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**Response to National Science Foundation/National Telecommunications and  
Information Administration “Request for Comments [on a] National Broadband  
Research Agenda”**

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The National Science Foundation (NSF) and the National Telecommunications and Information Administration (NTIA) recently requested “input to improve data collection, analysis, research, and their applications for the benefit of broadband policy development, program implementation, and program evaluation.”<sup>1</sup> This agenda is welcome since any program based on solid data and rigorous analysis is more likely to yield efficient, effective, and equitable outcomes.

In particular, broadband research should focus on three areas: demand, experimentation, and rigorous evaluation.

Demand is the least-well understood aspect of adoption. Subsidy programs have tended to focus on supply, with little regard to how people use the Internet or what will attract them to it. The reformed Lifeline program provides a monthly subsidy, ignoring survey and experimental results of the pilot programs suggesting that subsidies have little effect on adoption. It is crucial that we understand more about the nature of demand if we are to encourage the remaining non-adopters to join the network.

Learning about the factors affecting demand and adoption requires experimentation and the willingness to consider carefully the results of those experiments. That means agencies and their critics alike should not interpret unexpected or negative results of experiments as indicating agency or program failure. Even negative results of well-designed experiments can reveal new information regarding what may or may not increase adoption.

Experimentation should extend beyond adoption issues, as well. Research can also focus on ways of distributing subsidies and grants in ways that yield the most benefits.

Finally, research should focus on evaluating existing programs and determining ways of building evaluation into new programs. Evaluation should focus on long-term programs that have not yet received any attention, such as broadband subsidies distributed by the Rural Utilities Service, and others that are now ripe for evaluation, such as the Connect America Fund.

## **Study Demand**

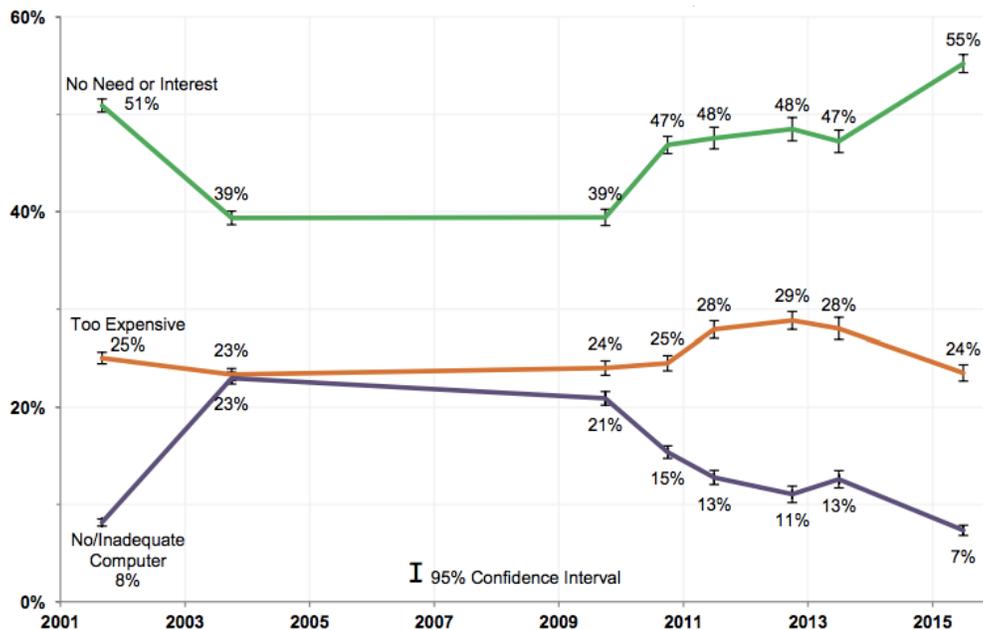
Recent research has revealed a large gap in our understanding of the demand characteristics of the people who remain offline. If, as a society, we want to connect them, we must bridge this gap. A recent NTIA report, based on the 2015 Current Population Survey, found that more than half (55 percent) of all households without broadband subscriptions reported the reason as “no

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<sup>1</sup> National Science Foundation and National Telecommunications and Information Administration, “National Broadband Research Agenda,” Federal Register, 81, no. 175 (September 9, 2016): 62479.  
<http://www.ntia.doc.gov/request-comments-national-broadband-research-agenda>

need or no interest” (Figure 1) “Too expensive” was a distant second at 24 percent of households. Moreover, the share who report no interest is growing as the share reporting too expensive is decreasing.

