahman, S., Perrin, M. B., & Johnson, E. (1997). Rural areas in the new telecommunications era. *Rural Development Perspectives*, 12(3), 32-39.

The new Telecommunications Act, enacted in 1996, was the first comprehensive rewrite of the Communications Act of 1934 that had ushered in an era of universal phone service for rural areas. The 1996 Act's provisions fall into five major areas: telephone service, telecommunications equipment manufacturing, cable television, radio and television broadcasting, and the Internet and online computer services. All these provisions will affect rural areas, but universal service is the most critical. Without the universal service provision rural areas may rapidly fall behind urban areas. In May 1997, the Federal Communications Commission enacted regulatory provisions for universal service.

Stephens, G.M. (1990). Funding telecoms in the developing world. *Satellite Communications*, 14(10), 14-16.

A lack of telecommunications facilities in developing countries is driving investment in private satellite networks. Unlike local PTTs, the businesses that locate in those countries have the money for telecommunications. Sometimes, an entire country can be pushed to upgrade its telecommunications facilities because of business investment in private networks. Increasingly, developing countries are realizing that telecommunications can spur economic development. Some PTT enterprises are not in very good shape operationally or economically. In Argentina, a privatization effort is under way. That country has about a 20% completion rate on telephone calls. A low completion rate makes it difficult to attract money for privatization. Private capital is available in Africa only if it is fully guaranteed by the US Agency for International Development.

Stevenson, T. (1991). Telecommunications development in Asia-Pacific: The case for a new Australian role. *Telecommunications Policy*, 15(6), 485-490.

This article describes the role of Australia in economic cooperation and telecommunications development in the Asia-Pacific region, particularly Asia. Australia's economic imperative focuses on north-east Asia while targeting markets for telecommunications in the relatively poorer nations of south-east Asia. A new role is advocated for Australia to take the Asia-Pacific Economic Cooperation forum it instigated beyond the purpose of economic cooperation directly into the cultural and human realm. Australia is challenged to use the new communications technologies to facilitate an active, shared learning process which could move Asia-Pacific into a new global order. A case is put for research on the use and impacts of the new telecommunications technologies in the service of humankind.

Stiglitz, J. E. (1986, February). The new development economics. *World Development*, 14(2), 257-165.

The theory of Ru organization based on raional peasants in environments where information is imperfect & costly provides a simple explanation for a wide variety of phenomena in less developed countries. It provides insights into both why sharecropping is so widespread & why it takes on the forms that it does, an explanation of the interlinkage of credit & land markets, & of cost sharing. It is argued that this theory provides a better explanation of these phenomena

than do the competing theories; criteria by which to evaluate these other theories are provided. This theory can be viewed as an important application of a more general paradigm, the "imperfect information paradigm," which has been useful in explaining economic phenomena under a wide variety of settings: under competition, oligopoly, & monopoly; in labor markets, capital markets, insurance markets, & product markets; & in developed & less developed countries.

Descriptors: Developing Countries; Rural Development; Economic Development

Identifiers: development economics, rural organization theory;

Stolfi, F., & Sussman, G. (2001). Telecommunications and transnationalism: The polarization of social space. *The Information Society*, 17(1), 49-62.

This article critically assesses the policy orientation, social impacts, and linkages of telecommunications in the United States within a government deregulated policy environment and an increasingly globalized economy. Deregulation has been driven by both ideological and technological demands, stemming from several political and economic transformations in the world economy, the collapse of state socialism in eastern Europe and the former Soviet Union, and greater oligopolistic competition among transnational corporations. An expanded infrastructure of new digital information and communications technology (ICT) is the foundation of a worldwide political economic regime of accumulation. ICT increases command and control capabilities of large corporations, together with the mobility and liquidity of capital, making it essential to the restructuring of the world economy, the new international division of labor, and the creation of global "information city" networks. At the same time, government deregulation and rapid technological change are associated with a number of spatial, economic, and social dualisms.

Strategic Networks Group. (2003, June 27). *Economic impact study of the South Dundas Township fibre network*. United Kingdom: United Kingdom Department of Trade and Industry.

Strategy Research Group. (2001). *2001 Latin American market planning report*. Miami, FL: Author.

Biennial report, for 2001, presenting detailed consumer market data, and selected general indicators and media information, for 19 Latin American countries (Argentina, Bolivia, Brazil, Chile, Colombia, Costa Rica, Dominican Republic, Ecuador, El Salvador, Guatemala, Honduras, Mexico, Nicaragua, Panama, Paraguay, Peru, Puerto Rico, Uruguay, and Venezuela). Data include the following:

a. Population and households: total, urban, and rural population, 1990-2050; population density, 2000; population growth rate, 1990-2050; population of major metro areas, 1995-2015; population distribution by age and sex, and percent of population age 19/younger vs. age 64/older, 2000 and 2050; average household size, 1990-2050; and distribution of households by size, 2000.

b. Socioeconomic strata: households and buying power (total, urban, rural, and major metro areas), for 4 socioeconomic classifications based on education, occupation, and ownership of consumer goods, 1998-2000.

c. Urban buying power and consumption patterns: average and total buying power for urban households, by expenditure category (food, clothing, housing, furnishings, health care, transportation/communication, leisure/education, and other), 2000.

d. Economic indicators and foreign trade: exchange rate, urban unemployment rate, and 3 main trading partners ranked by share of exports and imports, 2000; nominal GDP, per capita GDP, real growth rates for GDP and wages, and inflation rate, 1995-2000; GDP shares by component, 2000; and value of exports and imports, worldwide and for bilateral trade with U.S., 1995-2000.

e. Media, telecommunication, and computers: radio receivers, television sets, and daily newspaper circulation, 1995 and 2000; and telephones, mobile phones, fax machines, personal computers, and Internet hosts, all per 1,000 population, 1998.

f. Miscellaneous population characteristics: dependency ratio, life expectancy, poor urban households and poverty in urban areas, population distribution by religion and ethnic group, student population (primary, secondary, and tertiary levels), and illiteracy rate, 2000.

Strover, S. (2000). The first mile. *The Information Society*, 16(2), 151-154.

This article argues that the current universal service policies fail to appreciate first-mile issues, that is, how connectivity looks, feels, and behaves from the subscriber's perspective. For individuals and households, connectivity is not just merely a stretch of wire but an important connection that takes them out to a broader world, encapsulating network interface devices, the software, and training, as well as incentives to create content and contribute to the community. Universal service should represent the sum total of the capabilities that extend users into the networked nation, rather than just a "last-mile" collection of vendor-related concerns and constraints.

Strover, S. (2001). Rural Internet connectivity. *Telecommunications Policy*, 25(5), 331-347.

Examines Internet connectivity in rural regions, "... looking specifically at four states in the US. Access to the Internet has assumed new significance for commercial and political reasons, and remote and sparsely populated areas typically lack the telecommunications infrastructure for reliable and fast Internet connections. Even as government programs such as the federal E-rate provisions bring Internet connectivity for institutions such as schools and libraries under the government's universal service umbrella, more general Internet access to a broader community constituency has not been addressed within policy circles. Even the deployment of so-called "national" Internet services favors urban regions."

Strover, S. (2001, July). *Rural implications of H.R. 1542: The Internet Freedom and Broadband Deployment Act of 2001* (PB2001-12). The Rural Policy Research Institute (RUPRI). Retrieved from <http://www.utexas.edu/research/tipi/Reports/PB2001-121.pdf>

This policy brief examines some of the issues that H.R. 1542 raises for rural communities. The five possible impact of H.R.1542 on broadband service in rural areas must be addressed: 1) What would be H.R. 1542's effect on the number of providers operating in rural regions, as well as on the general availability of high speed services? 2) What might be the effect of the unbundling provisions on services in rural areas? Specifically, how would the remote terminal exception influence services in rural areas? 3) What are the implications of the unbundling provisions for new entrants, as well as for incumbent rural telephone companies? 4) H.R. 1542's premise is that more competition and consumer choice in broadband services are valuable. How might the bill affect the range of providers serving an area and the mix of services available? 5) What are the rural cost and affordability implications of the bill? It concludes, 1) Evidence from local competition statistics suggests that the current requirements of Section 271 may contribute to improved competitive behavior in those states that have met the Section's

mandates. 2) The elimination of competitive access to remote terminals will disproportionately affect services to rural populations, eliminating would-be competitors who might wish to provide services using such terminals. Only the incumbent would be able to use those facilities. New competitors would face the burden of creating their own facilities to reach customers, a difficult, expensive prospect for young companies.

