America's Forgotten Challenge: Rural Access

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Roughly 17% of the U.S. population lives in what is usually called rural America. Numbering approximately 50 million people, most live near a larger town or even within an hour of a major city, but many also may live in far more remote regions with limited driving access, much less access to air transportation. In spite of stereotypes surrounding the farming-based rural economy, in fact only about one percent of the American population actually lives on a farm, and as of 2004 only 6.2% of nonmetro jobs were in the agricultural sector. The occupations of the rural population, spread over roughly 80% of the land area of the U.S., are diverse, with about 12% of the rural population working in manufacturing, and a growing percentage working in retirement-destination and recreation-related industries. Nevertheless, people in rural regions share certain challenges. For some – such as people living in colonias on the border with Mexico - even having access to running water or sewage treatment facilities is a distant promise. Having access to basic infrastructure such as water, sewage, electricity, and telecommunications is taken for granted in most cities across the country, but in rural areas those facilities and their attendant capabilities have come later (or not at all), and they may be inadequate.

The telecommunications topography of the U.S. has never been kind to rural regions.[1] While people in major population centers might assume that their entire region is served by one of the dominant phone companies such as AT&T or Verizon, in fact many in the more rural and remote regions have for years relied on local independent or

cooperative phone companies for their basic service. The national map of telephone services is a checkerboard of different companies interspersed between the broad territorial swaths served by the legacy Bell companies.[2] In spite of the rhetoric of universal service, the monopoly AT&T of the 20th century avoided serving many of the most expensive, least populated and remote regions of the country, leaving it to other vendors or the local population itself to figure out how to get phone service. By the beginning of the 21st century, major carriers – AT&T (the product of several merged "Baby Bell" companies including SBC, Ameritech, Bell South, Pacific Tel), Qwest (including the former US West) and Verizon[3] - provide about 22 million access lines in nonmetropolitan regions while the independents and cooperatives provide another 24 million lines. These rural telephone companies are the "carriers of last resort," and sometimes represent a household's only communication link to the rest of the world.[4] For years they have relied on programs collected under the universal service label to help them maintain and upgrade their telephone networks. Universal service promised that telephone services in rural regions would be roughly equivalent in cost to those available in metro areas.

However, the 1996 Telecommunication Act opened the door to re-thinking universal service. Under the Section 706 requirement that the FCC continue to assess broadband capability, and with the Act's programs of support to schools and libraries for Internet connectivity in Section 254, and its language around the possibility of embracing broadband connectivity as part of universal service, the Act's hints at forward-looking provisions encouraged several critics and policymakers alike to speculate about alternative methods of achieving a "universal service" for broadband, or at least, about

ways to enhance broadband connectivity nationally, and specifically broadband access in rural regions. Indeed, there have been numerous bills introduced in Congress to reform universal service, as well as a comprehensive report and set of recommendations by the Joint Federal State Joint Board on Universal Service in November, 2007 (Federal-State Joint Board, 2007). Their observations regarding service to rural areas highlight the fundamental needs of rural regions, especially within their Broadband Fund recommendation, to which we will return later.[5] A fundamental question is whether the goals of basic universal service qua telephone service have been met, and whether broadband availability needs to be the next threshold for basic universal service.

This paper reviews the history of rural access and summarizes some of the economic factors that highlight the need for improved telecommunications in rural regions, framing the transformations associated with the information technologies of the past three decades as essential to cultivating economic vitality in rural areas. Data regarding the contemporary status of broadband services and potential benefits in rural areas are addressed. To revive rural regions through improved telecommunications services will mean reconceptualizing and reprioritizing communities and their abilities to determine their communication environments – in short, a reformulation of universal service that goes beyond an implicit "social contract."

History of Rural Access

Rural populations historically received telecommunications services later than did metropolitan areas.[6] In terms of telephony, the history of universal service is one of a regulatory tradeoff that almost inadvertently benefited rural populations - inadvertent in the sense that at no time was either the government or AT&T proactively committed to

ensuring that rural areas would enjoy the same services common in towns and cities. Rather, the policy grew out of interconnection disputes between AT&T and other companies, and became enmeshed with practical problems involved in the rate of return regulation, grants of monopoly service, and internal cross subsidies that the company supported for decades (Horwitz, 1989).[7] The upshot of a "universal service" policy (under the Kingsbury Commitment of 1913) meant that AT&T would interconnect with (or acquire) rival phone companies and sustain rates roughly comparable across its service locations. The company's arrangement with the government and state regulators kept local and residential phone call costs extremely low while long distance and business calling was more expensive to users than its actual costs would have required, an arrangement that continued throughout most of the 20th century. These cross-subsidies funded the universal service practices that enabled many rural telephone customers to enjoy telephone service.

