

# Organizing to Promote Broadband: Matching Structure to Broadband Policy Goals

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## 1. Introduction

In April 2010, the US Court of Appeals for the District of Columbia ruled that the Federal Communication Commission (FCC) had overstepped its authority in reprimanding Comcast for having interrupted users of BitTorrent file-sharing services. In a unanimous decision, the Court ruled that the FCC's attempt to use Title I of the Communications Act to execute its policy favoring an Open Internet was blatantly illegal. The consequences of the Court's decision might seriously undermine the FCC's efforts to promote broadband technology. As described by Art Brodsky, the communication director of Public Knowledge:

It was a pretty strong opinion as these things go. It was crucial because everything the FCC wants to do with its broadband strategy is dependent on questionable legal authority as a result of that court ruling (Brodsky, 2010).

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This episode is not the first time that opponents of communication-related policies circumvented substantive issues by framing their arguments in jurisdictional terms that focus on the FCC's authority to act. One need only recall, for example, that it took critics only two years, after the passage of the 1996 Telecom Act, to challenge the FCC's role in implementing it. In this particular case, the States contested the FCC's Common Carrier docket 96-98 (carrier interconnection order) in court, claiming that the FCC lacked the authority to establish interim proxy prices, or to prescribe specific pricing methodologies that the FCC might use. Agreeing with the States on jurisdictional grounds, the US 8<sup>th</sup> Circuit Court of Appeals overturned the FCC interconnection order on July 18, 1997. A few months later, the Court of Appeals reiterated its position when the States again brought suit against the FCC—this time charging that the Agency had sought to use section 271 of the Communications Act as a way of evading the Court's earlier ruling on the interconnection order (Rockwell 1997a; Rockwell 1997b).

What makes the present situation unique and interesting from a policy perspective, therefore, is not just that the Federal Communication Commission and its behavior are at issue, but also—and perhaps more importantly—that the FCC has actually taken a stand in defending its authority. For, over the years, the FCC has often been accused of cow towing to industry's interests, and backing down when politics became too intense (Garcia 2001).

Before casting judgment, however, we must remember that the challenges entailed in implementing policies, when they go against industry interests, should not be underestimated (Bradley 2010). One need only recall, for example, the problems that former FCC Chairman Reed Hundt faced when he acted to implement the 1996 Telecom

Act. According to Hundt, the Act's failure was due not to the over zealousness of the FCC, but rather to the contentiousness of the American legal culture, and the complexities of the US judicial system. As he described the problem: "When it comes to legislation, between the thought and the deed falls the shadow system. The shadow," he said, "is cast by the millions of lawyers in America" (As quoted in Braun, 1997). From Hundt's perspective, the FCC needed to have more, not less, authority if it were to successfully implement the Telecom Act. Curiously enough, today, Blair Levin, Director of the Omnibus Broadband Initiative, has echoed Chairman Hundt's sentiments. On departing the FCC after the completion of the plan, Levin actually questioned whether, given industry's leverage and the recent decisions of the Court, the Broadband Plan is even implementable (Lasar 2010; Morrissey 2010).

It is all the more significant, then, that FCC Chairman Genachowski did not simply back down upon hearing the Court's decision, nor in the face of industry protests (Hart 2010). Intent on pursuing an Open Internet policy, he took a different tack—one might say killing two birds with one stone. Genachowski not only reasserted the FCC's authority to set policy as laid out in the Communications Act; he also acted to bring broadband within the regulatory framework of the FCC by changing broadband's classification from an information service (type I), which are exempt from regulation (Wollacott 2010), to a communication service (type II), which are subject to regulation<sup>2</sup>.

Elaborating on his approach, and asserting his right to pursue it, Chairman Genachowski

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<sup>2</sup> Broadband services were deregulated and reclassified as an "information service," in 2005, during the Reagan Administration. Cable, which provided equivalent services, was not regulated; so the aim was to provide all ISPs a level playing field. The decision was also in keeping with the deregulatory climate of the day.

described his policy as a “Third Way”—that is to say, an approach that entails only *light* regulation. As he explained, the aim is not to regulate broadband pricing, or to require the owners of broadband infrastructure to share their assets; rather, the intent is to assure that the FCC has the legal authority to carry out its obligations, especially as they relate to broadband (Reardon 2010).

