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RESEARCH
REPORT

Increase Collaboration, Use Sustainability as a Criterion, Invest in Innovation and R&D, Ensure Maximum Long-Term
PROMOTE INNOVATIVE APPROACHES, Assess Progress, Support Commitment and Adequate Investment
Invest in Innovation and R&D, Ensure Maximum Long-Term Impact, Promote Innovative Approaches, Assess Progress
Adequate Investment, Increase Collaboration, **USE SUSTAINABILITY AS A CRITERION**, Ensure Maximum
R&D, Ensure Maximum Long-Term Impact, Promote Innovative Approaches, Assess Progress, Support Commitment
Investment, **INCREASE COLLABORATION**, Use Sustainability as a Criterion, Invest in Innovation and R&D
Innovative Approaches, Assess Progress, Support Commitment and Adequate Investment, Increase Collaboration
Sustainability as a Criterion, Invest in Innovation and R&D, **ENSURE MAXIMUM LONG-TERM IMPACT**

Sustaining Jobs After the Stimulus: Building on Broadband

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About the CGI Initiative for Collaborative Government

The CGI Initiative for Collaborative Government is a joint public-policy project of CGI in partnership with leading academic institutions. Launched in January 2008, the initiative's mission is to analyze models of government's collaboration with the private and nonprofit sectors in order to identify best practices in using collaboration to achieve mission results.

Government today partners with the private and nonprofit sectors to accomplish a broad range of mission-related and administrative functions. The question is not whether collaboration will occur, but rather how agencies will collaborate most effectively while retaining strategic alignment, control, and accountability. The CGI Initiative for Collaborative Government is focused on helping government answer this challenge.

The CGI Initiative publishes reports with academic partners including George Mason University, the founding partner with CGI; the Johns Hopkins Center for Civil Society Studies; and the University of Maryland Center for Public Policy and Private Enterprise. The CGI Initiative also conducts webinars, produces videos, sponsors events and publishes an online newsletter. A full listing of the CGI Initiative's 2010 agenda, access to reports, videos, and executive summaries of seminar discussions, as well as registration for webinars and subscriptions to *Collaborative Government Today* are available at www.collaborativegov.org.

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FOREWORD

One of the questions bubbling among federal, state and local government leaders and observers interested in the American Recovery and Reinvestment Act is: How can we sustain jobs over the longer term after the stimulus money runs out?

One approach that federal, state and local leaders can find ample evidence to support is to invest in broadband connectivity in the communities that most need them. In her paper, “Sustaining Jobs After the Stimulus: Building on Broadband,” published by the CGI Initiative for Collaborative Government in partnership with George Mason University, Dr. Darrene Hackler details the potential for broadband investment not just to create jobs now but also to serve as a sustaining artery for jobs in the long term.

Broadband’s potential impact is demonstrated by efforts already under way, where its deployment has helped give birth to information technology centers of excellence in rural and disadvantaged regions. In her 2008 research report, “Creating Jobs in America: Case Studies in Local Economic Development,” published by the CGI Initiative, Dr. Hackler described two examples of this approach in Russell County, Va., and Northeast Pennsylvania, along with examples of job creation via industrial diversification elsewhere.

In another 2008 report published by the CGI Initiative, Dr. Lester Salamon, Director of the Center for Civil Society Studies at Johns Hopkins University, recommended expanding on this model. He advocated “the creation of a National Technology Initiative to promote the development of skilled, technology-oriented jobs in disadvantaged American communities.” His recommendation was based on the need to build up U.S. information technology expertise as a matter of national security, as well as the imperative to create high-quality U.S. jobs.

To address this challenge, Dr. Salamon recommended the creation of “at least a dozen economically competitive centers of information technology in disadvantaged rural and urban areas of the United States over the next 10 years, with similar objectives possible in other technology areas.”