3) The broader limitation on the current unbundling policies (and the abandonment of the 14-point checklist as a guarantee that incumbents' networks are open to competitors) may speed up the BOCs' investment in facilities serving rural areas, but there is no mandated obligation in H.R. 1542 to do so. However, there is a five-year timetable under which the BOCs must ensure that all of their central offices "attain high-speed data capability." The definitions of this capability are limited to lines within approximately three miles of a central office. Thus, rural areas beyond those locations still would not necessarily have access to broadband connections. 4) Rural telephone companies have been exempt from the unbundling requirements, but under H.R. 1542 they would have to conform to the high-speed data services resale provisions for three years. This could create interim competition for broadband services, a plus for consumers. 5) Finally, given the costs of subscribing to broadband services and the relatively lower income levels of rural populations, rural populations may be poorly equipped to take full advantage of broadband networks. There is nothing in H.R. 1542 that addresses these serious rural affordability issues.

Strover, S. (2002). *The prospects for broadband deployment in rural America*. Austin, TX: University of Texas.

"The 1996 Telecommunications Act promises through its universal service provisions that telecommunications services will be roughly comparable across urban and rural areas, but the rapid development of new Internet-based services and the networks on which they depend illustrate huge discrepancies in broadband availability. This paper analyzes some of the programs and policies that claim to address this network divide, using existing data to comment on their efficacy. These analyses suggest that the prospects for near-term broadband services in rural region[s] are dim, and that the existing policy approaches appear insufficient to achieve the goal of widespread rural deployment."-- p. 1.

Strover, S. (2003). The prospects for broadband deployment in rural America. *Government Information Quarterly*, 20, 95-106.

Note: Article printed out & also saved as PDF file (File name: strovers2003.pdf).

"A great deal of policy attention over the past two years has been directed at insuring that more communities within the country have access to high speed or "broadband" connections. The 1996 Telecommunications Act promises through its universal service provisions that telecommunications services will be roughly comparable across urban and rural areas, but the rapid development of new Internet-based services and the networks on which they depend illustrates huge discrepancies in broadband availability. This paper analyzes some of the programs and policies that claim to address this network divide, using existing data to comment on their efficacy. These analyses suggest that the prospects for near-term broadband services in rural region are dim, and that the existing policy approaches appear insufficient to achieve the goal of widespread rural deployment." (Copyright Elsevier Inc. All rights reserved).

Strover, S., & Berquist, L. (1999, November). *Telecommunications infrastructure development: The state and local role* (P99-12). Columbia, MO: The Rural Policy Research Institute. Retrieved from <http://www.rupri.org/publications/archive/reports/1999/P99-12/index.html>

The project explores the initiatives of states and local municipalities that promote the development of advanced telecommunications infrastructure for their citizens, businesses, and institutions. It examines state and local initiatives that bear on the circumstances influencing competition for telephone-based voice and data services, particularly as they bear on rural areas and providers.

The aim of the study is to identify the evolving roles of state and local government in fostering advanced telecommunications infrastructure. In particular, the study hopes to highlight innovative programs at the state level that 1) promote competition through alternative regulation, or incentive programs to encourage competition 2) sustain universal service through the emerging state universal service funds, and 3) enhance rural telecommunications infrastructure with targeted funds or special rural initiatives.

This research identifies the emerging role of state and municipal governments in developing innovative telecommunications infrastructure through using city-owned telecommunications networks, leveraging existing utility networks, or creating public-private partnerships.

Strover, S., & Berquist, L. (2001). Developing telecommunications infrastructure: State and local policy collisions. In Communications policy in transition. In B. M. Compaine, B. M. & S. M. Greenstein (Ed.), *Communications policy in transition: The Internet and beyond* (pp. 219-240). Cambridge, MA: MIT Press.

Strover, S., Oden, M., & Inagaki, N. (2002?). *Telecommunications and rural economies: Findings from the Appalachian region*. Austin, TX: University of Texas.
Note: Paper printed out.

Strover, S., & Williams, F. (1991). *Rural revitalization and information technologies in the United States*. Research report prepared for the Aspen Institute and Ford Foundation.

Sullivan, R. J. (2000). *Financial industry perspectives: How has the adoption of Internet banking affected performance and risk in banks?* Kansas City, Federal Reserve Bank of Kansas City: pp. 1-16.

Article examining the impact of Internet banking on the financial performance of 10th district banks, 1999-2000.

Summers, G. F., & Branch, K. (1984). Economic development and community social change. *Annual Review of Sociology*, 10, 141-166.

"There is growing recognition that economic development in advanced industrial societies involves massive capital migration from one industrial sector to another. Economic development is a continual process of opening new areas, spatially & sectorally, while closing others. Development projects in Ru communities provide a laboratory in which to learn how the restructuring of advanced industrial societies affects local social structures. In a review of what has been learned from studies of communities coping with Ru industrialization & natural resource development, especially large-scale projects, particular attention is given to changes in

employment patterns, income, population, agriculture, local businesses, & public sector costs & revenues. The findings reveal an underlying tension between the free movement of capital, on the one hand, & community stability & worker welfare, on the other. It is concluded that local social changes are integral elements of external processes of economic development. They may be understood by directing attention to the spatial patterns of social, economic, & political inequality, & to the mechanisms that generate & sustain unevenness." 186 References. AA. (Sociological Abstracts).

Descriptors: Community; Social change; Rural; Development; Economic; Capital

Identifiers: community social change; rural economic development, spatial/sectoral capital migration; literature reviewed

Classification: Community/regional development; sociology of communities & regions

Sundet, P. A. (1985, fall). U.S. rural development acts and their impact on reduction of rural poverty: A Policy analysis. *Social Development Issues*, 9(2), 104-118

It is argued that individual policies inherent in the US Rural Development Acts since the 1960s can be grouped into four general categories: "industrial emphasis," which stresses the implementation of Ru industries to lower unemployment; "natural drift," which emphasizes laissez-faire economics to increase competition; public employment; & direct transfer of funds to supplement state programs. Benefits & problems associated with each category are discussed, & direct transfer policies are suggested as an alternative to the current industrial development thrust. The impact of the strategy chosen on social workers concerned with Ru social problems is assessed. 6 Tables, 37 References.

Descriptors: United States of America; Rural Poverty; Development Programs

Identifiers: rural development policies, US; post-1960s;

Swartz, N. (2000). Tax boost for broadband. *Wireless Review*, 17(9), 10.

The *Rural Telecommunications Modernization Act* was introduced in March 2000 to encourage providers to expand broadband services in rural areas and help close the digital divide. Broadband technology enables high-speed Internet access in rural areas, but to date, providers have shied away from the technology in rural areas because of the high costs involved. The new bill offers a 10 percent tax credit per year for 3 years to any provider that invests in rural broadband facilities providing high-speed service.

Taylor, J., & Williams, H. (1990). The Scottish Highlands and Islands Initiative: An alternative model for economic development. *Telecommunications Policy*, 14(3), 189-192.

In the UK, the incipience of market-led decision-making criteria bears witness to the organizational and regulatory changes that have characterized *Telecommunications Policy* since the early 1980s. The Scottish Highlands and Islands Initiative (H&II) provides a case study in the synthesis of telecommunications, information, and economic development policies. The H&II is a partnership between British Telecommunications NE (Scotland) District and the Highlands and Islands Development Board (HIDB). The modernization of the telecommunications network infrastructure under the H&II is focused on 2 interrelated strategies designed to reduce the cost of operating the network in the HIDB area: 1. the modernization of 43 telephone exchanges and the provision of digital main switching centers in Inverness and Lerwick, and 2. the upgrading and modernization of the junction network with either fiber-optic or digital radio technologies.

Telecom development. (2000, September-October). *Telecommunications Policy*, 24(8-9), 635-794.

Tennessee Regulatory Authority. (2000). *Tennessee's digital divide*. Retrieved 2002 from <http://www.state.tn.us/tra>

Thompson, C. S. (2002). Enlisting on-line residents: Expanding the boundaries of e-government in a Japanese rural township. *Government Information Quarterly*, 19(2), 173-188. Retrieved December 22, 2003, from the ScienceDirect database.

Tobin, J. M., & Wand, M. E. (1998). Competition in local telephone services: California's experience in implementation of the Telecommunications Act of 1996. *Administrative Law Review*, 50(4), 791-817.

The Telecommunications Act of 1996 established a strong national policy of competition in all telecommunications service categories and markets, including telephone services. California's experience in the implementation of this act is discussed.

Tomas Riveria Policy Institute. *The Tomas Rivieria Policy Institute* [Home page]. Retrieved June 27, 2002, from <http://www.trpi.org/dss/itstats.html>

"The Tomás Rivera Policy Institute conducts and disseminates objective, policy-relevant research and its implications to decision makers on key issues affecting Latino communities" -- Tomas Riveria Policy Institute home page. The Institute's major areas of research include political and social issues, economic well-being, education, and information technology.