This set of events, which has its origins going back to the 1996 Telecommunication Act (if not before) have generated considerable turbulence in the communications policy arena. Thus, even as some parties in industry call for further constraints on the FCC, others raise questions about whether or not the 1996 Act needs to be revamped to provide the FCC with greater authority (Media Berkman 2010). The present situation is not, however, in a state of stalemate. As complexity scientists tell us, chaotic situations, such as the one in which we find ourselves today, can produce major structural changes, in the form of phase transitions (Buchanan 2002). With everything upended, the future is up for grabs, providing a window of opportunity to overcome the legacy of the past, and perhaps even redesign the nation’s communication system to better meet the needs of the 21<sup>st</sup> century. One hopeful sign in this regard is that, shortly after Chairman Genachowski announced that he would exercise his broadband authority, the chairmen of major Congressional committees stated that they were interested in considering these contentious issues in the context of a revised Telecommunications Act (Media Berkman 2010).

This paper is thus a thought piece—stimulated by the prospects of a new Telecommunications Act and written based on the assumption that such an Act might be in the offing. Focusing on the Broadband Plan, it asks what kinds of organizational

capacity will be required to implement it, and where might that capacity best be housed. To address this question, the paper proceeds as follows. First, it examines the FCC Broadband Plan and the kind of goals that it has set out. Based on this discussion, section two argues that broadband should be conceived less as a *deployment problem* (as has traditionally been the case) and more as a *diffusion problem*. The next section examines the criteria for successful diffusion efforts, as laid out by Everett Rogers. Drawing on those criteria the following section identifies the types of organizational capacity that will be required to meet these criteria. Section Five examines the historical case of the Rural Electrification Administration, which was designed, in effect, around a diffusion model. In concluding, the paper asks whether it is possible to build some of the successful aspects of the REA experience into a National Broadband Plan

## **2. The National Broadband Plan**

Section 706 of the Telecommunications Act of 1996 called upon the Federal Communication Commission to encourage the deployment of advanced networking capabilities. Acting on the belief that competition would reduce costs and encourage investment, the FCC relied almost entirely on the market to achieve this goal. Hence, it classified Internet services as ‘information services,’ a classification over which it has little, if any, regulatory authority (GAO 2009). While touting the importance of broadband services, subsequent administrations maintained this same approach<sup>3</sup>. Contrary to the

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<sup>3</sup> As the GAO has characterized these policies: Officials at OSTP, FCC, and NTIA during the Bush Administration told us that current federal broadband policy was market-based; OSTP told us that the Bush Administration had implemented fiscal, technology, and regulatory policies based on the recognition that a competitive marketplace provides the

expectations associated with this policy, the United States continued to fall behind other countries in providing universal access to broadband services at affordable prices (GAO 2009). It now ranks 15<sup>th</sup> among OECD countries (GAO 2009). Responding to growing concerns lest our lagging infrastructure negatively affect US competitiveness, the Obama Administration took up the broadband torch as part of its stimulus package. In February 17, 2009, a little more than a year after Obama assumed office, the Congress passed the American Recovery and Reinvestment Act of 2009, which called upon the Federal Communication Commission to develop a National Broadband Plan, which would provide a roadmap for ensuring that every American has affordable access to broadband capability (FCC 2009). To this end, the Act provided more than \$7 billion to promote universal broadband access.

Mirroring the fractionated nature of the US communication policy arena, the American Recovery and Reinvestment Act distributes responsibility for promoting broadband across a number of federal agencies. Thus, NTIA received funding to develop a broadband inventory map; the FCC was called upon to develop a national broadband plan; NTIA, in consultation with the FCC, is charged with establishing a grants program—the Broadband Technology Opportunities program; and RDUP is charged with issuing loans, loan guarantees, and grants to increase broadband accessibility (GAO 2009). Of

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best environment for achieving the United States' broadband goals, and competitive markets should be deregulated; an official at FCC characterized FCC's broadband policy in recent years as one that reduced barriers to entry, lessened regulation of broadband, and encourage investment; and NTIA told us that federal broadband policies of the past few years flow from an early speech made by President Bush that emphasized the deployment of broadband, and that NTIA had executed to remove economic disincentives." (GAO 2009: 14).

course, notwithstanding this division of labor, the Act requires cooperation and coordination among these agencies responsible for implementing the Broadband Plan. Thus, for example, the FCC is responsible for developing an evaluation of the projects funded by the Act. Likewise, the FCC will need access to NTIA's data set in order to determine what, exactly, is an underserved area (GAO 2009).

Having been vetted through a number of different venues and arenas throughout the country (RUS 2010), the FCC's Broadband Plan was finally released on March 16, 2010. It was an ambitious plan, embodying almost 200 recommendations (Gross 2010; Bradley 2010).

The FCC's National Broadband Plan lays out broad strategies and policy goals intended to be recommendations to Congress on how to provide high speed Internet access to homes and communities across the country. The Plan lays out six major goals that include providing broadband access to 100 million homes by 2020, placing the United States at the international forefront of innovation and speed; providing every American with affordable access and the skills needed to subscribe; providing access to communities to be utilized by non-profit and public institutions; providing a nation-wide public safety network to first responders; and providing Americans the opportunity to trace and manage their energy consumption in real-time. (FCC 2010: 25-27).