Just weeks after the release of these two 2008 reports, the American economy entered a serious decline. Subsequently, in February 2009, the American Recovery and Reinvestment Act became law. Among its many areas of targeted stimulus, the Recovery Act included billions of dollars to expand broadband connectivity across the United States and to train American workers for 21st-century jobs. The Recovery Act investments in broadband put immediate force behind a recommendation by Salamon to close what he termed “the infrastructure gap.”

“To be economically competitive with overseas sites, new information technology locations in the United States will likely need to be developed in historically underdeveloped rural and central city areas, where wage levels even for technology-related jobs are typically 20 percent to 30 percent lower than in

[information technology] hot spots like California's Silicon Valley," Salamon wrote.

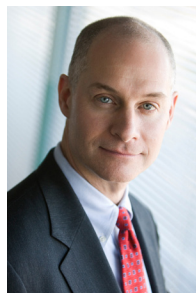
"These areas often lack the infrastructure of broadband connectivity needed to support modern IT businesses. A critical prerequisite for the kind of National Technology Initiative proposed here will, therefore, be to upgrade the technology infrastructure in these areas, much as the Rural Electrification Administration did in electrifying rural America for modern agricultural production 70 years ago."

At a time when communities are wrestling with how to spark and sustain economic growth beyond the Recovery Act, federal, state and local leaders could do well to expand investment in and leverage of programs like broadband to enable job growth in rural and disadvantaged regions. The investment not only has the ability to create jobs today but also to sustain them into the future.

For example, broadband investment could attract businesses desiring to expand and build IT functions. Such IT centers might first build up a state's health IT capacity to meet needs driven by Recovery Act health programs. Then, in following years, that same IT center could provide broader software development and IT services to clients in the region, as well as to other organizations around the country and even the globe, wherever the demand for IT services is high. As a result, the broadband investment and resulting IT centers not only create jobs locally, they make those jobs sustainable by creating industries with a potentially nationwide — even worldwide — supply of clients.

As localities look to capitalize on grant opportunities provided by the Recovery Act or future federal budgets, and as federal policy-makers and program officials consider creation and implementation of new initiatives (e.g., investments in new energy and green technologies), broadband investment is a very viable option for achieving high-quality, sustainable U.S. job creation. Additionally, this approach improves U.S. national security by expanding onshore expertise to deliver the secure information technology needed to protect the homeland and support our warfighters.

By investing taxpayer dollars in broadband and supporting programs such as workforce training, governments can get a long-term and extended bounce from the Recovery Act, implement telecommunications infrastructure networks they very much need in order to execute their missions, and build up America's technology capacity to enhance national security in the process.



Andrew McLauchlin

Director, CGI Initiative for Collaborative Government



SUSTAINING JOBS AFTER THE STIMULUS: BUILDING ON BROADBAND

In March 2010, the Federal Communications Commission released its National Broadband Plan, a blueprint for extending high-speed, always-on Internet access across the United States. The plan was required under the 2009 American Recovery and Reinvestment Act (ARRA). The FCC worked on the plan in coordination with the Commerce Department's National Telecommunications and Information Administration (NTIA) under the Broadband Technology Opportunities Program (BTOP), also established under the Recovery Act. The FCC will both institute the plan and set benchmarks for meeting the goal of national broadband access.

According to the Recovery Act, the National Broadband Plan was to include:

- An analysis of the most effective and efficient mechanisms for ensuring that all people of the United States have broadband access
- A detailed strategy for achieving affordability of such service and maximum use of broadband infrastructure and service by the public
- An evaluation of the status of deployment of broadband service, including progress of projects supported by grants made under BTOP and the Agriculture Department's Broadband Initiative Program
- A plan for use of broadband infrastructure and services in advancing consumer welfare, civic participation, public safety and homeland security, community development,

healthcare delivery, energy independence and efficiency, education, worker training, private sector investment, entrepreneurial activity, job creation and economic growth and other national purposes.

Of all the goals and purposes set for the National Broadband Plan, none is as central to national economic recovery as creating jobs. Job creation is the focus of the Recovery Act and the engine of reinvigorated economic growth. Fortunately, a significant body of research suggests that broadband expansion brings both employment growth and economic development.