Under the pressures of AT&T's divestiture in the 1980s, however, universal service and these internal cross subsidies began to be subjected to closer economic scrutiny; as marketplace and deregulation rhetoric swept across the U.S. government agencies, and as the word "subsidize" became equated with inefficiency and government-mandated bloat, the universal service programs that transferred funds to higher cost networks in rural areas and that supported lower local calling became the target of reform. The rhetoric of competition, however, rarely addressed actual market dynamics accruing to more remote, low population regions. Consequently, neither AT&T's divestiture in the early 1980s nor the competition policies gradually instituted within the telecommunications regime between 1982 and 1996 adequately addressed the

fundamental policy issues around ensuring telecommunications service in rural areas. Section 254 in the Telecommunications Act affirms the basic principles of universal service, and even has language stating "access to advanced telecommunications and information services should be provided in all regions of the Nation." However, the actual meaning of "advanced services" has become the subject of heated debates ever since the 1996 Act was passed.

That said, basic telephone services were indeed present in most of the U.S. at the time of the Act's passage, and into the early 1990s national telephone penetration rates stood at about 94% (nonetheless with poor or nonexistent service in tribal regions continuing at shameful rates).[8] However, with the development of the Internet, and home and business dependence on the wireline infrastructure in order to access it, new infrastructure pressures materialized. First dial-up access and then broadband access required a wireline system that was more robust than that designed to support voice calls; the overall phone network had been optimized for voice calls of short duration, but Internet use required much longer connections, and with more bandwidth-intensive actions characteristic of working with music and video files, more network capacity as well. The basic telephone infrastructure in many rural areas had older switches and longer loops, translating into slower connections – if there were suitable connections at all. Some studies showed as well that many rural areas had no Internet Service Providers in the local calling area so that accessing the Internet meant a long distance or toll call (Strover, 2001).[9]

As noted above, the 1996 Telecommunications Act recognized the growing importance of Internet connectivity by mandating that the FCC ensure that broadband

services (with broadband defined as merely 200 Kbps)[10] develop equitably and quickly and by creating universal service programs to help with institutional (schools, libraries, rural medical facilities) Internet access. In the late 1990s the National Telecommunications and Information Administration began to support modest innovation projects under its Telecommunications Opportunities Program (TOPS, the successor to a program called "TIIAP" or the Telecommunications and Information Infrastructure Assistance Program dedicated to the same goal), and worked with the Census Bureau to gather information on computer and Internet use. In the late 1990s several states also began programs to investigate, map or augment telecommunications infrastructure with a view to improving access for rural regions and economically disadvantaged populations. These activities unfolded within the context of national pronouncements – but no actual policy or funding – for a National Information Infrastructure, promoted and espoused by then Vice President Gore.[11]

As Internet connectivity assumed increasing importance on the national stage, study after study documented a gap between metro areas and rural areas in terms of access to broadband – that is, the availability of broadband services. (Actual subscription to broadband is another question that will be discussed later in this chapter.) The FCC's monitoring of broadband deployment under the requirements of the 1996 Telecommunications Act consistently showed that broadband was being deployed with good progress across the nation, but their statistics were never independently verified and were (and continue to be) entirely reliant on vendor reporting using FCC Form 477.[12] As many critics have noted, the FCC broadband data illustrates the existence of subscribers where vendors already serve; it simply does not begin to apprehend the areas where

broadband is not available. Moreover, their zip code unit reporting for this inquiry is doubly inadequate for rural regions in which zip codes can cover large geographic areas. The way their statistics are arrayed does not allow one to differentiate between one provider being available in a territory as opposed to two or three providers serving the same region – in short, the difference between a monopoly situation and a competitive situation. As well, the data do not differentiate between the presence of a single instance of a broadband connection in a zip code as opposed to one intensively used in a region, undercutting the interpretive power of their numbers. (The Agency addressed some of these shortcomings in March, 2008, when it adopted a new plan that will measure broadband availability in terms of the geographically smaller unit of the Census tracts, a tract being composed of several census block groups, which in turn are composed of several census blocks. The agency also will note five categories of speed in its assessments.[13])

The agency's March 2008 report *High-Speed Services for Internet Access: Status as of June 30, 2007*[14] presents information about deployment and subscribership to broadband, including advanced services from wireline telephone companies, cable operators, terrestrial wireless service providers, satellite service providers, and any other facilities-based providers.[15] Its results include that more than 99% of the country's population lives in the 99% of Zip Codes where a provider reports having at least one high-speed service subscriber; and that high population density is positively associated with subscribership to high-speed Internet. In contrast, low population density shows an inverse association.