The plan focuses on three major strategy areas that include investment, adoption and utilization for public services like health care and education. Each section contains numerous recommendations to Congress and other agencies, such as the National Telecommunications and Information Administration, intended to meet the various goals

over the next decade. The first section, entitled, “Innovation and Innovation and Investment,” calls on the government, the FCC, the NTIA and Congress to free up wireless spectrum for use by Internet Service Providers. The aim is to encourage wireless-wireline competition at higher speeds. It also calls on the Bureau of Labor Statistics to provide detailed data on broadband availability, penetration, and prices (FCC 2010: 129). The section also lays out recommendations for lowering infrastructure costs and for government investment in research and development projects.

The plan also calls for strategies of inclusion and adoption, citing that 100 million American homes are without broadband and that approximately 14 million Americans lack access to broadband infrastructure. While it emphasizes that many of those who lack access may choose to forego service because they see no need for it in their homes, others either cannot afford service (or computers for that matter) or lack the skills needed to utilize the services effectively. The Plan cites growing digital exclusion among the most marginalized members of society—ethnic and racial minorities, senior citizens, the disabled and those living on tribal lands (FCC: 2010; 129). Among a few of the recommendations laid out to combat this phenomenon are projects designed to integrate non-subscribers into the broadband ecosystem, such as providing funding aimed at enabling a “universalization target” of 4 Mbps of download and 1 Mbps of upload speeds, the highest in the world (FCC 2010: 135). The plan furthermore addresses the need to eliminate cost barriers, as well as lower digital illiteracy by launching a public training service in the form of a National Digital Literacy Program (FCC 2010: 168).

The third, and last, major section of the plan cites a “diffusion lag” in the nation’s public service sector. The aim of this section is to offer up recommendations that will enable services such as health care, education, first responders, and government to be integrated into an ecosystem and to develop a “digital culture” and more transparency. This section seeks to encourage environmental awareness and civic engagement among the citizenry by integrating broadband into the smart grid, allowing users to track their energy consumption in real-time and creating a more transparent government by connecting government and citizens through social media environments (FCC 2010: ch. 12 & 14). This section also recommends creating a public safety broadband response network that will allow first responders to send and receive voice, video and other data more efficiently, and to allow the public to access emergency services across a range of communication platforms (FCC 2010: 313).

The section also recommends creating incentives for widespread e-care adoption and ensuring connectivity for health care response locations that include replacing the Internet Access Fund with a Health Care Broadband Access Fund and allocating moneys to upgrade the broadband service for health care providers operating on tribal lands (FCC 2010: 200). In the area of education, the plan lays out strategies to promote online learning that include the sharing and licensing of digital educational content, reforming state accreditation organizations to allow for more online credit courses and online teaching across states lines, as well as integrating digital literacy standards into curricula (FCC 2010: 244).

The last chapter offers up a statement and guide for the plan's implementation, pointing out that the plan itself is expected to be ever changing. It recommends that the Executive Branch establish a Broadband Strategy Council to coordinate the plan's implementation and allow the FCC to regularly update and publish timetables and status reports on the plan's development (FCC 2010: 333).

While stakeholders have generally applauded the intent of the plan, there are many who question specific aspects of it (Ritchel and Stelter 2010; Bradley 2010b). For example, some in the high tech community and many others representing minority groups and community-based organizations say the plan doesn't go far enough (Bradley 2010b). Some members of the industry are also ambivalent; they want more details, fearing that—in the end—the Plan might serve to discourage investment. Broadcasters, in particular, are concerned lest spectrum to be made available for broadband will come at their expense. At the same time, many public interest groups are disappointed that the plan does not recommend 'open access' rules that would require the big phone and cable TV companies to lease their networks to rivals so they can offer services at their own prices (Tessler 2010).

A more fundamental criticism of the plan relates to its underlying rationale. Much in keeping with past telecom policy, the Broadband Plan is essentially a technology deployment strategy, relying on industry to provide the momentum for adoption, by competing and driving prices down so that more people can afford to purchase Internet access. The value of this approach is questionable, however, not only because past efforts in this regard would appear to have failed to meet their objectives, but also because recent

survey data suggest that the present limits to usage do not represent so much of a *real supply problem*, but rather a *significant demand problem*.

