

National Telecommunications and Information Administration and the National Science Foundation request for comments

Submission Authors: Jeffrey Gepper and Juliana Lucchesi

Our experience and expertise on this topic is grounded in our work, research, and engagement with a small, public telecommunications entity in rural Iowa. Residential and business surveys, large employer interviews, and a community visioning session were conducted to assess the current internet service conditions and identify future digital priorities. Based on our community assessment, we engaged in scenario planning, financial modeling, and organization assessment for the future of the telecommunications network. We used feedback to develop a strategic plan for the effective, efficient, and equitable expansion of the network. The strategic plan included the creation of financial models, investment scenarios, and an implementation plan.

The full report on our research and experience in broadband planning can be found at the following link;

https://iisc.prod.drupal.uiowa.edu/sites/iisc.uiowa.edu/files/project/files/metronet_final_report.pdf

The responses below are a representation of the difficulties and identified areas for improvement in researching and developing broadband programs.

A. Broadband Technology

A.1. *No response*

A.2. *No response*

A.3. *No response*

B. Broadband Access and Adoption

B.4. From our experience and research, we have found there is a need for further analysis in methodologies for creating prioritization models based on public and industry needs, financial strategies and opportunities for fixed broadband network build-out, and financial feasibility modeling for sustained network and service growth. Initial capital investment creates a large barrier to fixed broadband network development due to the lack of economies of scale and cost to construct the initial network.

Limited capital investment leads an agency to create a network unable to meet the needs of all users. Prioritization of consumers, both residential and commercial, need to be taken into consideration when laying out a long-term plan for fixed broadband development. Investing in research related to successful fundraising using different organizational models would assist communities to roll-out comprehensive networks.

Fundraising, whether through public financing mechanisms (i.e. taxation, bonding), private-public partnerships, or privately driven investment, is not adequately catalogued and analyzed for other communities. Supporting research with case studies related to the different financial methods could improve the gap in knowledge between communities and encourage broadband network development. Organizations well suited to collect and host information are the NTIA, FCC, NSF, and state technology agencies.

Additionally, existing broadband research relies heavily upon initial deployment and requires further study into system sustainability. Research into long-range planning and scenario development would be crucial to prepare, as best as possible, for the rapid development of technological advances in telecommunications transmission. Increasing consumer usage and changes to individual devices will continue to strain current infrastructure in most municipalities and rural areas.

B.5. Rural and underserved populations that cannot obtain the economies of scale to attract service from traditional broadband providers should be prioritized due to their lack of resources and ability to access telecommunications services. In our experience, the term underserved also includes those unable to afford basic broadband services. The current definition neglects the accessibility based on socio-economic status of a household. These populations are unable to politically compete with large telecommunications providers and garner momentum to achieve greater connectivity. It is imperative that the NTIA and NSF should prioritize these communities, because it is unlikely they will otherwise see future investment. Similar to the Rural Electrification Administration (REA), areas of low population density are often left to fend for themselves and are left behind technologically, economically, and socially. Agencies that could assist in research efforts related to rural and underserved population research are U.S. Department of Agriculture and U.S. Department of Housing and Urban Development.

B.6. Attention needs to be given to the trend of legislation proposed and supported by large internet providers and similar lobbying efforts that hinder or prohibit the opportunities of municipally owned telecommunications.

Broadband technology and services are constantly evolving, making it difficult for public and private entities to remain at the forefront of service provision and business management. Research and education on new broadband distribution tactics and technology would greatly benefit smaller telecommunications providers who do not have the resources to conduct research and development.

There is a need for research, training, and materials related to the management, service, and employment strategies for initial and sustained network growth. Acquiring staff that is trained and knowledgeable in both the technical components of broadband development and the business administration is often difficult and cost prohibitive. Agencies that could assist with this research initiative are state university systems, Department of Labor, Bureau of Labor Statistics, NSF, and NTIA.

B.7. *No response*

B.8. *No response*

B.9. *No response*

C. Socioeconomic Impacts

C.10. Measuring the economic impact of a broadband network is extremely difficult and has evaded researchers. Our attempts to measure the economic impact of broadband infrastructure was discontinued due to the amount of assumptions made for the calculations resulted in conclusions that did not have a solid foundation in fact and measurement.

Researching effective methods for measuring the economic impact of broadband development and expansion would assist communities by providing rationale for public investment in telecommunications infrastructure. Education and tools would help communities evaluate the ways broadband development can positively be utilized and impact their community.

Rural and disenfranchised communities have suffered from slow connectivity and lack of service due to the cost of infrastructure and the absence of economies of scale. Research into opportunities and barriers for underserved and rural telecommunication consumers is crucial to maintaining a level of equality in access to educational, medical, and social benefits.

Telecommuting has become more popular with the change in workplace dynamics and types of industries in the United States. The first need is to clearly define what a telecommuter is and utilize that one definition when establishing the rates at which telecommuting is present in communities. It is impossible to conduct cross-disciplinary and cross-agency research without a universal definition.

Methodologies and areas of study are needed to successfully measure the social impact of broadband development, such as telemedicine, education, and social connectivity.

Standardizing survey questions that can then be collected through cross-agency surveys would help record cost savings as an economic gain to the community over time and educational opportunities provided through better access through broadband services. These are just two examples of the type of data that could be collected to better understand the costs and benefits associated with broadband development.