Their data would seem to illustrate widespread availability of broadband access, yet anecdotal and other surveys disagree with the findings.[16] For example, the General Accounting Office (May 2006)[17] issued a report to Congressional Committees (http://www.gao.gov/new.items/d06426.pdf) critical of the FCC's determination of broadband deployment in the US. It recommends improvements, and notes:

> For its zip-code level data, the FCC collects data based on where subscribers are served, not where providers have deployed broadband infrastructure. Although it is clear that the deployment of broadband networks is extensive, the data may not provide a highly accurate depiction of local broadband infrastructures for residential service, *especially in rural areas* (p. 3).[18]

> It is more costly to serve areas with low population density and rugged terrain with terrestrial facilities than it is to serve areas that are densely populated and have flat terrain. It also may be more costly to serve locations that are a significant distance from a major city. As such, these important factors have caused deployment to be less extensive in more rural parts of the country (p. 4).

> Households residing in rural areas were less likely to subscribe to broadband service than were households residing in suburban and urban areas. Seventeen percent of rural households subscribe to broadband service, while 28 percent of suburban and 29 percent of urban households subscribe to broadband service. We also found that rural households were slightly less likely to connect to the Internet, compared with their counterparts in suburban areas (pp. 12-13).

In two other studies examining deployment, Grubesic and Murray (2004)[19] examined the incidence of broadband competition in the U.S. across a year and a half period, concluding that there is a clear urban-rural hierarchy in broadband Internet access as a function of competition, and that although competition continues to increase at the national level, rural and smaller metropolitan areas often fail to benefit from high levels of broadband competition, compared to many metropolitan areas. Prieger (2003)[20] analyzed comprehensive telecommunications services data covering technologies,

demographics, language, market size, location, and telcos. His core findings include that while a rural location decreases availability of services, market size, education, Spanish language use, commuting distance, and a Bell Operating Company presence increases availability. In contrast to other studies he found little evidence of inequality based on income or on black or Hispanic population concentration, and mixed evidence concerning availability on Native American or Asian concentration.

Naturally many studies of the digital divide invoke considerations of Internet access as well as basic access to computers and the training to use them. Focusing on access alone does not explain the broader problem of technological literacy that faces rural regions, and several studies document the systematic lags that rural regions have experienced in computer ownership and use, Internet use, and broadband availability.[21] Certainly issues of broadband availability are necessary but not sufficient components of a thorough-going understanding of the problems rural areas face as they grapple with the information economy dynamics of the 21st century.

State Programs

Over the past several years many states also initiated their own universal service programs, generally in response to changing competitive circumstances within their own regions and the prospect of reduced federal support to carriers. For the most part, they obtain funds directly from telecommunications customers or from telecommunications companies that in turn assess a fee on customers. A study by the Government Accountability Office found that state universal service, generally aimed at telephone service, favor services for the deaf and disabled as well as lower income households, typically concentrated in central city and rural regions (GAO, 2002, p. 13).[22]

As noted earlier, several states initiated programs or projects to explore or expand broadband access, among them Texas' Telecommunications Infrastructure Fund (Chapman, 2005)[23] and Michigan's well publicized State Technology Plan (dating from 1998) and LinkMichigan initiative (launched in 2001). A more recent crop of initiatives has been spearheaded by telecommunications companies and private sector advocates, with ConnectKentucky being in the vanguard of efforts to cooperatively develop telecommunications capabilities through coordinated and locally-based efforts. California took a somewhat different approach when it passed Executive Order S-23-06, *Expanding Broadband Access and Usage in California*[24] in 2006, and more recently, assembled a comprehensive Broadband Task Force Report that systematically analyzes existing broadband infrastructure throughout the state and identifies policy actions to enhance connectivity and Internet use throughout the state (California Broadband Task Force, 2008).[25]

Finally, the Federal-State Joint Board report of 2007 urges the federal government to work closely with states in order to apply universal service funding at a more granular level to unserved or underserved regions that actually need direct support. If this recommendation is implemented, there will be much more activity targeting the status of broadband access in rural areas within states.[26]

The overall picture of state-level universal service projects is encouraging, but still there is a great deal of variation across states in how they think about telecommunications services – both telephone and broadband access – for rural regions. Some profoundly rural states appear to ignore the issue entirely while others are more

proactive. The prospect of a more integrated federal-state approach probably would help the situation a great deal.