Thus, for example, according to a recent PEW research survey (Horrigan 2008) private Internet connectivity has only risen by 3% over the last year, and of those surveyed, 53% do not believe the government should intervene in broadband, or that the issue is of particular importance. The majority of those unconcerned about broadband are non-subscribers, who argue that only those who already have access to high-speed services are concerned about broadband expansion. Another recent survey, conducted by ABI Research, reinforced the PEW study, finding that at the end of 2009, 64% of households had broadband. The study breaks the 35% of non-subscribers into four categories. The largest group (37.8%) claims to have no need for broadband, 26.3 % cite a lack of affordability, and 18.3 % don't own a computer of any kind. The remaining 3.6 % live in rural or wilderness areas lacking infrastructural support for broadband.<sup>4</sup>

Equally doubtful is the Plan's expectation that greater technology deployment will lead to the uptake of innovative approaches to employing technology for public purposes, such as healthcare, e-government, education, etc. As Janice Hauge and James Prieger have pointed out, there have been few analytical evaluations of the impact of deployment strategies on technology uptake, much less on the innovative use of technology to achieve public goals. Thus, there is no evidence to guide policy makers about the chain of events—and therefore the points where policy intervention might make a difference—that link the deployment of Internet technologies to innovative outcomes in diverse public settings (Hauge and Prieger 2010). Without such research and data, proper evaluation, feedback

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and restructuring cannot take place—as the Plan, as it is presently laid out, presumes. Under these circumstances, there is a real danger that many of the resources, allocated to the broadband problem, in something of a vacuum, may go to waste. As Ryan Singel has characterized the situation:

. . . But how do we make sure that the billions aren't spent creating the 21<sup>st</sup> century equivalent of ditches to nowhere. The question of how to spend that money most effectively is largely unanswerable, since almost no one knows anything about the internet's infrastructure and those that do aren't sharing that information with policymakers or regulators (Singel 2008).

### **3. The Need for a Diffusion Perspective**

The Broadband Plan laid out by the FCC clearly recognizes that the full benefits of broadband usage in the United States will only be realized when broadband technology is employed not only by individuals seeking their own particular ends, but also—and perhaps more importantly—by groups and social organizations that aim to address major social and economic needs. As highlighted in the Broadband Plan, these occasions might include, for example—technologies to support education, health care, economic development and emergency services. This is a major shift in emphasis, and it requires new ways of thinking about technology promotion. For example, when the focus of a policy is on individuals, acting on their own, it is possible to pursue a supply-side strategy, which looks to market competition to encourage investment and lower prices and thereby encourage innovation and greater usage. And, as we have seen, this has been the primary approach followed by the FCC in the past. However, if advanced networking technologies are to operate to the benefit of social and economic ends, a deployment approach will not be enough. In such cases, policy makers will need to take account not only of the user, but also of the social

context in which the technology is being deployed. In other words, policy makers will need to create the optimal conditions for the productive use of networking technologies and their incorporation into a particular social setting.

To capture the critical variables for success, technology deployment strategies must be linked to diffusion strategies. Whereas technology deployment refers to the physical provision of infrastructure facilities, technology diffusion can be defined as the process by which technologies and technical innovations are extended and adapted over time and space, and integrated into day-to-day social and economic activities (Brown 1981; Rogers 1995). As Hanney et al., have described this process with respect to information technologies:

. . .diffusion involves more than acquiring computerized equipment and micro-electronics-based products and related know-how. It involves the development of technical change-generating capabilities and the adaptation of a given technology to a wide range of needs (Hanney et.al. 1995).

Ideally, this process is a cumulative, iterative one; once deployed, new technologies continue to evolve, and are “reinvented” in response to changing needs and circumstances. Hence, the course that the diffusion process takes is determined not only by technical and economic factors, such as technology advances and declining costs, but also by social and institutional factors, such as the availability of mechanisms for information learning and information exchange.

Notwithstanding the critical relationship between deployment and diffusion, these two strategies are rarely combined. In fact, all too often, supply driven deployment strategies—focusing almost exclusively on the problem of access—work to undermine the very socioeconomic conditions that are required to encourage widespread and sustainable

usage (OTA 1991; Garcia and Gorenflo 1997). Unfortunately, changing course and designing and implementing technology diffusion strategies is especially challenging in today's deregulated, economic environment, in which the political and economic modus operandi is to let markets take their course.

#### **4. Criteria for Executing a Successful Diffusion Strategy**

To fully appreciate what is entailed in carrying out such a strategy, we must look more closely at Everett Rogers' well-known diffusion model. According to Rogers, diffusion is not so much a market process, as it is a communication process. To be exact, diffusion is "the process by which innovations are communicated through certain channels over time among the members of the social system." (Rogers 1995: 10). Accordingly, policy strategies designed to promote the goals outlined in the FCC Broadband Plan must be grounded in a solid understanding of how these communication processes work.