Tomlinson, J. E. (2001). *Cybercitizens of the Commonwealth: How rural and urban Pennsylvanians access and use the Internet*. Harrisburg, PA: Center for Rural Pennsylvania.

Torero, M., Chowdhury, S. K., & Galdo, V. (2003). Willingness to pay for the rural telephone service in Bangladesh and Peru. *Information Economics and Policy*, 15(3), 327-361.

This paper measures rural households' willingness to pay (WTP) for access to public telephone services in Bangladesh and Peru through contingent valuation methods. The paper utilizes both parametric and nonparametric estimations. The main result of the paper suggests that *Rural Telecommunications* projects are welfare enhancing, since households' WTP are higher than the prevailing tariff rates. This result holds under the different parametric and non-parametric measures used and is consistent with the multiple benefits that rural households obtain with the access to a public telephone service. These central tendency measures, parametric and nonparametric, may be used in the cost benefit analysis (CBA) of the rural telephone project.

Trincherro, M. P., & Smith, H. R. (1999). Federal preemption of state universal service regulations under the Telecommunication Act of 1996. *Federal Communications Law Journal*, 51(2), 303-347.

With the passage of the Telecommunications Act of 1996, Congress revamped federal universal service policy by requiring that universal service support be explicit. The Act also provides that states can supplement federal universal service support with state universal service support. However, under section 254(f) of the Act, state programs must not be inconsistent with the FCC's rules for implementing the Federal Plan. Section 254(f) provides for express

preemption of state universal service plans but uses FCC rules as a measure for determining when preemption is required. As a result, the case law governing express preemption by Congress is in and of itself an insufficient guide for determining the scope of the section 254(f) preemption power. To interpret section 254(f), case law governing preemption of state law by the FCC must also be incorporated. Thus, a three-pronged test is required to determine whether a state universal service plan is preempted by section 254(f).

Trinkwon, D. (1997). Technology of fixed wireless access. *Telecommunications Policy*, 21(5), 437-450.

The ability of different wireless technologies to co-exist within a single geographic area, owned and operated by different service providers with relatively simple sharing arrangements for common infrastructure is one of the key aspects that makes wireless technology a valuable addition to the universal service concept--in fact it can change the fundamental assumptions embodied within traditional approaches to universal service. This paper examines the challenge that operators and regulators have in providing telecommunications services, especially to smaller communities, and the role that Wireline Equivalent Fixed Wireless Access systems can play.

Tscheschlok, C. (2001). *Rising to meet the digital challenge in rural communities: A growing divide?* Macomb, IL: Western Illinois University.

Reports upon Digital Divide-issues as they pertain to rural areas of the US.

Tweeten, L. (1987). No great impact on rural areas expected from computers and telecommunications. *Rural Development Perspectives*, 3(3). 7-10.

Ullman D., Williams, S., & Emal, J. (1996). Using technology to stimulate rural economic development: Nebraska's community Internet navigator program. *Economic Development Review*, 14(1), 14-15

In order for rural Nebraska communities and businesses to effectively utilize the new Internet electronic information resource, it seemed clear that the first step was to develop a pilot program which would combine Nebraska's existing capabilities with an innovative training and delivery system in which rural communities could play a major role, and comfortably maintain. Nebraska's Community Internet Navigator Program was the result of a cooperative effort of individuals in the state's development agency, the University of Nebraska-Lincoln, and Nebraska communities that were willing to share part of the cost and lend some effort to the new initiative. The approach was to identify university students who were planning to return to their rural communities during the summer and who already knew or were willing to learn how to utilize the Internet to find economic development information that could benefit their community. As a result of the 1994 Community Internet Navigator Program, a number of Nebraska communities have contacted the Nebraska Department of Economic Development and the Institute of Agriculture and Natural Resources about involving their community and expanding the program.

Understanding the digital divide. (2001). *OECD Observer*. Paris: Organization for Economic Co-operation and Development.

Telecommunication access paths are the basic symptom of the digital divide. Competition is the road to access. With liberalization, access prices are dropping. Liberalization is also

leading to lower bandwidth prices. At the same time, Internet access prices are declining and numbers of Internet hosts are rising rapidly worldwide. However, differences among OECD countries remain large. For example, statistics shows that countries with unlimited Internet access stay on line longer. Income and education is an important determinant of PC penetration and Internet access. Furthermore, Family structure, age, and gender make a difference as well. An ethnic divide is also apparent; English is the main language of the Internet; urban homes are more connected than rural ones, and firm size is important for Internet access. For addressing the digital divide, cable, satellite, and digital TV may be a means of diminishing the digital divide. Mobile telephony offers another potential route for access.

Ungar, Bernard L. (2003, September 4). *Facilities location: Progress and barriers in selecting rural areas and using telework: Testimony before the Committee on Small Business, House of Representatives : Statement of Bernard L. Ungar, Director, Physical Infrastructure Issues*. Washington, DC: Author. Retrieved from <http://www.gao.gov/new.items/d031009t.pdf>.

Note: Testimony printed out.

“The location of an organization's facilities has far reaching and long-lasting impacts on its operational costs and ability to attract and retain workers. The Rural Development Act of 1972 has required federal agencies to give first priority to locating new offices and other facilities in rural areas. Rural areas generally have lower real estate and labor costs, but agency missions often require locations in urban areas. Telework, also called telecommunicating or flexiplace, is a tool that allows employees to work at home or another work location other than a traditional office. Benefits of telework include reducing traffic congestion, improving the recruitment and retention of workers, and reducing the need for office space. Telework could allow federal workers who live in rural areas to work in or near their homes, at least some of the time. This testimony summarizes and updates work GAO has previously done on the progress in and barriers to the federal government's efforts to locate its operations and workers, when possible, in rural areas” (p. [1]).

Universal Service Administrative Company. (2001). *2000 annual report: Reaching and connecting Americans*. Washington, DC: Author.

University of Albany, State University of New York, Center for Technology in Government. (2002). *e-Gov firstStop: Home*. Albany, NY: Author. Retrieved June 26, 2002, from <http://www2.ctg.albany.edu/egovfirststop/>

"e-Gov FirstStop helps government professionals find high-quality, practical resources for e-government initiatives. The documents, Web sites, and other material shared here have been reviewed and selected by experienced e-gov scholars and professionals" -- e-Gov home page.

University of Massachusetts, Donahue Institute. (2002). *Technology as an economic catalyst in rural and depressed places in Massachusetts*. Massachusetts: Author. Retrieved 2002 from <http://www.donahue.umassp.edu/pdf/Eda.pdf>

Report on how communities in economic distress coped with the military cutbacks in the past decade and how the role of technology became a potential economic catalyst. The five areas investigated were two cities in Massachusetts, Lynn and New Bedford, a sub-city district of Boston, Roxbury, and two towns in rural Franklin County, Greenfield and Orange.

U.S. Bureau of Justice Assistance. (2000). *Rural law enforcement Internet access, technical assistance, and training program*. [Washington, DC]: Author. Retrieved 2002, from <http://purl.access.gpo.gov/GPO/LPS6962>

Fact sheet about access and use of the Internet by rural police departments.

U.S. Bureau of the Census. *Consolidated federal funds report*. Washington, DC: Author. Retrieved November 4, 2002, from <http://www.census.gov/ftp/pub/econ/www/go1300.html>

"Presents an overview of the Consolidated Federal Funds Report, authorized under United States Code, Titles 13 and 31, and conducted every year to provide data on Federal government expenditures by state, county, and subcounty area. Explains the data collection methods used, the Federal Expenditures by State and Consolidated Federal Funds reports released after the survey, the users and uses of the reports, and the content of the data collected. Also lists related programs" -- Worldcat abstract.

U.S. Bureau of the Census. (2002). *State and county quickfacts* [Home page]. Washington, DC: Author. Retrieved June 2002, from <http://quickfacts.census.gov/qfd>

U.S. Bureau of the Census. (2002). *Census 2000 urban and rural classification*. Washington, DC: Author. Retrieved August 23, 2002, from http://www.census.gov/geo/www/ua/ua_2k.html

U.S. Census Bureau's urban and rural classification Web page which provides "... information about the Census 2000 urban and rural delineation" and also provides the criteria used by the Census Bureau to "... delineate urban and rural areas based on the results of Census 2000."