Agencies that would assist with data collected are Bureau of Economic Analysis, Federal Communications Commission, NTIA, and NSF.

C.11. *(See C.10. response)*

C.12. One of the key problems was defining the measurements of the following socioeconomic impacts that would be consistent over time; educational attainment, telemedicine access, and career development, continued education, and job opportunities.

Establishing a methodology for the measurement of positive and negative socioeconomic impacts, with well-defined metrics for what effectiveness means to different communities throughout the United States, would help synchronize analysis of broadband development. Some communities may define effectiveness based on service cost and others on availability of service.

Competition can be difficult for small and disadvantaged communities due to the inability to communicate and politically sway influential decision-makers who have access to funding opportunities and legislation. A collection of case studies would help communities defend their right serve their citizenry with telecommunications access. Case studies would be related to garnering political support for public broadband networks and successfully defending the formation of public telecommunications networks. It was our experience that small providers were bullied, pressured, and intimidated by larger corporations through costly litigation and lobbying.

D. Opportunities for Federal Leadership in Data Collection and Research

D.13. *(See D.19. response)*

D.14. There needs to be a joint effort between state, county, and localities, including collaboration between public works engineers, planners, and transportation entities. As telecommunications services creep ever closer to becoming a public good, business entities and demand based economies will leave rural populations and impoverished communities in the proverbial dark. Therefore, systematic government intervention will be required to serve these disenfranchised populations, similar to the aforementioned REA.

D.15. Firstly, working to establish a clear set of definitions and methodologies for researching and developing telecommunication systems would greatly increase the transferability of previously conducted research and best practices. Secondly, providing funding and initiatives to research institutions and public entities would help further the landscape of telecommunications and broadband services. The federal government would greatly benefit research efforts by establishing a strict series of definitions for the various components of broadband technology, services, research, and business. Lastly, the federal government would do well to strengthen efforts for maintaining a database of telecommunications data, including consumer usage, service provision and extent, consumer costs, and public/private infrastructure expenditures.

D.16. The critical data and research needs in the areas of broadband are related to the reporting methodology and types of data collected. The Federal Communications Commission (FCC) and NTIA databases rely heavily upon self-reported data from telecommunication providers, as opposed to actual speeds and household usage. The data presented in the FCC's National Broadband Map, when compared to data

collected through client reporting, has shown to be inaccurate regarding the available bandwidth and upload/download speeds. One reason for the inaccuracy is that the reported data is from the provider side of the broadband network, which does not account failures experienced at the household level. This can be done using reporting software and online speed/bandwidth tests at the household level.

For future data collection, the FCC and NTIA would benefit from third party and user based data collection, specifically including client collection systems. Collecting data at the household level for consumer cost of internet (including a solution for pricing out bundled services), actual speed received by the household, amount of time utilizing the internet, and categories of internet usage (work, education, health, entertainment, etc.).

Mapping of telecommunications infrastructure, including whether it is privately or publically owned, would further help analyze the availability of internet service and telecommunications access throughout the country.

D.17. Collecting household level data would help smaller communities create baselines and identify areas of high need. (See Q.16 response)

Communities would benefit from Research, materials, and presentations on best practices conducted by publicly owned telecommunications providers who have been successful in reaching their citizens fairly, effectively, and efficiently, while remaining sustainable financially.

D.18. Funding studies that help determine the economic impact of broadband development is crucial to understanding the impacts of broadband development. Providing grant opportunities for telecommunications research and development in rural areas will aid these communities by assisting in the assessment of the costs and benefits of telecommunications for social, economic, and educational impacts. Agencies that could assist with collection and maintaining the data are Bureau of Economic Analysis and Bureau of Labor Statistics.

D.19. A large hurdle for our research was developing clear definitions for terms that had multiple associations. Federal and state agencies need to collect, establish, and distribute common, clearly defined terminology that can be easily communicated throughout the scientific community, private entities, governmental agencies, and the public. Researchers from different levels of academia and industry must be able to communicate with stakeholders of various backgrounds, languages, and educational levels. The development of a broadband technology and development guidebook and toolkit for telecommunications definitions and methodologies for measuring speed and capacity should be universal and easy to understand. Agencies that should house common terminology for broadband planning at NTIA, NSF, and FCC. One agency should develop the list and all three should house the resource.

Key references

Connect Iowa. (2015). Community Broadband Planning Toolkit. Des Moines, IA: Connect Iowa. Retrieved from http://www.connectiowa.org/sites/default/files/connected-nation/2015_connect_iowa_white_paper_community_tool_kit.pdf.

Ford, G., & Koutsky, T. (2005). Broadband and Economic Development: A Municipal Case Study from Florida. In Applied Economic Studies. Retrieved from <http://community-wealth.org/sites/clone.community-wealth.org/files/downloads/article-ford-kautsky.pdf>.

Mediacom Iowa, LLC v. Incorporated City of Spencer, No. 02-0554. (2004)

OECD (2013), "Broadband Networks and Open Access", OECD Digital Economy Papers, No. 218, OECD Publishing. <http://dx.doi.org/10.1787/5k49qgz7crmr-en>