Federal Universal Service Program

Noted professor of law Tim Wu stated in a 2008 interview that "How the broadband Internet is regulated and what kind of capacity it has in the first place is now going to become the obsession of Hollywood, of Washington, New York, the whole country, as we discover what 21st century media policy looks like."[27] When it comes to considerations of the Internet, the primary federal response to enhancing broadband access in rural regions has taken shape through the Universal Service programs. Most of the $6.5 billion budget for the federal universal service programs goes to the High Cost program (roughly 70% of outlays) and the Schools and Libraries Program (roughly 25% of outlays) according to the Congressional Budget Office figures for 2004 (CBO, 2005).[28] Rural regions benefit significantly from these two programs. Nevertheless, as the universal service fund faces shortfalls (even though not all of the program receipts are always allocated) and with new technologies such as voice over IP at once promising improved services to rural areas[29] but also displacing some of the services that traditionally contributed to the universal service program, profound changes in the philosophy and operations of the universal service program are necessary if rural areas are to keep pace with the rest of the country.

While the E-Rate program favors less economically well off areas – which generally includes rural regions – it does not directly or solely tackle the access problems that plague rural residents. Most specifically, even though E-rate programs are highly valued, many rural and especially minority populations do not feel able to use or

comfortable with computers and Internet access in institutions such as a public library or a school. Additionally, there is growing evidence that *regular* use of computers and Internet access - the sort of use that implies ready access either at home and/or at work – contributes to productivity gains.

The High Cost program has doubtless been helpful to maintaining telephony in rural regions that face greater than average expenses relating to low population density and greater distances within their physical plant. This funding has been use to upgrade lines so that Internet access is available. However, the ballooning demands on the universal service fund have a great deal to do with a relatively new crop of wireless carriers' desires to receive a portion of the fund (as Eligible Telecommunications Carriers), and this has little to do with a genuine upgrade to the telecommunications - especially broadband - capabilities of rural regions.

More significantly, the Joint Federal-State Board that monitors broadband services under the 1996 Telecommunications Act offered trenchant recommendations to reform universal service in its report *In the Matter of High-Cost Universal Service Support Federal-State Joint Board on Universal Service* (CC Docket No. 96-45),[30] adopted by the FCC in November, 2007. In particular the Joint Board espouses an approach that argues for a *comprehensive* policy that will address the problems of broadband in rural regions, complaining that the historically piecemeal problem-solving tactic is insufficient to solve contemporary problems of access.

Whether universal service funds should directly support rural broadband deployment remains to be seen. Several bills introduced in 2007 would build broadband services directly into universal service. The Universal Service for Americans Act[31] and the

Universal Service Reform Act of 2007[32] would have explicitly broadband, including in the case of the former creating a fund specifically for broadband in unserved areas and in the case of the latter explicitly funding broadband and creating a broadband mandate. Suffice it to say that the picture is considerably complicated by the demands of wireless carriers on the existing fund, a demand that deflects attention from the broader issue of broadband connectivity.

Access and Use

Lags in rural regions in network infrastructure parallel historical lags in computer ownership and use. The National Telecommunications and Information Administration studies in the late 1990s and early 2000's statistically analyzed computer ownership and Internet access by race, household income, location, education and other demographic indicators, and became a short-lived benchmark for documenting a "digital divide" in the US (US Department of Commerce, 1995, 1998, 1999, 2000).[33] However, the surveys never went much further than simply illustrating "lags" across ethnic and racial groups, age categories, income, education and location categories. While gaps between males and females, for example, in terms of computer and Internet use declined over time, the gap between urban and rural regions in terms of Internet use – though reduced – endured.[34] [35] More current results from the Pew Internet and American Life Project (2006) provide data summarized in Tables 4-6. As is evident, rural households report less access to home broadband, less access to broadband at work, lower frequency of using the Internet and fewer online activities compared to urban and suburban regions (Table 4).[36] According to the Pew Internet and American Life Project's statistics, the share of Americans who have

broadband connections at home has now reached 42% (about 84 million), up from 29% (about 59 million) in January 2005 (Pew, April, 2006).[37] [38]

Table 4 Internet Access and Use by Community Type – all Internet users

However, rural penetration lags urban penetration. Pew's data from earlier in 2006 shows a 15% difference between the two regions in terms of broadband subscription, in spite of the fact that the populations' interested in having broadband appears to be equivalent. As well, some rural telephone companies report lower subscription rates for broadband compared to urban DSL, although in many of those cases the price of the service also is higher in rural than in urban areas. Finally, some studies illustrate that various Internet use divides – the geography-based digital divide as well as those related to age, education and race/ethnicity - are linked to opportunities for understanding the applicability of Internet-based resources to daily life and for training with computers.