U.S. Bureau of the Census (2002). *Metropolitan areas definitions*. Washington, DC: Author. Retrieved August 26, 2002, from <http://www.census.gov/population/www/estimates/metrodef.html>

U.S. Congress. Office of Technology Assessment. (1990). *Critical connections: Communications for the future* (OTA-TCT-407). Washington, D.C.: U.S. Government Printing Office.

U.S. Congress, Office of Technology Assessment. (1991, April). *Rural America at the crossroads: Networking the future* (OTA-TCT-471). Washington, D.C.: U.S. Government Printing Office. Retrieved from <http://www.wws.princeton.edu/cgi-bin/byteserv.prl/~ota/disk1/1991/9136/913601.PDF>

Rural America is at the proverbial crossroads. Many rural communities show signs that raise concern for their future: loss of economic vitality, a relative decline in income, high unemployment, low workforce participation, and an exodus of talent. Advances in communication and information technologies, however, hold promise for rural America, by reducing the barriers of distance and space that have disadvantaged rural areas. Rural businesses can now link to other businesses or access major markets, even in other countries, just as readily as those in urban areas, while still enjoying the many distinctive benefits of rural living. This study explores the role that communication technologies can play in securing rural America's future. It develops several policy strategies and options to encourage such development. The

study explores the role that communication technologies can play in securing rural America's future. It develops several policy strategies and options to encourage such development.

U.S. Congress, Senate, Committee on Agriculture, Nutrition, and Forestry. (2000). *Rural satellite and cable systems loan guarantee proposal and the digital divide in rural America : hearing before the Committee on Agriculture, Nutrition, and Forestry, United States Senate, One Hundred Sixth Congress, second session ... February 3, 2000*. Washington, D.C.: U.S. G.P.O. For sale by the U.S. G.P.O., Supt. of Docs., Congressional Sales Office.; iii, 98 p.

Hearing that examined a rural satellite and cable systems loan guarantee proposal and the digital divide in rural America.

U.S. Department of Agriculture, Economic Research Service. (2002). *Measuring rurality: Rural-urban continuum codes*. Retrieved June 2002, from <http://www.ers.usda.gov/Briefing/Rurality/RuralUrbCon/>

Discusses the rural-urban continuum codes, a classification scheme for distinguishing "... metropolitan counties by size, and nonmetropolitan counties by degree of urbanization and proximity to metro areas"-- p. [1].

U.S. Department of Agriculture, Economic Research Service. (2002). *Measuring rurality: Urban influence codes*. Retrieved June 2002, from <http://www.ers.usda.gov/briefing/rurality/UrbanInf/>

Discusses urban influence codes.

U.S. Department of Agriculture, National Agricultural Statistics Service. *Agricultural statistics data base*. Washington, DC: Author. Retrieved from <http://www.nass.usda.gov:81/ipedb/>.

Database includes U.S. and state data from NASS published reports (some commodities and data items have historical series back to 1866). Crops, livestock, and farm number statistics are available at the county level as well.

U.S. Department of Agriculture, National Agricultural Statistics Service. *Census of Agriculture*. Retrieved from <http://www.nass.usda.gov/census/>.

Provides electronic access to the 1992, 1997, and 2002 (release of data begins in spring 2004) Census of Agriculture. Each census is released in multivolume sets comprised of: 1) a Geographic Area Series (U.S., state, and county data); 2) a Subject Series (agricultural atlas, farm count and rankings by congressional district, zip code (selected items), etc.; and 3) Special studies.

U.S. Department of Agriculture, National Agricultural Statistics Service. *National Agricultural Statistics Service* [Home page]. Washington, DC?: Author. Retrieved from <http://www.usda.gov/nass/>.

Provides links to the Census of Agriculture as well as to other agriculture-related information and statistics.

U.S. Department of Agriculture, National Agricultural Statistics Service, & Pennsylvania Department of Agriculture. *Pennsylvania Agricultural Statistics Service* [Home page]. Harrisburg, PA: Author. Retrieved from <http://www.nass.usda.gov/pa/>.

"A field office of USDA's National Agricultural Statistics Service in cooperation with the Pennsylvania Department of Agriculture... the Service's mission is to provide timely, accurate and useful statistics in service to Pennsylvania and U.S. agriculture" (Home page).

U.S. Department of Agriculture, Rural Utilities Service. (2002?). *Rural Utilities Service telecommunications program* [Home page]. [Washington, DC]: Author. Retrieved November 4, 2002, from <http://www.usda.gov/rus/telecom>

Home page of the United States Department of Agriculture's Rural Utilities Service.

U.S. Department of Commerce. (2002). *E-stats* [Home page]. Washington, DC: Author. Retrieved June 2002, from <http://www.census.gov/estats>

U.S. Department of Commerce, Office of Technology Policy. (2002, September 23). *Understanding broadband demand: A review of critical issues*. Washington, DC: Author.

This analysis "... examines the state of broadband demand and usage in the United States, identifying successes, challenges and actions to promote more aggressive uptake. Our goal is to identify trends, issues and opportunities for policy makers and business leaders" (p. 1). U.S. Department of Commerce, National Telecommunications and Information Administration. (2000). *Americans in the information age falling through the net*. Washington, D.C.: The Author. Retrieved October 10, 2000, from <http://www.ntia.doc.gov/ntiahome/digitaldivide/>

NTIA's reports on the information technology gap in America. Includes fact sheets on the "digital divide" and provides a list of partnerships for bridging the divide.

U.S. Department of Commerce, National Telecommunications and Information Administration. (2000). *Closing the Digital Divide*. Washington, DC: The Author. Retrieved June 2002, from <http://www.digitaldivide.gov/>

The National Telecommunications and Information Administration (NTIA) of the U.S. Commerce Department presents information about federal programs of the administration of U.S. president William Jefferson Clinton (1946-). The programs are designed to provide all Americans with access to the Internet and other information technologies. The resource includes speeches, reports, statistics, and more.

U.S. Department of Commerce, National Telecommunications and Information Administration. (2000?). *[Falling through the Net 2000 Charts and other statistical materials]*. Washington, DC: The Author. Retrieved June 26, 2002, from <http://www.ntia.doc.gov/ntiahome/fttn00/charts00.html>

Charts included with the Falling through the Net 2000 report as well as additional graphics, etc. on the topic.

U.S. Department of Commerce, National Telecommunications and Information Administration. (2002). *National Telecommunications and Information Administration* [Home page].

Washington, DC: The Author. Retrieved June 26, 2002, from <http://www.ntia.doc.gov/>

"The National Telecommunications and Information Administration (NTIA), an agency of the U.S. Department of Commerce, is the Executive Branch's principal voice on domestic and international telecommunications and information technology issues" -- NTIA Facts (<http://www.ntia.doc.gov/ntiahome/ntiafacts.htm>).

U.S. Department of Commerce, National Telecommunications and Information Administration. (1995). *Falling through the Net: A survey of the "have nots" in rural and urban America*.

Washington, DC: US Dept. of Commerce. Retrieved June 2002, from

<http://www.ntia.doc.gov/ntiahome/fallingthru.html>

By supplementing the existing database in these two critical respects, NTIA has developed a more expansive profile of universal service in America - - a portrait that includes computers and modems as well as telephones. The data in the attached tables provide fresh insights into the make-up of those who are not connected to the National Information Infrastructure ("NII"). More particularly, this research has explored the characteristics of the "have nots" in rural versus urban settings. In addition, the agency has gained new insights about the "information disadvantaged" in America's central cities, enabling policymakers for the first time to array these characteristics against rural and urban profiles. NTIA's examination reveals the usage habits of PC/modem users in accessing on-line services, an important input for policy development in the nascent Information Age.

U.S. Department of Commerce, National Telecommunications and Information Administration. (1998). *Falling through the Net II: New data on the digital divide*. Washington, DC: The Author.

Retrieved June 2002, from <http://www.ntia.doc.gov/ntiahome/net2/falling.html>

Analyzes phone and computer usage by people of various income levels, ethnic groups, urban/rural residences, age, and other characteristics; US. Based on 1997 Census Bureau surveys; updates "Falling through the net: a survey of the 'have nots' in rural and urban America", National Telecommunications and Information Administration, July 1995.

U.S. Department of Commerce, National Telecommunications and Information Administration. (1999). *Falling Through the Net III: Defining the Digital Divide. A Report on the Telecommunications and Information Technology Gap in America*. Washington, DC: The Author.

Report on household access to telephones, computers, and the Internet, and computer use among individuals, 1998 with trends from 1984.