According to Rogers, innovations are not adopted all at one stroke. To the contrary, adoption is a process that takes place over time, and in the course of five different stages, each of which is a social process that involves actors interacting with others. In *phase one*, for example, actors learn from others about an innovation, gaining some initial information about what it is and how it works. In *phase two*, actors are either persuaded by others of the benefits of the innovation or not, depending on the attitude that they develop in the course of their experiencing the innovation. The *third phase* occurs when actors make a decision as to whether or not to accept or reject the innovation. *Phase four*, in Roger's model, entails the decision by actors to implement an innovation—that is, to put

it into practice. In the final phase, *phase five*, actors will either confirm or reverse a previous decision (Rogers 1995: 161).

In Roger's model, a number of factors play a role in determining whether or not the diffusion of an innovation eventually takes place and the speed at which it occurs. Equally important, the type of impacts that these factors have is related to the phase in the process with which they are associated. Take communication channels, for example. As Roger's points out, whereas mass media channels are effective in the initial 'learning' phase of the process, peer-to-peer ties are more important in the persuasion and decision making phases. Likewise, whereas in the initial phase of awareness, contacts among heterophilous groups are most productive in generating information about an innovation, interactions among homophilous groups are more effective in the later phases of adoption when people develop more emotionally charged attitudes about an innovation (Rogers 1995).

Rogers also relates the success and speed of the diffusion process to the attributes of innovations and those who advocate and use them. Accordingly, he argues that innovations are more likely to be adopted to the extent that they have a relative advantage; are compatible with existing norms and prior ways of doing things; are non-complex; trialable; and observable (Rogers 1995: 207).. As importantly, he categorizes potential users according to their innovativeness—innovators, early adopters, early majority, late majority, and laggards—with each category being linked to specific social and economic attributes. Thus, according to Rogers, early adopters tend to have higher status, wealth, levels of educational achievement, social mobility and are more cosmopolite than are later adopters

(Rogers 1995: 269). Similarly, Rogers describes change agents as being more cosmopolitan and educated than the average potential user.

Based on these categories, the criteria for successful diffusion can be summarized as follows:

- \* The innovators in any given social context (or cluster) must have access to sources of information from outside that cluster. This will entail active promotion by outsiders, characterized by Rogers as change agents.
- \* Change agents must identify appropriate opinion leaders who are influential within the target social setting, and with whom change agents are on a relative equal footing, allowing for mutual engagement and providing a basis for trust and support.
- \* Change agents, and opinion leaders must work together to acquaint less enthusiastic users with the new technology, and to provide assistance to them in using it. The use of the technology should be related to a group's specific goals, so that its compatibility with these goals, and its comparative advantage in achieving them, can be clearly demonstrated. As well, learning about and applying the technology to achieve common goals should be carried out with group participation, which will not only reinforce commitment to the technology but also provide for a platform for mutual support. Shared usage of a technology to achieve a common purpose may also enhance the social capital required to successfully carry out that purpose.
- \* Provision must be made to provide support over time to allow not only for sustainability but also for continued innovation as the technology evolves in context. To this end, active linkages need to be maintained between national policy makers and those operating locally.

## **5. Meeting the Criteria—The Organizational Capacity Required**

Meeting the criteria for promoting technology deployment is far less demanding than meeting the criteria for encouraging technology diffusion—one reason, perhaps, that deployment strategies have typically been preferred over diffusion strategies. Of particular note in this regard is the difference in the organizational capacity required.

With deployment strategies, for example, much of the effort is left to the *invisible hand*. Thus, the Government can invest in infrastructure for the Internet, and then leave it,

first to the scientific community, and later to industry, to carry on from there. Similarly, the Government can promote individual usage by enforcing competition law to ensure low prices, and by providing incentives for investment in the form of tax credits, etc. In like fashion, the Government can provide funding to government labs for technology development, without becoming involved in the innovation process itself.

Not so in the case of diffusion strategies! As described above, diffusion is not a straightforward linear process. To the contrary, it is highly complex, taking place over time and in stages, each of which is dependent on all the others. Each of these stages will require its own policy strategy, different resources, and engagement with different players. On top of this, each strategy must be flexible enough to incorporate feedback and allow for adjustments along the way. As importantly, unlike deployment strategies, which tend to be top down, diffusion strategies require on-going interaction between government change agents and target populations so that “learning-by-doing” can take place—in both directions—and innovative practices can emerge as a result.

Compounding the situation, there is no “one size fits all” diffusion strategy, as is often the case with technology deployment. One need only consider that the government can employ tax credits, for instance, to encourage investment in technology related industries, regardless of the industry in question. Similarly, the government can fund research and development, with wide-ranging spillover effects, as the histories of the computer industry and the Internet attest. In contrast, meeting the societal goals that are outlined in the FCC’s Broadband Plan will require diffusion strategies that are targeted not only to specific sectors of activities, such as health care, education, etc., but also to specific

places and institutional settings. Designing such strategies will, therefore, require expertise that extends well beyond the traditional law and economics that is to be found in most Federal agencies today. In addition to the need for knowledge of specific subject areas, expertise in the fields of sociology, anthropology, political science, and communication will be required.