A lower penetration rate of broadband Internet, and the slower speeds that typify rural Internet networks, may be key factors to distinguish the differences in Internet *use* (as opposed to access) between rural and urban people. As the following table from the Pew data indicates, there are only small differences in Internet uses for broadband users in rural and those in non-rural areas. In other words, we observe that with respect to both frequency and intensity of Internet use, rural and non-rural people are nearly equally likely to use the Internet when it *is* available.

Table 5 Internet Use by Community Type – home broadband users

However, there are differences in "lifestyle" in different locations that may be carried over to online activities, as illustrated in Table 6.

Table 6 Online Activities by Community Type – all Internet users

The possible explanations for differences in Internet use related to lifestyle include:

- The distance from transportation services (airports, train stations) makes travel costlier for rural Americans and hence the Internet is more attractive.
- A combination of less availability of online banking and traditional habits (in-person banking) in rural areas decreases the likelihood of rural Americans to use online banking.
- Since online classified services are organized around specific cities, rural Americans may have less interest in them.
- The absence of large electronic stores selling computer game software in rural areas encourages rural Americans to download such software online.
- Greater distances from colleges or educational institutions increases rural Americans taking classes online.
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Other research on the business use of broadband in rural areas also has found core differences between rural and urban settings. Pociask's (2005)[39] *Broadband Use by Rural Small Businesses* found that rural small business less frequently subscribe to broadband and that they are less likely to benefit from the range of new technologies that broadband facilitates (such as Voice-Over IP). Oden and Strover (2002)[40] likewise noted major differences in rural business operations when broadband access to the Internet was incorporated into operations compared to other rural businesses not using the Internet or broadband connections.

The broader outcomes associated with computer and Internet access are presented in muddy, ambiguous ways in much of the literature. Assumptions regarding the need for certain skills and the implicit benefits abound, but there is little research on the actual life-changing force of such "improvements." In general, we lack strong empirical results that provide compelling evidence that economic and community development goals can be realized through programs of computer and Internet access.[41] If one broad social goal in the U.S. over the past ten years has been to facilitate access, the more important goal of ensuring that access is *meaningful* for communities and individuals has slid off the agenda. Put another way, there is scant evidence that telecommunications can transform lives in the absence of change in other structural features such as household income and education levels.

In this regard, rural communities have frequently been in the vanguard in actively attempting to mold their communications environments through locally-based efforts such as municipal Wi-Fi, public computer and Internet access or cable television services. Universal service programs, specifically the e-rate program benefiting schools and libraries, have been helpful to institutions such as schools and libraries, which in rural areas often lack funding for such technology. Nevertheless, such programs have a difficult time entirely compensating for the lack of economic capital that is typically required to purchase computers, become educated about them, or maintain costly subscriptions to broadband services. For example, as of 2004 the nonmetro earnings per nonfarm job were $31,582 compared to metro area earnings of $47,162.[42] Given equivalent rural-nonrural demand for and interest in Internet services, the absence of both suitable network infrastructure combined with lower ability to pay for broadband services

means that rural regions will not match nonrural areas in terms of their ability to fully utilize the capabilities of contemporary communications networks.

Challenges: Why Rural Regions Need Broadband

If national and state level policies have done little or simply not enough to improve the environment for affordable and ubiquitous broadband access in rural areas, should we really care? Population continues to migrate from rural areas, and many of the economic endeavors located in rural regions, such as farming and manufacturing, now require very little human labor because they have been mechanized. Daniel Bell's vision of an Information Society[43] (Bell, 1971) nourished critics who warned that the uneven pattern of development associated with contemporary economic drivers of telecommunications technology could lead to profound inequities in certain regions and for certain populations (Castells, 1996; Schement and Lievrouw, 1987; Hepworth and Robins, 1988; Mansell, 2000).[44] Others argued that the "trickle down" effects of telecommunications-based capabilities would bring important benefits to even the most remote areas (Schmandt et al., 1991).[45] In the 1970s and 1980s, the optimistic arguments around the so-called "death of distance" thesis were particularly popular (later publicized by Frances Cairncross, 1997)[46]; however, they have given ground to the more recent, spatially-based views of the society and the economy that can explain the geography of a new information economy with specific reference to dynamics such as the uneven telecommunications capabilities evident in rural America (indeed, in rural regions throughout the world) (Strover, Oden, and Inagaki, 2002; Castells, 1996).[47]