U.S. Department of Commerce, National Telecommunications and Information Administration. (2000). *Advanced telecommunications in rural America: The challenge of bringing broadband service to all Americans*. Washington, DC: The Author. Retrieved June 2002, from

<http://www.ntia.doc.gov/reports/ruralbb42600.pdf>

Advanced Telecommunications in Rural America is a response by the National Telecommunications and Information Administration (NTIA) and the Rural Utilities Service (RUS) to a request by ten U.S. Senators on the status of broadband deployment in rural versus non-rural areas in the United States. This report also responds to a call by President Clinton and Vice President Gore to bridge the digital divide and create digital opportunities for more

Americans. The rate of deployment of broadband services will be key to the future economic growth of every region, particularly in rural areas that can benefit from high-speed connections to urban and world markets. This report finds that rural areas are currently lagging far behind urban areas in broadband availability. Deployment in rural towns (populations of fewer than 2,500) is more likely to occur than in remote areas outside of towns. These latter areas present a special challenge for broadband deployment.

U.S. Department of Commerce, National Telecommunications and Information Administration (2000). *Falling through the Net IV: Toward digital inclusion. A Report on Americans' access to technology tools*. [Washington, DC?]: The Author. Retrieved June 2002, from <http://www.ntia.doc.gov/ntiahome/fttn00/contents00.html>

Report on household access to computers and the Internet, and computer use among individuals, 2000 with trends from 1994.

U.S. Department of Commerce, National Telecommunications and Information Administration (2002). *A Nation online: How Americans are expanding their use of the Internet*. [Washington, D.C.]: The Author. Retrieved June 2002, from <http://purl.access.gpo.gov/GPO/LPS17442>

Examines the diversification of Internet uses in the United States.

U.S. Department of Commerce, U.S. Government Working Group on Electronic Commerce. (2000). *Leadership for the new millennium: Delivering on digital progress and prosperity*. Washington, DC: Author.

Third annual report on Federal activities in support of computer access, Internet use, and electronic commerce, 2000.

U.S. Department of Education. (2002). *Digest of education statistics, 2001*. Washington, DC: Author.

Annual data compilation of education-related statistics.

U.S. Department of Labor, Bureau of Labor Statistics. *Bureau of Labor Statistics Home Page: U.S. Department of Labor*. Washington, DC: Author. Retrieved from <http://www.bls.gov/>.

The BLS Web site offers information and/or statistics on a wide array of business-related topics including: a) wages by area and occupation; b) geographic profile of employment and unemployment; c) state and local employment; d) employment projections; e) state and county wages; f) productivity and costs; g) consumer expenditures; g) employment, hours, and earnings and much more.

U.S. Department of Transportation, Bureau of Transportation Statistics (BTS). *United States Department of Transportation, Bureau of Transportation Statistics (BTS)* [Home page]. Washington, DC: Author. Retrieved from <http://www.bts.gov/>.

Provides statistical information on all types of transportation in the United States.

U.S. Department of Transportation, Federal Highway Administration. *Highway statistics*. Washington, DC: Author. Retrieved from <http://www.fhwa.dot.gov/policy/ohpi/hss/hsspubs.htm>.

"The Highway Statistics Series consists of annual reports containing analyzed statistical data on motor fuel; motor vehicles; driver licensing; highway-user taxation; State and local

government highway finance; highway mileage, and Federal aid for highways. This data is presented in tabular format as well as selected charts and has been published each year since 1945. Every ten years since 1945, a Summary of Highway Statistics has been published. These publications include a general summary of information on highways, their use, and financing. Much of the same data as shown in the annual series are provided in yearly trend format to the current year. All highway data are submitted by the States. Each State is analyzed for consistency against its own past years of data and also against other State and Federal data. The finished product is as close as possible to the original submission with only minor adjustments. Major issues are resolved with the help of the data provider" (About Highway Statistics, <http://www.fhwa.dot.gov/policy/ohpi/hss/abouthss.htm>).

U.S. Department of Transportation, Federal Highway Administration. (2003). *National traffic and road closure information*. Washington, DC: Author. Retrieved January 2, 2004, from <http://www.fhwa.dot.gov/trafficinfo/index.htm>.

Provides links to weather/road conditions, traffic conditions, regional information as well as to state Departments of Transportation in each state in the United States.

U.S. General Accounting Office. (1987, March). *Telephone communications: Issues affecting rural telephone service* (GAO/RCED-87-74). Washington, D.C.: Author.

U.S. General Accounting Office. (2001). *Facilities location: Agencies should pay more attention to costs and Rural Development Act*. Washington, DC: Author. Retrieved from <http://www.gao.gov/cgi-bin/fetchrpt?rptno=GAO-01-805>.

This report reviews the types of federal functions that lend themselves to being performed at locations other than Washington, D.C., and federal regional cities. There are concerns that federal agencies may not have been considering locating facilities in rural areas, as required by the Rural Development Act of 1972 (RDA), particularly in light of recent advances in telecommunications technology. GAO found that since its 1990 report (GGD-90-109) on this issue, federal agencies continue to locate for the most part in higher cost, urban areas. Eight of the 13 cabinet agencies surveyed had no formal RDA siting policy, and there was little evidence that agencies considered RDA's requirements when siting new federal facilities. Further, GSA has not developed for congressional consideration a cost-conscious, governmentwide location policy, as recommended by GAO in 1990. In GAO's survey, the sites that involved relocated operations still largely remained in urban areas, while the sites that involved newly established operations were more evenly spread over the rural and urban areas. Federal agencies' mission requirements, such as the need to be near clients or other organizations, apparently have led them to select urban areas. GAO found that government functions, such as research and development, data processing, accounting and finance, and teleservice centers, can be located in rural areas. Although it is not clear from the information GAO collected whether any of the federal agencies that located sites in urban areas could have located them in rural areas, one matter that is clear is that RDA has not had the influence on federal siting practices that Congress appears to have intended when RDA was enacted. Many agencies had no RDA policy, as required by the act, and many agency personnel in GAO's survey either did not consider RDA or did not know whether the act was used in making their site selection.

U.S. General Accounting Office. (2001). *Telecommunications: Characteristics and choices of Internet users: Report to the Ranking Minority Member, Subcommittee on Telecommunications, Committee on Energy and Commerce, House of Representatives*. Washington, DC: The Author. Retrieved December 29, 2001, from <http://www.gao.gov/cgi-bin/gettrpt?rptno=GAO-01-345>

Americans' use of the Internet has grown dramatically during the last few years. Nationally, more than half of all households have a computer and more than 80 percent of those households have access to the Internet. Yet, during the last few years, even as Internet usage has continued to expand, concerns have arisen about whether access to the Internet and other advanced telecommunications services is limited for Americans in lower socioeconomic classes or who live in rural areas. The General Accounting Office (GAO) found that Internet users are more likely to be white and well-educated and have higher-than-average household incomes. There is no noticeable difference between the genders when it comes to Internet usage. GAO also found that the availability of some services is limited by location. Some of this information points to the existence of the "digital divide," but the evidence is not clear. It is important, however, to ensure that the differences in Internet availability do not adversely affect existing societal divisions.

U.S. Government. *FedStats*. Washington, DC: Author. Retrieved from <http://www.fedstats.gov/>.

FedStats offers access to "... official statistics collected and published by more than 100 Federal agencies reporting expenditures of at least \$500,000 per year in one or more statistical activities including: 1) planning of statistical surveys and studies, including project design, sample design and selection, and design of questionnaires, forms, or other techniques of observation and data collection; 2) training of statisticians, interviewers, or processing personnel; 3) collection, processing, or tabulation of statistical data for publication, dissemination, research, analysis, or program management and evaluation; 4) publication or dissemination of statistical data and studies; 5) methodological testing or statistical research; 6) data analysis; 7) forecasts or projections that are published or otherwise made available for government-wide or public use; 8) statistical tabulation, dissemination, or publication of data collected by others; 9) construction of secondary data series or development of models that are an integral part of generating statistical series or forecasts; 10) management or coordination of statistical operations; 11) statistical consulting or training. All of the statistical information available through FedStats is maintained and updated solely by Federal agencies on their own web servers" (About FedStats, <http://www.fedstats.gov/aboutfedstats.html>).

U.S. Postal Service. (2001). *Household diary study: Mail use and attitudes in postal FY2000*. Washington, DC: Author.

Mail volume to and from households, use, and views, by class, source, content, and household characteristics, FY2000 with comparative data for FY99 and FY87. Data are from the annual USPS Household Diary Study surveys of about 5,300 households.

Usherwood, B., & Linley, R. (2000). Evaluating equity in public library services. *Journal of Librarianship and Information Science*, 32(2), 72-81.