Equally challenging, efforts to enhance organizational capacity may very well bring with them greatly increased costs. Even assuming that adequate funding is available in today's depressed economy, budgetary concerns and the need for accountability might require that government take on the additional burden of monitoring progress, and developing and implementing tools to assess outcomes. Political costs may also be greater, not only because—with greater uncertainty—risks are higher, but also because putting together the alliances and resources necessary to carry out a diffusion strategy will give rise to winners and losers, and hence potentially require large amounts of political capital.

### **The Case of the Rural Telephone Cooperatives & the REA**

To get an idea of how such organizational capacity might be brought together, and coordinated, to promote broadband infrastructure in the United States, it is useful to look at the case of the Rural Electrification Administration (REA). In its heyday, the REA—a Federal agency housed in the Department of Agriculture—pursued a combined deployment/diffusion strategy in an effort to deliver both electricity and telephony to unserved rural areas. To this end, the Agency brought together change agents, opinion leaders and local communities in an on-going configuration, which generated increasing returns as well as the social capital so critical for rural development. Employing local

capacity together with Federal support, the REA achieved its goals at minimal cost and in a sustainable manner that fostered rural development goals. Given today's challenges in promoting broadband, it is time to revisit the history of the REA to see what lessons it affords.

How did the REA achieve such success? In 1894, when the original Bell Telephone Company patents expired, US rural communities entered the telephone business. Shunned by urban-based telephone companies, rural residents took it upon themselves to provide their own phone service, relying almost exclusively on local capital and labor. In many local villages, doctors and other local professionals took the initiative, whereas in more remote areas it was farmers who set up the first telephone lines (OTA 1991).

Rural phone companies organized themselves in a wide variety of ways, depending on their local resources and situations. Some purely private companies, which functioned as intercom systems, consisted of a single line, which was owned and shared by a small group of people. Others were organized on a profit-seeking basis, taking the form of privately owned and commercial stock companies. Mutual stock companies, in contrast, were owned entirely by users. Organized on an informal basis, the members of these organizations paid a prorated share of the capital expenditures, maintenance, and improvement fees. Farmer lines were typically set up as purely private or mutually owned systems (Hatfield 1980). Thus, for example, to join the Liberty Telephone Company in 1910, one had to pay an up-front fee of \$25; provide a telephone, a pole, and some labor; as well as pay a flat annual fee of \$7 for service (Hatfield 1980).

Rural phone companies were able to make do with such limited resources because they shared what they had and kept their expenses to a minimum. Local farmers, for example, often built networks using their own materials and tools. When necessary, they purchased equipment from independent manufacturers or through mail order catalogues distributed by such firms as Sears and Roebuck and Montgomery Ward. Having built their own networks, these farmers had little trouble maintaining them. Problems did arise, however, when they resorted to very low-quality equipment and poles, which sometimes included barbed wire and fence posts. Overall, however, the model was a great success. By 1920, 39 percent of all farmers had obtained rudimentary service, and in some Midwestern states the number of telephones per person exceeded that in the East. (Atwood, 1984)

Despite their initial successes and the important service benefits that they provided, rural telephone companies' fates were inextricably linked to those of the communities they served. With industrialization and the onset of the Great Depression, these companies were no longer able to sustain themselves. Many failed. Because urban-based telephone companies were unwilling to serve these thin, unprofitable markets, service in rural communities continued to deteriorate. Thus, by 1940, only 25 percent of all farm residencies in the United States had working telephones (United States Census, 1949).

This trend was only reversed when the Federal Government decided to adopt a less market oriented, and more community-based, approach to telephone deployment in rural areas. To promote rural telephony, the Government turned to the Rural Electrification Administration (REA), which had already proven successful in bringing electricity to rural

areas. The model advocated by the REA—the cooperative—was designed to address the problem of market failures in rural economies.

As in the case of the telephone, rural residents had greatly lagged behind urban residents in accessing electricity. By 1935, less than 12 percent of all America's farms were served. Private utilities were unwilling to provide service because demand seemed low and the technical problems high. At first, the Federal Government sought to assist and encourage private industry rather than displace it. When industry failed to respond, President Roosevelt created the REA, which bypassed municipal and private industry with its own grass roots, cooperative networks (Garwood and Tuthill 1963). Although REA's goals were ambitious—universal high-quality service, rapid deployment, and low rates—the agency was successful in achieving them. Few rural cooperatives defaulted. By 1940, 3 percent of all farmers had electricity; by 1950, 78 percent were receiving service; and by 1959, 96 percent (United States Department of Agriculture, 1989).