The distribution of telecommunications capabilities tracks that of other human resources: where there is more wealth and more education, the resources tend to be more

plentiful; where there is knowledgeable leadership, the capabilities increase; where multifaceted coalitions of groups or organizations join together to plan and share assets, they multiply. In other words, the spatial distribution of telecommunications resources has to do in part with the actual hard- and software, but it also has to do as well with human resources being available in order to exploit the infrastructure's potential.

We observe that rural regions share with urban areas the broader economic trends that have incorporated information technology into all productive activities. While companies such as Goggle, AOL, Cisco and Dell epitomize contemporary information companies, in fact virtually all consumption and production sites in the U.S. - from Wal-Mart to the local paper mill, from the grocery store to the concert theatre - incorporate computer-based information systems and technologies. Rural regions' traditionally resource-dependent industries are no exception, and some of the newer activities expanding in such areas – recreation and retirement centers are locating increasingly in rural regions – will also depend on information infrastructures. For example, as retirement communities begin to flourish in rural regions, one can anticipate a migration of the information-intensive health industry will follow. Research in some of the most distressed region of Appalachia found that in locations where local businesses and services - whether health, education, banking, manufacturing or services - incorporated telecommunications capabilities, the communities enjoyed improved productivity (Strover and Oden, 2002).[48] Telecommunications-intensive industries have a special role in bringing more infrastructure and knowledge to a community, and while many such industries are not located in rural areas, their influence is particularly striking when they do locate in less populous regions.

Information industries and technologies penetrate virtually all sectors of life, and they dynamically interact with local strengths to create new capabilities. This pattern renders pointless any policy-based separation of information and telecommunications technologies from activities in the normal domains of education, culture, and work. These technologies create access to opportunities on all fronts, and rural regions must be able to use them, to harness their power lest we move toward a two-tier society, with rural areas a true backwater.

Thus the challenges to rural access are several. They entail (1) recognizing the significance of this infrastructural element to all aspects of life in rural – and metro – regions of the country, and incorporating into economic, educational, and social policies the budgets and practices that exploit telecommunications' potential; (2) conceding that marketplace dynamics do not deliver timely services to more remote and less populous regions and developing improved mechanisms to improve services in those regions; (3) crafting programs that systematically augment the range of services and available training and expertise around broadband services in rural regions.

Recommendations

What can we say about universal service and telecommunications in rural areas?

- The demand for "advanced" services seems more uncertain in rural regions than in metro areas, but studies show that when access exists, demand appears to track the use rates in metro areas.
- The broadband deployment data produced by the FCC are problematic, and connectivity in rural areas is still questionable; population surveys indicate it is inadequate.

- Although the FCC appears to believe that broadband connectivity is widely available in rural areas, such connectivity in only a first step; it is a necessary but not sufficient element required to exploit the powers of new technologies. Knowledge and expertise around new broadband applications that expand alongside improved network capabilities are less well developed in rural regions.
- Access and use data suggest rural populations do not have home or work-based access to broadband on a basis comparable to that of metropolitan regions.
- Small businesses in rural areas do not incorporate access to the Internet into their operations as ably as do small businesses in metropolitan regions.
- The E-rate program doubtless has benefited rural areas, but there appears to be no *special* advantage to rural states (those with lower population densities) in terms of garnering these funds. It remains an open question as to whether, in the absence of E-rate funds, rural schools and libraries would be able to maintain their educational technology infrastructure.

Drawing on economist Amartya Sen's capabilities approach, an alternative vision of universal service and its contribution to rural populations must focus on cultivating peoples' ability to improve their lives – with the specific nature of those improvements to be determined by people themselves (Sen, 1999).[49] This in turn requires renewed focus on self determination in the communications/telecommunications environment, a process made more viable with the onset of new media, networks, and varieties of telecommunications services. Public policy that acknowledges not just parity with urban regions but also self determination is what could revitalize the applications of telecommunications to life in rural regions. While reformulating the principles of

universal service is no small undertaking, the time could not be better to do so: the legacy models of regulation, of technology definitions (information services, telecommunication services), of regulatory ability, and of accountability are splitting apart and becoming unmanageable. A new valuation methodology that is technology neutral but *outcomes sensitive* is what can shape telecommunications services to the varied needs, strengths and opportunities resident in rural areas – indeed all areas of the country.