Figure 1: Reasons People do not Subscribe to Broadband



The FCC’s recent Lifeline broadband experiments run by 14 Internet Service Providers (ISPs) in cooperation with the FCC in 2012<sup>3</sup> confirm these results.<sup>4</sup> The FCC and the ISPs found that they were able to sign up only a small fraction of the number of non-adopters they expected (Figure 2).<sup>5</sup> Intriguingly, among those who did subscribe, even those who reported not having had broadband previously because of price reported subscribing as part of the plan because they wanted to stay in touch with people, not because they got a good price.<sup>6</sup>

The implication is that the Lifeline program, by simply providing a monthly subsidy, is unlikely to encourage many additional people to subscribe. Instead, it may largely subsidizing people who

<sup>2</sup> Giulia McHenry et al., “The Digital Divide Is Closing, Even as New Fissures Surface” September 27, 2016, fig. 2, [http://papers.ssrn.com/sol3/papers.cfm?abstract\\_id=2757328](http://papers.ssrn.com/sol3/papers.cfm?abstract_id=2757328).

<sup>3</sup> Federal Communications Commission, “In the Matter of Lifeline and Link Up Reform and Modernization | Telecommunications Carriers Eligible for Universal Service Support | Connect America Fund,” June 22, 2015, paras. 30–31, [https://apps.fcc.gov/edocs\\_public/attachmatch/FCC-15-71A1.pdf](https://apps.fcc.gov/edocs_public/attachmatch/FCC-15-71A1.pdf).

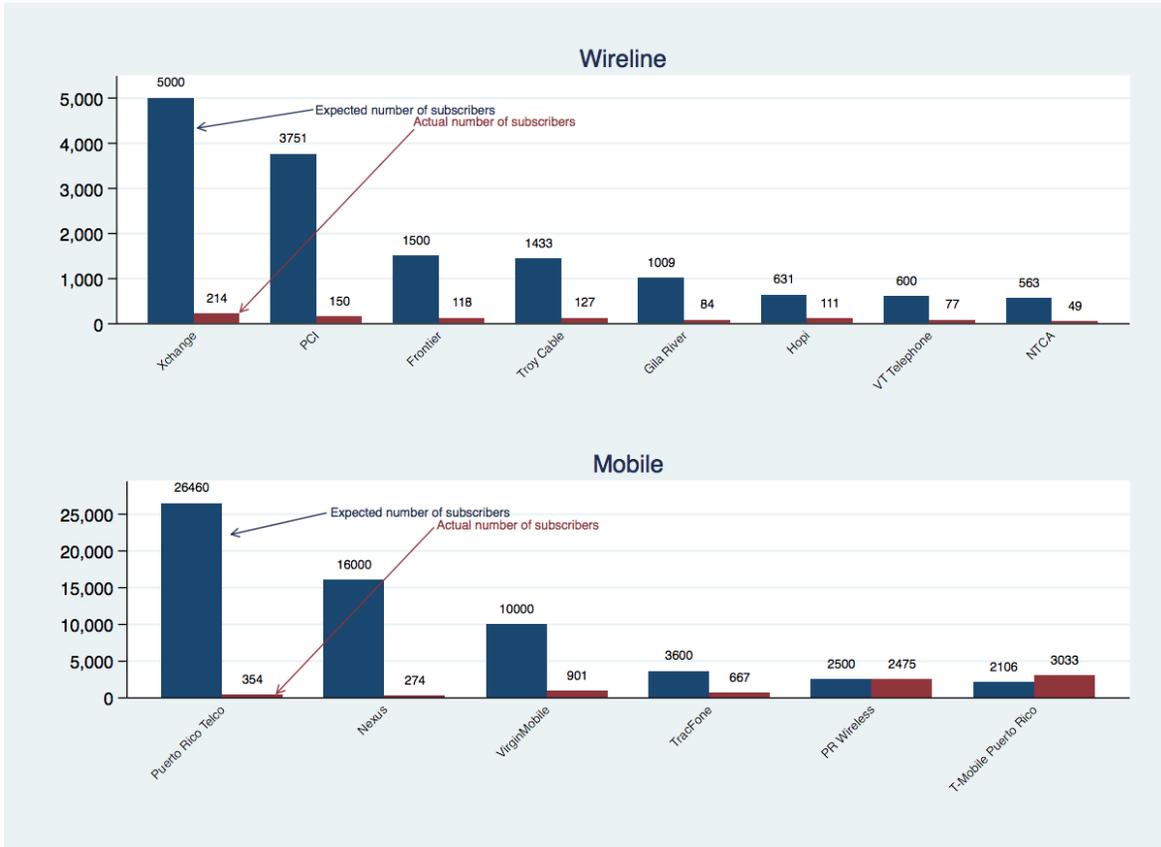
<sup>4</sup> Ibid.