Rural electric cooperatives also played an important role in economic development. To this end, they worked not only with REA, which—though its loan program—served to promote deployment, but also with the local extension services, located at near-by land grant colleges, who helped to promote economic development and, with it, technology diffusion. Thus, the cooperatives aggressively recruited and served industrial, commercial, and suburban customers, which had the effect of increasing the number of consumers each year, from 5 million in 1960 to 12 million in 1987. In so doing, they greatly facilitated the movement of industrial, commercial and non-farm residences to rural areas (U.S. Department of Agriculture 1989).

Looking for a new mission in the late 1940s, REA welcomed the task of helping to deploy telephones to rural areas. With its authority expanded by Congress, the REA helped to achieve high quality, state-of-the art telephone service in rural communities. To serve widely scattered residences, it pioneered technology to reduce the size of wire, its cost of installation, and its vulnerability to lightning and icing. REA borrowers also replaced party lines with one-party service. Rates were standardized and comprehensive "area" coverage was provided. Attesting to the program's success, 94 percent of all farms were served by telephones in 1990 (United States Department of Agriculture 1989).

The contribution of the Rural Electrification Administration to rural America was by no means limited to technology deployment, however. By educating and working jointly with rural telephone companies, REA fostered technology transfer without which technical systems could not be upgrade and/or maintained. In addition, by channeling its support to local providers, who relied as much as possible on local resources, the REA helped to reinforce rural economies.

This policy, in turn, had positive cumulative effects. Because the cooperatives and independent telephone companies were socially embedded in their local communities, their managers and owners were able to quicken the flow of market information and pass on their technical skills and entrepreneurial expertise. Moreover, in cases where telephone providers were organized as cooperatives—which operated according to democratic rules of the game—the process of managing and administering the provision of telephone services helped to build the social capital that can greatly facilitate economic development in a rural environment.

REA fulfilled many of the goals that were originally assigned to it; but another, and everlasting, value has been REA's successful technology diffusion model for overcoming market failures associated with technology deployment. In fact, in one manner or another, it is a model that policy makers might reconsider today, when developing strategies to promote broadband.

### **Putting The Horse Before the Cart**

Recent surveys have made clear that the demand for broadband is running out of steam, as all but those who Everett Rogers would describe as *late adopters* and *laggards* have by now adopted broadband technology. Drawing on Roger's diffusion model, it would appear that pushing adoption up the diffusion curve at this point requires an entirely new policy strategy that is tailored to this type of user and this stage of the process. In particular, hesitant adopters must be convinced that the technology in question is not only "cool" but also—and much more importantly—meaningful in their lives. Convincing these skeptical users, moreover, will not be easy. Learning about the technology through marketing information and the mass media is not enough; these adopters must be convinced of the benefit of these technologies based on face-to-face interactions with, and support from, their trusted peers.

The REA experience suggests one way of tackling this process; start with a problem such as health care, and emergency preparedness (of which there are many) and build on, and support, local activists, who are also trusted opinion leaders in their communities, to generate broadband-based strategies to deal with these problems. Local activists have a first-hand knowledge of the situation on the ground, so they—far more than national

service providers—are likely to structure technological solutions that are tailored to a specific context and hence make sense to hesitant adopters. As importantly, local opinion leaders are likely to have the social capital and network resources required to generate the trust needed to bring reluctant users on board. A local approach, such as this, also has the advantage of minimizing the organizational capacity required at the Federal level, a benefit that is particularly relevant in today’s political environment. As importantly—as the REA case clearly illustrates—it is only by utilizing local capacity that such capacity can grow, generating increasing returns as well as a more general understanding of the way that technology can contribute to local and national goals.

Today’s national broadband strategy, as laid out in the Broadband Plan, is a far cry from such an approach. Targeted, for the most part, to the deployment side of the equation, it looks primarily to the availability of technology, and the ability of users to employ it, to drive demand. Not surprisingly, therefore, it focuses on cost-based strategies to promote demand, while placing the responsibility for promoting broadband to agencies that have the prime responsibility for determining telecommunications policies such as the FCC and the NTIA, notwithstanding the fact that these agencies—given the resources available to them—may be ill equipped to grasp the full range of social and economic implications of the technologies over which they oversee (Garcia 2001; Garcia and Surles 2007)

To move forward with a diffusion-oriented strategy will require not only thinking “outside of the box,” but also implementing policies within a new set of organizational arrangements. Recall that organizations are not neutral (Seidman, 1980). Depending on

their specific purposes and the circumstances in which they operate, organizations vary according to their resources, organizational structures, normative criteria, operational procedures, and how and to whom they distribute benefits (Scott, 1981; Pfeffer and Salancik, 2003). As important, organizations are path dependent. Once established, they become locked into their ways, taking on characteristics, or even personalities, of their own (North, 1991; Weick, 1995). As described by DiMaggio:

The constant and repetitive quality of much organized life is explicable, not simply by reference to individuals, as maximizing actors, but rather by a view that locates the persistence of practices in both their taken-for-granted quality and their reproduction of structures that are to some extent self-sustaining (Powell and DiMaggio, 1991: 9).