A capabilities approach to universal service would alter the terms of how we think about this constellation of priorities. It implies at minimum (1) a *process* of ascertaining needs and localized constructions of priorities and (2) broadening the range of what could be supported under this program. Some of these principles are embedded in the recommendations of the Federal State Joint Board report from 2007.

Infrastructure availability, content applicability, pricing, and training are the four pillars affecting rural Internet subscription and use. Viable programs influencing these factors can take several forms. Since simple deployment alone, however, appears to be an insufficient driver, any programs stimulating deployment must be linked to investments in training and use. Continuous formative and summative evaluations are essential in order to monitor the utilities of these programs for individuals and communities. The following options focus on building community capabilities; they are premised on the notion that cultivating them will ultimately draw additional vendor interest. In other words, a capabilities approach to public policy enhances social goods and can work with a market-based approach to telecommunications.[50]

Recommendation 1:

Adopt a national broadband policy that is capable of guaranteeing sustained investment in telecommunications infrastructure. The country requires constantly updated capabilities that are affordable and available to all.

Recommendation 2:

Grants for Internet training. These could be block grants and must be outcomes-oriented and outcomes-dependent. The target populations could be not only individual users but also small businesses. Increasing small business use of the Internet could have tremendous economic impact on rural regions. Grants within states themselves could go to various entities, including non-profits, towns, county and local government units, etc.

Recommendation 3:

Universal service funds should enhance communities' projects for extending their telecommunications capabilities. They could be used to match local investment in infrastructure, connectivity, public access and similar access technologies. Provide broadband infrastructure development and use incentives to communities that can demonstrate they are ready to develop both their own facilities/expertise as well as their abilities to use these facilities. Communities should match federal investment in some manner. Communities could purchase broadband services or develop their own infrastructures.

Recommendation 4:

Invest in community college-based Internet applications capabilities classes for individuals and small businesses. Create incentives for colleges that enroll small business owners, with some outcome-based measure being the trigger for an incentive "subsidy" or payment.

Recommendation 5:

Create “Rural Leadership Academies” that select aspiring or actual rural leaders for two-three weeks of leadership training, which would include training in not only using the Internet but also training in running computer education clinics or courses, in “nuts and bolts” of broadband infrastructure, and in resource-sharing across institutions. The Leaders would be charged with catalyzing Internet availability and use in their respective communities, leaving it to them to decide what makes most sense for their own unique circumstances.

Summary

Recent FCC activity around broadband connectivity is beginning to awaken to this infrastructure’s significance in the lives of all Americans. Re-defining broadband as at least a speed of 768 Kbps, as was adopted in March, 2008, begins to suggest that the Commission recognizes that an important dimension to this service is speed, but a more long term approach would dispense with interim markers doomed to be outmoded and instead focus on capabilities and why we want and need to utilize broadband services.

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[1]Sharon Strover, "Rural Internet Connectivity," *Telecommunications Policy* 25 no.5 (1999): 331-347.

[2]GTE was the largest independent telephone company, rivaling some of the Bell companies in terms of size. It merged with Bell Atlantic to become Verizon in 2000. AT&T has re-merged with most of the companies it originally spun off after its divestiture in the early 1980s.

[3]AT&T’s merger with Bell South was approved at the end of 2006.

[4]Cell phone service is absent in many rural areas even if a carrier has the authorization to provide service in the region. A typical practice is to establish service in only the most populous town of a rural area licensed for mobile services.

[5]In section 12 the report notes "The Broadband Fund would be tasked primarily with disseminating broadband Internet services to unserved areas, with the support being expended as grants for the construction of new facilities in those unserved areas. A secondary purpose would be to provide grants for new construction to enhance broadband service in areas with substandard service. Another secondary purpose would be to provide continuing operating subsidies to broadband Internet providers serving areas where low customer density would suggest that a plausible economic case cannot be made to operate broadband facilities, even after receiving a substantial construction subsidy."

[6]Cable television is the sole exception to this pattern, but even it was originally motivated by rural communities' desire to receive the television signals that populations in more metropolitan regions already enjoyed.