Reports results of research conducted by the Centre for the Public Library in *The Information Society*, Sheffield University, Department of Information Studies, to develop a tool for evaluating the social impact of public library activities. The project included an examination of equity or fairness in the distribution of services in relation to objectives. The study involved

library staff, elected members, focus groups of local residents, users and non users of public libraries in the City of Newcastle upon Tyne and the County of Somerset, UK. The methodology used in the study has been published in detail elsewhere (IFLA Journal, 25 (2) 1999, 90-6). Barriers to equity were found to be related to: physical barriers; geographical barriers; economic barriers. The data shows that both Newcastle and Somerset library services are administered fairly, with only isolated examples where equity had to be counter balanced with efficiency considerations. In terms of equity of access to services, both library authorities had policies to improve access for people with disabilities, although there was a call for a more user focused approach by the focus groups. Problems in Somerset, resulting from rural isolation, were overcome through a comprehensive network of services. Problems in Newcastle, resulting from economic barriers, were helped through policies directed at priority groups and areas.

Valentine, G., & Holloway, S. L. (2001). A window on the wider world? Rural children's use of information and communication technologies. *Journal of Rural Studies*, 17(4), 383-394.

The possibilities which information and communication technologies (ICT) offer people (or groups) to overcome the friction of distance and the constraints of materiality mean that these technologies are seen to have particular relevance in rural areas which have been historically characterized in terms of their economic and social peripherality. In this paper, we draw on empirical research with children and their teachers and parents, to explore the opportunities which ICT are seen to offer young people living in rural areas. First, we examine the information that children access on-line and how young people make sense of this expanded terrain. Second we focus on communication, by considering children's use of email and chat rooms. Third, we explore how this information and these modes of communication may be shaping young people's sense of place in the world. Our findings expose a clear contrast between the ambitious and future orientated ways in which adults imagine ICT will expand their children's educational and employment opportunities, and social and spatial horizons, and the everyday ways in which these technologies actually emerge for children in practice.

Valletti, T. M. (2003). Is mobile telephony a natural oligopoly? *Review of Industrial Organization*, 22(1), 47-65.

This paper presents a model of competitive interaction among mobile telecommunications operators. Operators can offer services in two separate markets, urban and rural areas, and customers commute between them. Market coverage of an operator can then be interpreted as a parameter of vertical product differentiation. The main implication is that the industry has strong features of a "natural oligopoly": Only a limited number of operators with possibly different coverage can survive in equilibrium. It is also shown that competing operators do not have an incentive to reach roaming agreements over non-overlapping areas. On the contrary, roaming can be easily agreed upon by colluding operators.

Vanderbilt University, Project 2000. (1999). *The Evolution of the Digital Divide: Examining the relationship of race to Internet access and usage over time*. Vanderbilt University.

Examines relationship between race and the Digital Divide.

Van Horn, R. L., & Harvey, M. G. (1998). The rural entrepreneurial venture: Creating the virtual megafirm. *Journal of Business Venturing*, 13(4), 257-274.

To compete effectively, entrepreneurs must gain a competitive advantage through the development of a distinctive core competency. The unique dimension of entrepreneurial ventures historically has hinged on better understanding of a market niche, on the ability to adjust product, service and price rapidly to meet customer's needs, and on innovation to bring about new products and services for the marketplace. Each of these means to differentiate the entrepreneur's product or service depends on the quality and speed to information available to the entrepreneurial decision-maker. This paper develops a model to provide information and expertise to small entrepreneurs. The entrepreneurial virtual megafirm entails the use of electronic information-sharing as well as providing rural-based entrepreneurs with quality expertise to aid in the development of strategic decisions.

Venkatachalam, S., & McDowell, S. D. (2003, May). What is broadband? Where is "rural"? *Government Information Quarterly*, 20(2), 151-166.

Note: Article printed out and also saved as a pdf file, VenkatachalamS2003.pdf.

The article examines comments made in response to the National Telecommunications and Information Administration's (NTIA) November 2001 *Request for Comments on Deployment of Broadband Networks and Advanced Telecommunications Services*. "Interveners were asked how they would define broadband services, and to propose policies to promote the deployment of broadband infrastructure and services" (p. 152). "In examining these comments, this article considers this process as part of the politics of selecting definitions for broadband. In doing so, it uses a 'framing' mode of analysis" (p. 152). (MAT abstract).

Vogelsang, I., & Compaine, B. M. (2000). *The Internet upheaval: Raising questions, seeking answers in communications policy*. Cambridge, MA: MIT Press.

At the beginning of 2000, the US economy was enjoying the longest period of sustained growth and economic prosperity in its history. According to "The Internet Upheaval", part of the explanation for this phenomenon is a consequence of how information technologies, in particular the Internet, are upending fundamental economic and social structures. These research studies explore some of the *Telecommunications Policy* ramifications of this upheaval. The first section addresses the complexities of adapting the First Amendment to the Internet, the debate over the taxation of e-commerce, and Internet users' attitudes toward online privacy. The second section looks at how the Internet has changed, or will change, traditional models used by economists, sociologists and others to explain how the world works. The third section discusses the need for new economic models to deal with the rapidly changing competitive landscape. Finally, the fourth section examines economic and policy aspects of universal service.

Walker, J. F. (2001). Paved with good intentions: How interLATA data relief undermines the competitive provisions of the 1996 Act. *Federal Communications Law Journal*, 53(3), 533-556.

Examines H.R. 1542, which attempts to solve the problem of the digital divide by providing Bell operating companies with expansive interLATA (local access and transport areas) relief for data services; US. Offers alternatives to changing the current law, proposing why alternatives are superior, because H.R. 1542 will harm consumers in rural and urban areas by eliminating choice and raising prices.

Wallin, J. S., Wilson K. R., et al. (2001). *The Digital divide in North Carolina*. Southern Sociological Society.

Many studies have documented the digital divide in the US. Rural & minority household are much less likely to have a home computer or be connected to the Internet. This study examines the digital divide in NC. In May 1999, Vision 2030 & the North Carolina Board of Science & Technology sponsored a study to assess public perceptions of the role & importance of science & technology in the NC economy. The general population telephone survey employed random digit dialing. Of the households contacted, 52% completed the interview. The data have been weighted to insure a completely accurate geographic distribution across the seven regions of NC. Over half of the households (53%) have a home computer & over one-third (36.2%) are connected to the Internet. As in other studies, respondents from rural counties, minority, & female respondents were less likely to have a home computer or to be connected to the Internet. When family income, education, age, employment status, marital status, & the presence of children were controlled, the effects for population size & gender were no longer statistically significant, but the effect for minority status continued to be statistically significant. This same pattern was found for both dependent variables.

Wallman, K. (1997). *The Telecommunications Act of 1996: Congress' new vision for universal service for rural America*. Washington, DC: Opastco.

Contents: 1. Two threshold policy questions about universal service support for rural telephone customers -- 2. Brief review of universal service support mechanisms before the Act and the FCC's May 8, 1997 order -- 3. Definition of universal service: which services should be regarded as universal and which ones should be supported? -- 4. Extent of federal support for universal service -- 5. Competitive and technological neutrality -- 6. Skimming the cream -- 7. Calculating what it costs to provide supported service, and calculating the level of support that should be provided -- 8. Conclusion.

Wart, M. V. Rahm, D., & Sanders, S. (2000). Economic development and public enterprise: The case of rural Iowa's telecommunications utilities. *Economic Development Quarterly*, 14(2), 131-145.

This article examines the creation of public enterprises as a form of economic development for rural American communities. These public enterprises have a beneficial economic development role to play when there is a private sector failure to deliver high-quality, low-cost services in critical economic areas. The study examines Iowa's advanced telecommunications services in rural areas. Some rural areas perceive themselves to be well served by the private sector, but others perceive themselves to be woefully underserved. When rural Iowa communities believed themselves to be deprived of market-based services, they created public enterprise telecommunications utilities. Factors necessary for high-quality public enterprise telecommunication system success (as well as those leading to failure) are discussed. Also discussed are trends showing the importance of the new public enterprise telecommunications utilities.

Washington Internet Project. (2002). *Washington Internet Project (WIP): Universal service page*. Author. Retrieved December 9, 2002, from <http://www.cybertelecom.org/usf/slfund.htm>

Webre, P. (1998). *Federal subsidies of advanced telecommunications for schools, libraries, and health care providers*. Washington, DC: Congressional Budget Office (US Congress).