<sup>5</sup> Scott Wallsten, “Learning from the FCC’s Lifeline Broadband Pilot Projects” (Technology Policy Institute Working Paper, March 2016), [https://techpolicyinstitute.org/wp-content/uploads/2016/03/Wallsten\\_Learning-from-the-FCCs-Lifeline-Broadband-Pilot-Projects.pdf](https://techpolicyinstitute.org/wp-content/uploads/2016/03/Wallsten_Learning-from-the-FCCs-Lifeline-Broadband-Pilot-Projects.pdf).

<sup>6</sup> Ibid.

would have subscribed even without the subsidy. Thus, if we truly want to encourage adoption, it is crucial that we study Internet demand.

Figure 2: Expected vs. Actual Subscribers to Pilot Projects



Source: Wallsten (2016)<sup>7</sup>

## Conduct Experiments

The FCC has been innovative over the past few years by showing its willingness to conduct experiments on projects intended to spur supply and demand. Two, in particular, are noteworthy, as are the responses to those experiments. One was the group of Lifeline experiments discussed above. The other is the reverse auction the FCC held to provide mobile broadband coverage in uncovered areas. Researchers in and out of the government should work to advance the use of experiments.

The Lifeline pilots yielded the important, if unexpected lesson discussed above that we know little about how to encourage the last group of people to connect. The outcome implies

<sup>7</sup> Ibid., fig. 2.

researchers and the FCC should design additional experiments to more completely investigate the simple question of what affects signup rates of nonadopters.<sup>8</sup>

The Mobility Fund Reverse Auction was a program in which the FCC distributed \$100 million to provide mobile broadband coverage in areas without it.<sup>9</sup> Unlike other subsidy programs, in this case wireless companies submitted bids requesting the subsidy they believed they would need to cover a given area. The FCC then allocated the funds based on cost-effectiveness, with the most cost-effective bid receiving subsidies first, moving to the next most cost-effective bid, and continuing until the budget was spent. The auction proved that reverse auctions and a bidding process for subsidies can work, creating a way to more effectively allocate subsidies in the future.

The Lifeline pilot also revealed another, more unfortunate, lesson: that when an experiment uncovers something unexpected, the agency may be unwilling to take those results into account. In particular, the Lifeline reforms ignored the pilots and the excellent staff report<sup>10</sup> examining the pilots' outcome. Conducting the experiments is a good first step, but they can have a much stronger effect if policymakers are willing to pay attention to the results, even if they show current policy may be lacking or misdirected. To this end, part of studying broadband could include research with a political-economic focus, studying how agency processes and incentives affect the role and impact of research itself.

### **Evaluate Existing Programs**

A large number of existing programs intended to promote various aspects of broadband have not been evaluated in any meaningful way. The USDA's Rural Utilities Service (RUS), for example, has distributed and continues to distribute billions of dollars for broadband in grants, loans, and loan guarantees. To my knowledge, RUS programs have *never* been subject to evaluation. Additionally, the Connect America Fund has been subsidizing broadband since 2012. While still relatively young, enough time has passed that it should be subject to rigorous evaluation, as well.

The High-Cost Program, which preceded CAF, suffered from lack of measurable goals and, thus, evaluation. The Government Accountability Office (GAO) noted in 2008,

In the 1996 Act, the Congress established the principles underlying universal service, which provide a clear purpose for the high-cost program. However, since 1998, FCC has distributed over \$30 billion in high-cost funding without developing specific performance goals for the program. Additionally, FCC has not developed outcome-based performance measures for the program. While FCC has begun preliminary efforts to address these shortcomings, its efforts do not align

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<sup>8</sup> T-Mobile Puerto Rico's Lifeline experiment focused on how different types of advertising affected signups. They concluded that blanket television advertising was the most effective, while direct marketing proved largely ineffective. Television advertising is less likely to be feasible outside of Puerto Rico, where the population is poorer and adoption rates are much lower than in the 50 states. Wallsten, "Learning from the FCC's Lifeline Broadband Pilot Projects."

<sup>9</sup> Scott Wallsten, "Two Cheers for the FCC's Mobility Fund Reverse Auction," *Journal on Telecommunications and High Technology Law* 11, no. 2 (November 22, 2013), [http://www.jthtl.org/content/articles/V11I2/JTHTLv11i2\\_Wallsten.PDF](http://www.jthtl.org/content/articles/V11I2/JTHTLv11i2_Wallsten.PDF).