[7]Robert Horwitz, *The Irony of Regulatory Reform* (New York: Oxford University Press, 1989)

[8]FCC, Trends in Telephone Service. Industry Analysis & Technology Division, Wireline Competition Bureau (2005).

[9]Strover, Sharon, "Rural Internet Connectivity." *Telecommunications Policy* 25 no. 5 (2001): 331-347.

[10]It was increased to a standard of 768 Kbps in March, 2008.

[11]This policy pronouncement grew out of the High Performance Computing and Communication Act of 1991.

[12]Statistical data and summaries are available at Local Telephone Competition and Broadband Deployment (http://www.fcc.gov/wcb/iatd/comp.html).

[13]See www.washingtonpost.com/wp-dyn/content/article/2008/03/19/AR2008031903356.html.

[14]FCC (2008), *High-Speed Services for Internet Access: Status as of June 30, 2007.*

[15]Previous releases of additional broadband statistics are available at www.fcc.gov/wcb.stats. This report can be seen at http://hraunfoss.fcc.gov/edocs_public/attachmatch/DOC-280906A1.pdf.

[16]See for example Robert Atkinson, "The Case for a National Broadband Policy," *Information Technology and Innovation Foundation* June 2007 < http://www.itif.org/files/CaseForNationalBroadbandPolicy.pdf> **(Access Date).**

[17]General Accountability Office, "Broadband Deployment Is Extensive throughout the United States, but It Is Difficult to Assess the Extent of Deployment Gaps in Rural Areas," 2006, <http://www.gao.gov/new.items/d06426.pdf> (Access Date).

[18]For example, under the present data collection scheme, FCC counts a Zip Code as covered by broadband service if it contains at least one broadband subscriber. Also, a Zip Code is counted as broadband service area even if carriers only serve businesses. As a result, the number of Zip Codes serving broadband services is likely overstated in terms of the availability of residential broadband services. Additionally, there is no consideration given to the price, speed or availability of connections across the Zip Code.

[19]Tony H. Grubesic, , and Alan T. Murray, "Waiting for Broadband: Local Competition and the Spatial Distribution of Advanced Telecommunication Services in the United States," *Growth & Change* 35 no. 2 (2004): 139-165.

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[23]Gary Chapman, "Missing Links: Lessons on the digital divide form Texas' Telecommunications Infrastructure Fund," 2005, <http://telecom.cide.edu/include/internet_conference_2005/Gchapman_paper.pdf> (Access Date)

[24]California, State of, Executive Order S-23-06 *Expanding Broadband Access and Usage in California* (2006).

[25]California Broadband Task Force, *California Broadband Task Force Report* January, 2008, <http://www.calink.ca.gov/pdf/CBTF_FINAL_Report.pdf>(15 April 2008).

[26]The Federal State Joint Board Report, 2007, Section 13, states, "Effective use of federal funds for broadband will require a detailed knowledge of the areas in which effective terrestrial broadband service is unavailable. Collecting information on areas without broadband or where broadband is substandard is a complex task. Broadband availability can vary on a street-by-street basis, sometimes on a house-by-house basis. Moreover, the facts can change quickly, for example when a wireless Internet service provider opens or closes its doors. To effectively apply federal funds to expand broadband deployment, primarily through new construction grants, it is essential that the agency responsible for dispensing the funds have access to detailed, current geographic information. The Joint Board believes that the Commission has engaged in some broadband mapping activities, but not at the scale necessary to administer broadband construction grants. States are generally more capable of performing this task, in large part because they have smaller areas and have more sources of information about local needs. Moreover, several states have already assembled data approaching or exceeding the required level of accuracy.

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[28]Congressional Budget Office, *Financing Universal Service* 2005, <http://www.cbo.gov/showdoc.cfm?index=6191&sequence=0> (12 September 2006).

[29]Voice over Internet Protocol, for example, would substitute an "Internet" connection for a landline connection, and one type of service had contributed to the universal service fund while the other did not. In June, 2006, the FCC added VoIP to the list of universal service contributors; however, the same issue will be faced with other new technologies in the future. The drain on universal service funded posed by multiple wireless service providers was recognized as a growing problem by 2006.

[30]Federal-State Joint Board on Universal Service, *In the Matter of High-Cost Universal Service Support* (CC Docket No. 96-45) (2007).

[31]U.S. Congress, January 2007. S.101.IS Universal Service for Americans Act.

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