### **How To Proceed?**

To match organizational structure to broadband policy goals, we need to establish an organizational capacity specifically designed to pursue an effective diffusion strategy, as laid out above. To be tenable in today's political climate, such a strategy must also—to the greatest extent possible—require the lowest possible monetary incentives and employ existing organizational capacity. Moreover, given our general lack of understanding about broadband and its diffusion, any set of arrangements should promote learning-by-doing on the part of users and policy makers alike. Although to analyze a variety of organizational options would be well beyond the scope of this paper, we identify one approach that we believe has strong potential. One must keep in mind, too, that this idea is speculative insofar as it is based on the assumption that Congress, in designing a revised Communications Act, specifically grants the authority to implement such a broadband policy.

The proposed idea calls for the creation of a ‘*skunk work*’ (for lack of a better term), which would be designed as *a participatory milieu/community of practice* within the Department of Commerce, separate from the National Telecommunications and Information Administration. Although NTIA has responsibility for administering broadband grants under the American Recovery and Reinvestment Act of 2009, its approach is typically linear and top-down, as well as deployment oriented. To shift gears and take on the responsibilities required to carry out an interactive, learn as you go, diffusion strategy would require greatly reorganizing NTIA and enhancing its capacity and breadth of knowledge and experience at considerable expense.

Like NTIA, a broadband ‘skunk work’ located within the Department of Commerce would have the benefit of executive branch support. However, it would not have a legacy favoring deployment grants. Moreover, in contrast to NTIA, it could be organized in a non-bureaucratic way that minimized the need for additional organizational capacity and allowed for feedback, learning, and continuing innovation. Thus, for example, participants might be drawn—much as they are at the National Science Foundation—on a flexible and temporary basis corresponding to the nature of projects and their time frames. Rotating participants would have the advantage of soliciting new learning while at the same time diffusing through past participants the learning that has already take place. Some skunk work participants would serve in a grant-making capacity, while others would bring their diverse expertise and experience to generate new ideas that can be incorporated into broadband applications. In keeping with a diffusion strategy, the idea would be to bring together change agents (who might be broadband providers,

government workers, NGOs, professionals, academics, etc.) together with local opinion leaders who are engaged in some type of public services (e.g. health care, emergency services). Interacting together, and with local grantees, participants would share experiences, gather data and feedback, and work out innovative solutions to recognized problems. Thus the broadband skunk work would provide an on-going, up-to-date resource for local grantees. Grants would be allocated based not only on applicants' abilities to put together a committed team of stakeholders and strategies that incorporate all stages of the diffusion process, but also—and as importantly—on the willingness of team members to become part of an on-going participatory learning process. Over time, participants in these processes can be linked together in a virtual community of practice.

The approach laid out here is in keeping with the Broadband Plan's notion that the plan is not fixed, but rather evolving in accordance with how successfully it is being implemented. To assure that needed readjustments take place, the Broadband Plan calls for the establishment of a Broadband Strategy Council within the executive branch, which would review broadband strategies and deployment over time. While it is important to have external oversight and a mechanism for readjustment, the Plan does not go far enough. Merely mapping deployment, as is called for in the Plan, fails to provide useful data about impacts and the mechanisms by which they come about. A preferred method for evaluating broadband strategy might be to charge the National Science Foundation, which has a broad base of technical and social science expertise, with the task of soliciting research on this subject. Such analyses might be channeled through one of three NSF programs: The Office of Cyberinfrastructure, Virtual Organizations as Sociotechnical

Systems (VOSS), and Cyber-enabled Discovery and Innovation. Such research could then be directed to the Strategy Council.

One final note about costs and benefits is in order here. Diffusion strategies are far more complex and non-linear than deployment strategies. Requiring the coordination and collective action of multiple stakeholders, participatory strategies can be very uncertain. Nonetheless, collective action can yield very high rewards by generating social capital and stimulating increasing returns (Putnam 1993; Skryms 2004). Thus, to the extent that government programs, such as the one outlined here, can provide adequate third party incentives to promote participation and engagement in broadband diffusion, the benefits will likely far exceed the costs.

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