In May 1997, pursuant to the Telecommunications Act of 1996, the Federal Communications Commission (FCC) issued a report and order detailing its plan for providing subsidies to elementary and secondary (K-12) schools, public libraries, and public and nonprofit rural health care providers through the Universal Service Fund (USF). In that order, the FCC laid out the terms and limits of its program to promote access to advanced telecommunications services—such as the Internet and computer networking—by those groups. Most notably, the FCC created a system of sliding-scale subsidies for schools and libraries that would average 60 percent of eligible expenses. Collections and expenditures for those purposes are scheduled to begin in 1998. However, the details of the plan are still subject to change. The FCC issued an order on reconsideration modifying aspects of the plan late in December 1997, and more changes are likely to be made during 1998. This paper presents the Congressional Budget Office's (CBO's) baseline estimates for federal outlays and revenues under the FCC's May 1997 plan to provide those federal subsidies. CBO estimates that outlays would rise from about \$0.6 billion in fiscal year 1998 to \$1.2 billion in 1999. After that, outlays are expected to increase by a little more than \$0.1 billion per year, reaching \$2.4 billion in 2008 (see Summary Table 1). CBO assumes that revenues necessary to fund those expenditures will be collected as required and that the USF will be deficit neutral on a fiscal year basis.

Wellenius, B. (1984). On the role of telecommunications in development. *Telecommunications Policy*, 8(1), 59-66.

Over the past 20 years, a number of studies have been conducted to assess the influence of telecommunications on economic development for developing countries. These studies are summarized, and it is concluded that they have, to varying extents, documented that telecommunications development positively affects economic development. Additional research along this line will have little impact on telecommunications investment decisions in developing nations. Instead, the results of this research must be communicated to those government officials and international agencies responsible for development investment decisions. The economic contributions of telecommunications can best be emphasized in connection with specific telecommunications project plans, based on economic documentation, prepared case material, and data on benefits distribution. Webber and Clevely comment that further research is needed to document the spatial effects of telecommunications, showing how telecommunications connectivity affects the distribution of benefits both within and across countries.

Wellenius, B. (2001, November). *Closing the gap in access to rural communication: Chile 1995-2002* (World Bank Discussion Paper, No 430).

Retrieved from http://www.infodev.org/library/WorkingPapers/chile_rural/Chile%20-%20final%2017%20december%2001%20-%20revised.pdf

In this study, the author documents and reviews the Chilean experience in *Rural Telecommunications*. The report focuses on the principles, practical organization, results, improvements on the basic design, outstanding issues, and prospects for extension of the approach to more advanced forms of communication and access to information. This report will help other developing countries learn from the Chilean experience, adapt it to their own needs and circumstances, and accelerate their efforts to improve basic access to communication.

West, P. C., Blahna, D, & Fly, M. (1985). *Rural economic development consequences of the population turnaround in Northern Lower Michigan*. Rural Sociological Society (RSS) (Conference paper).

The consequences of the population turnaround for Ru economic development are examined in a 9-county region in northern lower Mich. Data from census reports & a mailed questionnaire were used to test competing hypotheses about Ru development consequences: (1) economic infusion (positive economic impact); (2) economic overload (negative impact on unemployment & increased competition for jobs); & (3) a contingent eclectic model. The major finding was that for white-collar strata, economic infusion is supported; for blue-collar strata, economic overload theory is supported. Thus, the contingent eclectic model received the greatest support. (Sociological Abstracts).

Descriptors: Rural; Economic; Development; Population; Growth; Michigan

Identifiers: rural economic development; population turnaround; mailed questionnaire, census data; Michigan; economic overload/infusion models

Western Governors' Association. (2001). *Centers of excellence in rural America* [Home page]. Retrieved February 25, 2003, from www.westgov.org/wga/initiatives/cera.htm

Sponsored by the Western Governors' Association, state and local leaders from Wyoming and North Dakota have been working over the past few years to create Centers of Excellence in Rural America (CERA)--a "... network of small rural towns deploying affordable, high speed telecommunications services. The towns currently participating in the project include Lusk, Powell, and Glenrock in Wyoming and Watford City and Mayville in North Dakota."

Western Rural Development Center. (2002). *Western Rural Development Center* [Home page]. Logan, UT: The Author. Retrieved February 25, 2003, from <http://extension.usu.edu/WRDC/>

The WRDC is one of four USDA-sponsored regional centers in the country that "participates in rural development research and extension (outreach) projects cooperatively with universities in the West. The Center works closely with university personnel, policy makers, elected officials and other community leaders, and citizens to 1) identify key issues shaping the future of rural regions of the West and 2) organize projects that respond to those issues. Utah State University sponsors the Center, with major support from the Agriculture Experiment Station, Extension, the College of Humanities, Arts, and Social Sciences, and the College of Natural Resources" -- About us (<http://extension.usu.edu/WRDC/>)

Wilkins, J. (2001, Winter). The software industry in Georgia: Beyond the urban periphery. *Economic Development Review*, 17(3), 40-51.

"As software and other high tech companies cluster near major metropolitan areas, they face similar changes with regard to labor recruitment and workforce development, quality of life, and other issues. While several metro areas have enacted high tech sectoral development strategies in their area, the concern by the software industry is whether metro areas can support their future growth and sustainability needs. The potential for rural communities to develop, attract, and support software companies is examined, looking specifically at Georgia. Workforce challenges have been identified as a leading barrier for rural Georgia as well as a key site selection concern for software firms" (ProQuest abstract). Subjects: Rural development; High tech industries; Professional recruitment; Workforce planning; Teenage pregnancy

Williams, F. (1991). *Telecommunications and U.S. rural development: An Update*. Aspen, CO: Aspen Institute.

Williams, F. (1991). *The new telecommunications: Infrastructure for the information age*. New York: The Free Press.

Wilson, R. H. (1992). *Rural Telecommunications: A strategy for community development*. *Policy Studies Journal*, 20(2), 289-300

The types of telecommunications innovations in rural areas are identified. The origins of the innovations and the policy and development implications of these innovations are determined.

Wilson, R., & Teske, P. (1990). Telecommunications and economic development: The state and local role. *Economic Development Quarterly*, 4, 158-174.

Wilson, W. W., & Zhou, Y. M. (2001). Telecommunications deregulation and subadditive costs: Are local telephone monopolies unnatural? *International Journal of Industrial Organization*, 19(6), 909-930.

In early 1996, Congress passed the Telecommunications Law, providing the foundation for the opening of regulated local telephone monopolies to competition. One important premise for introducing competition into local telephone markets is that these markets are not (or are no longer) natural monopolies. This paper reexamines the natural monopoly issue using a cost function that controls for firm heterogeneity. Our subadditivity tests suggest that Local Exchange Carriers' (LECs) costs are subadditive when there are controls for unobserved heterogeneity, suggesting that local telephone markets are natural monopoly markets.

Winders, R. (2000, Winter). Small business development and nonmetropolitan job growth in Georgia. *Growth and Change*, 31(1), 82-.

"To assess development potential of small business, this research examines the age and size characteristics of non-metropolitan firms and the contribution of business "births," "deaths," expansions, and contractions to job growth. Analysis of data derived from the federal-state unemployment insurance program in Georgia indicates that firms employing fewer than 100 workers account for 44.3% of private sector nonfarm employment in non-metropolitan counties. Overall, the mix of small and large firms remained quite stable over the five-year study period. The dynamics of job creation and loss differ dramatically by enterprise size and manufacturing/non-manufacturing sector." (ProQuest abstract).

Subjects: Small business; Economic development; Rural development; Statistical analysis; Employment

Wireless Internet technologies: Hearing, April 13, 2000. Committee on Science. Subcommittee on Technology. Washington, D.C.: Superintendent of Documents.

Discusses the Internet's development to a wireless technology, focusing on how some wireless technologies could help provide broadband Internet service to areas lacking the infrastructure, such as fiber optic networks, for wired access; other ways wireless could change the way people use the Internet.

Wirtz, R. A. (1999, April). *Rural businesses are spurring much of the growth in telecommunications*. Retrieved from <http://woodrow.mpls.frb.fed.us/pubs/fedgaz/99-04/telecomm.html>

"Rural businesses looking to improve their productivity and competitiveness are pushing much of the demand for advanced telecom. Rural branch offices are requesting digital links to the main office in urban areas, to Nina Duncan of the Blackfoot Telephone Cooperative in Missoula, Mont. Local companies are competing for contract jobs in far-removed places and increasing sales through the Web, she says. Even ranchers are turning high-tech "and changing the way they do business." (PolicyFile abstract).

Wirtz, R. A. (2001). Digital haves and have-nots. *FedGazette*, 13(6). Retrieved December 29, 2001, from <http://woodrow.mpls.frb.fed.us/pubs/fedgaz/01-11/digital.html>

Rural areas are assumed to be on the losing side of the digital divide, but that might not be the case.

Wohlbruck, A., & Levy, M. (2001). Linking communities to opportunities through telecommunications. *Economic Development Review*, 17(3), 34-39.