<sup>10</sup> Wireline Competition Bureau, "Low-Income Broadband Pilot Program," Staff Report (Federal Communications Commission, May 22, 2015), [https://apps.fcc.gov/edocs\\_public/attachmatch/DA-15-624A1.pdf](https://apps.fcc.gov/edocs_public/attachmatch/DA-15-624A1.pdf).

with practices GAO and OMB have identified as useful in developing successful performance goals and measures. In the absence of program goals and data pertaining to the program's performance, the Congress and FCC may be limited in their ability to make informed decisions about the future of the program.<sup>11</sup>

Similarly, in 2005 the White House Office of Management and Budget rated the high-cost program as "not performing" in part because

The program lacks measures and goals to assess performance. The program does not measure the impact of funds on telephone subscribership in rural areas or other potential measures of program success, nor does it base funding decisions on measurable benefits.

Program administration lacks sufficient Federal oversight. No memorandum of understanding exists between the Federal Communications Commission and the program's non-Federal Administrator, nor have measurable standards for program administration been established.<sup>12</sup>

Early reports about CAF are not promising. In 2014 GAO noted that "a lack of transparency and accountability of high-cost spending and (2) poor accessibility and usability of data and information" still make evaluation difficult.<sup>13</sup>

While the GAO should, and undoubtedly will, continue its reviews of the CAF, the program is ripe for rigorous study by outside researchers. The FCC should not be in charge of such an evaluation, for obvious conflict of interest reasons. Funding from NSF could be crucial in learning about the effectiveness of this large program.

### **Distribute Research Funds Using Rigorous Methodologies**

To the extent that NSF or NTIA has funds to distribute to conduct broadband research, they should do so in a coherent, objective manner. As an agency whose primary objective is funding research, the NSF has extensive and rigorous procedures for submitting and selecting grants.<sup>14</sup> NTIA has a different objective and, thus, has less experience. The experience of the Broadband Technology Opportunity Program (BTOP) should serve as a cautionary tale.

Some aspects of BTOP were inherently confusing through no fault of NTIA. Congress mandated that it be a mechanism to provide immediate economic stimulus and promote broadband, when those two objectives were not always compatible. Even given that unfortunate constraint, NTIA did not establish any mechanism for ranking the expected effectiveness of BTOP grants. A group of 71 economists had suggested using a reverse auction approach, but NTIA rejected that idea.<sup>15</sup> The result, unsurprisingly, was enormous variation in the expected cost-effectiveness of the

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<sup>11</sup> Government Accountability Office, "FCC Needs to Improve Performance Management and Strengthen Oversight of the High-Cost Program," June 2008, 25, <http://www.gao.gov/new.items/d08633.pdf>.

<sup>12</sup> <http://www.whitehouse.gov/omb/expectmore/summary/10004451.2005.html>

<sup>13</sup> Government Accountability Office, "FCC Should Improve the Accountability and Transparency of HighCost Program Funding," July 2014, <http://gao.gov/assets/670/664939.pdf>.

<sup>14</sup> [https://www.nsf.gov/pubs/policydocs/pappguide/nsf10\\_1/gpg\\_index.jsp](https://www.nsf.gov/pubs/policydocs/pappguide/nsf10_1/gpg_index.jsp).

<sup>15</sup> Paul Milgrom et al., "Comments of 71 Concerned Economists: Using Procurement Auctions to Allocate Broadband Stimulus Grants," 2009, [http://papers.ssrn.com/sol3/papers.cfm?abstract\\_id=1377523](http://papers.ssrn.com/sol3/papers.cfm?abstract_id=1377523).

funded proposals.<sup>16</sup> More disturbingly, NTIA paid \$5 million to a firm for an official evaluation project and dictated many aspects of the project, including the grants the firm was allowed to study.<sup>17</sup> The not-so-independent study found positive effects of BTOP perhaps because it was forbidden from studying grants that were not successful. Should NTIA find itself with the opportunity to fund outside evaluations, it should endeavor to choose proposed projects objectively, based on the rigor of the proposed research questions and methodologies.

## **Conclusion**

NTIA and NSF's request for comments on data and research needed to inform broadband policy is an important step towards a coherent, data-driven national research agenda. This agenda should include three components. The first is a focus on demand. Surveys and real-world experimentation demonstrate that we understand little about how to get the last group of nonadopters online. The second is to use experiments to explore what works and what does not and to use that information to inform policy. The third is to rigorously evaluate existing programs that have not yet been subject to such scrutiny, like the Rural Utilities Service broadband subsidies and the nearly four year-old CAF.

Focusing on these issues and methodologies should enable policymakers to better focus scarce resources in ways that truly improve broadband adoption.

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<sup>16</sup> Gregory L. Rosston and Wallsten, Scott, "The Broadband Stimulus: A Rural Boondoggle and Missed Opportunity," *IS: A JOURNAL OF LAW AND POLICY FOR THE INFORMATION SOCIETY* 9, no. 3 (March 2014): 453–70.

<sup>17</sup> <http://thehill.com/blogs/pundits-blog/technology/230483-new-study-of-broadband-stimulus-program-is-not-so-independent>