It is not certain that rural America will be able to take advantage of the telecommunications revolution to create jobs and sustain economic development. Technology, geography, and demography are 3 critical factors in determining whether the promise of the Telecommunications Act of 1996 will be seen in rural regions. While major metropolitan areas are benefiting from the latest technology, obtaining and maintaining the information highway is much more costly and difficult in small towns and rural areas. Rural economic and community development professionals and policymakers must make telecommunications a part of their short and long-term planning for building communities and creating jobs. Some suggestions for rural regions to use in participating in the technological revolution are presented.

Wolak, F. A. (1996). Can universal service survive in a competitive telecommunications environment? Evidence from the United States consumer expenditure survey. *Information Economics and Policy*, 8(3), 163-203.

The purpose of this paper is to assess the impact of reducing the magnitude of the cross-subsidy in telephone services pricing that flows from long-distance service to local service on the consumption of both of these telephone services and consumer welfare at the household level. Our econometric modeling framework specifies a complete system of household-level demand functions that are derived from the assumption of utility maximization. Our primary data source is the Bureau of Labor Statistics' Survey of Consumer Expenditures. In addition to local and long-distance phone service, food, clothing, and other non-durable expenditures are included in our five-good demand system. All of our price change scenarios point to the conclusion that there appears to be little loss in household-level welfare and little, if any, reduction in the number of households connected to the local telephone network, due to the projected reductions in this cross-subsidy brought about by an increasing amount of competition in all telecommunications markets. In addition, we find that if these local service price increases are coupled with reductions in the price of long-distance service, the net effect can actually be a gain in consumer welfare for a large fraction of households which in the aggregate yields a net benefit to the population of United States households.

Wood, C. (1999). A Two-tier system: Rural Canadians have less access to health care. *Maclean's*, 112, 32-3.

Discusses problems such as shortages of physicians and hospital beds, and efforts to improve the situation, including use of the Internet and telemedicine; example of British Columbia. Included in a collection of articles under the overall title "The Maclean's health report: how 16 Canadian cities rate in quality of health care".

Wood, L., & Glasmeier, A. K. (2000). *On hold: Telecommunications in Rural America*. Washington, DC: Economic Policy Institute. Retrieved from <http://www.lights.com/epi/virlib/Studies/2000/onh.PDF>

In this book, authors review evidence about the experience of rural communities in accessing modern telecommunications. It is divided into six parts. The first summarizes the special problems of rural areas in ensuring access to modern telecommunications. Part two recounts the history of telecommunications access in the U.S. and the special experience of rural areas. Part three reviews the effects of rapid change in telecommunications technology and the challenges facing public and private infrastructure provision. Part four examines the potential benefits of advanced communications in rural areas, while part five evaluates the technological options for high-speed connections. Part six suggests areas in which public policy can contribute to the dissemination of new technologies to rural and sparsely populated areas of the country.

Wresch, W. (1996). *Disconnected: Haves and have-nots in the Information Age*. New Brunswick, N.J. Rutgers University Press.

In the Information Age, information is power. Who produces all that information, how does it move around, who uses it, to what ends, and under what constraints? Who gets that power? And what happens to the people who have no access to it? With vivid anecdotes and data, William Wresch contrasts the opportunities of the information-rich with the limited prospects of the information-poor. Surveying the range of information - personal, public, organizational, commercial - that has become the currency of exchange in today's world, he shows how each represents a form of power. He analyzes the barriers that keep people information-poor: geography, tyranny, illiteracy, psychological blinders, "noise," crime. Technology alone, he demonstrates, is not the answer. Even the technology-rich do not always get access to important information - or recognize its value. Wresch spells out the grim consequences of information inequity for individuals and society. Yet he ends with reasons for optimism and stories of people who are working to pull down the impediments to the flow of information.

Wright, D. (1995). Reaching out to remote and rural areas: Mobile satellite services and the role of Inmarsat. *Telecommunications Policy*, 19(2), 105-116.

This paper analyses the problems faced by developing countries in extending telecommunications to remote and rural areas. It identifies some possible technical solutions using mobile satellite services, especially in specialized niche markets, but also ways in which telecommunications can be made more widely available to populations in rural and remote areas. Although means must be found to finance such development, the paper highlights the necessity of implementing policy and regulatory frameworks conducive to the availability of mobile satellite services.

Xavier, P. (1997). Universal service and public access in the networked society. *Telecommunications Policy*, 21(9/10), 829-843.

Concern about access to the new services and facilities emerging from the technologically dynamic telecommunications industry and its 'convergence' with broadcasting and information technology has resulted in calls for a reconsideration of the nature and scope of Universal Service Obligations (USOs) so that they are more adequate and relevant in an era of technological acceleration towards a networked information society. This paper assesses approaches to upgrading USOs and to developing policies for public access to the networked society undertaken thus far in various OECD countries, and proposes frameworks for conducting the tasks in a systematic manner.

Yilmaz, S., & Dinc, M. (2002). Telecommunications and regional development: Evidence from the U.S. states. *Economic Development Quarterly*, 16(3), 221-228.

During the past 20 years, advancements in telecommunications technologies have had direct impact on firms, particularly in the service-related sectors, and the telecommunications infrastructure has become important to their production processes. These developments also have had an indirect effect on the overall economy of regions because of the externalities they generate. This article is an examination of the impact of telecommunications infrastructure on the service sectors' output growth among the 48 contiguous U.S. states. The findings suggest that not every state receives the full benefits of its own telecommunications infrastructure. A state-by-state regression analysis shows the variation in returns on telecommunications investments across states. This variation may be due to the inefficient utilization of telecommunications infrastructure as a factor of production. Data envelopment analysis confirms that the states accruing significantly positive benefits are those in which businesses use the telecommunications infrastructure most efficiently. Serdar Yilmaz is a public sector specialist at the World Bank Institute working on issues related to public finance and intergovernmental fiscal design in developing countries. His interests are the analysis of decision making in the public sector, the analysis of intergovernmental policies in developing countries, and the role of infrastructure service provision in regional development patterns. Mustafa Dinc is a consultant at the Development Data Group of the World Bank. His work involves issues related to statistical capacity building and data analysis for poverty-reduction strategies in developing countries. His research interests are regional development, regional policy analysis, and efficiency and productivity assessments of different.

Young, E. L., & Bransford, L. A. (1983). Telecommunications in rural America: an appraisal and a prediction. *The Information Society*, 2(2), 107-121.

Rural communities have been isolated from the health, educational, and public services available in more densely populated areas. Advances in telecommunications technology, including low-power television, direct broadcast satellites, and satellite-fed cable services, offer the opportunity to alleviate rural isolation, to improve the quality of rural life, and to promote economic development. Despite such technological advances and the recognized need, *Rural Telecommunications* networks have not been established. Rural markets have been considered unprofitable and lacking in sufficient consumer demand. Thus, commercial suppliers have not made the substantial investments necessary to provide *Rural Telecommunications* services. Government subsidies will be required to motivate the private sector to invest in *Rural*

Telecommunications. Once rural communication networks are in place, they should become self-supporting.

Youtie, J. (2000). Field of dreams revisited: Economic development and telecommunications in LaGrange, Georgia. *Economic Development Quarterly*, 14(2), 146-153.

Rural communities are entering the telecommunications business to leverage telecommunications infrastructure for economic development. They face challenges in obtaining advanced infrastructure comparable to that in urban areas as well as in using it as an economic development tool. This article examines the process of obtaining advanced telecommunications infrastructure and the extent to which economic development outcomes followed through a case study of rural LaGrange, Georgia. The experiences of LaGrange suggest that an initial fiscally conservative investment approach to entering into telecommunications service provision as a rural municipality appears to be sound, given supportive public policies, municipality experience in the public utilities business, and private sector partnerships.

Zehr, M. A. (2001, May 10). Technology counts 2001: Rural connections. *Education Week*.

Zeitoun T. (1997). *Development strategies for the use of information and communication technologies in rural and remote areas. Report to the 8th TDAB Meeting, International Telecommunication Union*. Geneva.

Zolnierek, J., Eisner, J., & Burton, E. (2001). An empirical examination of entry patterns in local telephone markets. *Journal of Regulatory Economics*, 19(2), 143-159.

In this analysis we examine the market entry patterns of new local telephone companies. We construct and estimate a multinomial logit model using information describing numbering code distribution within local telephone markets and the associated income, density, and regulatory characteristics of these markets. Our findings support the conventional wisdom that facilities-based entry by new local competitors is more likely to occur in large urban telephone markets. In addition, we present evidence that, with the exception of territories served by Ameritech, entry is more likely to occur in Bell Operating Company service territories.