For example, a 2007 Brookings Institution report found that employment is projected to increase by 0.2 percent to 0.3 percent per year for every one percentage point increase in broadband penetration in a state. A 2007 Sacramento Regional Research Institute study commissioned by AT&T found that broadband use generated approximately 198,000 jobs in California between 2002 and 2005. And in January 2010, the Public Policy Institute of California released results of a nationwide study of broadband expansion between 1999 and 2006. It found that extending broadband service is associated with large increases in employment growth, especially in technology-reliant industries such as utilities; information, finance and insurance, professional, scientific and technical services; management; and administrative and business support services.

In addition to ordering the National Broadband Plan, the ARRA provided \$7.2 billion to two

programs to fund projects that will expand access to and adoption of broadband services:

- The Commerce Department's NTIA is administering the \$4.7 billion BTOP, which will provide grants to fund broadband infrastructure, public computer centers, and sustainable broadband adoption projects.
- The Agriculture Department's Rural Utilities Service (RUS) is administering the \$2.5 billion Broadband Initiative Program (BIP) to make loans and grants for broadband infrastructure projects in rural areas.

The programs have dual goals:

- To provide broadband service to consumers in unserved areas of the country, and to improve broadband service to consumers in underserved areas, and
- To provide broadband education, awareness, training, access and support to libraries, educational institutions and other organizations to facilitate greater use of broadband, including more use by low-income, unemployed, aged and otherwise vulnerable populations.

NTIA and RUS broadband funds were to be distributed during two windows. The first closed in November 2009 and saw \$182 million allotted primarily to telecommunications vendors for middle-mile projects — those extending backbone fiber that cuts broadly through sections of the country. The second window opened February 16, 2010. Approximately \$4.8 billion was expected to flow through the agencies during this round, which closed mid-March.

As state and local governments deploy broadband funds granted under the Recovery Act and prepare applications for remaining funds, important issues linger:

1. How can ARRA efforts be sustained beyond recovery?
2. What critical assets and capacities do state and local governments need to build with current funding in order to capture new and innovative jobs in the future?
3. What can localities do to stimulate human capital development for sustainable, long-term job creation?

In anticipation of broadband investment from Commerce's BTOP and Agriculture's BIP programs and as a result of the FCC's National Broadband Plan, state and local governments are examining how best to use the funds. In seeking to ensure that the broadband effort creates not only jobs but also conditions for sustained economic development after the stimulus ends, federal, state and local officials can apply lessons learned from successful broadband-based economic transformations.

Drawing on those experiences, this paper offers seven recommendations, five for federal agencies and two for state and local governments, to improve the chances that broadband deployment will create jobs and spur economic recovery.

Recommendations for the Federal Government

1. Encourage increased collaboration across federal agencies to leverage funding, expertise and policy tools.
2. Use sustainability as a criterion for economic development investments by focusing on critical assets such as human capital; green, clean, and lean infrastructure; and entrepreneurship.
3. Increase investment in innovation and research and development.
4. Ensure that the nation's investment in

broadband organizes key resources for maximum long-term impact.

5. Promote innovative approaches to investment, financing, distribution and regulation of broadband.

Recommendations for State and Local Governments

1. Perform strategic reviews to assess progress in developing critical assets.
2. Ensure long-term commitment and adequate investment in human capital; green, clean and lean infrastructure; and entrepreneurship.

Broadband Transforms Southwest Virginia

Southwest Virginia's Russell County and the town of Lebanon offer an example of broadband-based economic transformation, which is detailed in my report, "Creating Jobs in America: Case Studies in Local Economic Development," published in August 2008 by the CGI Initiative for Collaborative Government and George Mason University.

The 21st century opened with Russell County's coal mining-based economy in crisis. From 1993 to 2004, the region saw a 20 percent loss in jobs. Coal mining dropped 29.4 percent of its employees; manufacturing and tobacco production also showed sharp declines. The median age in the area rose sharply as young adults fled for jobs and livable wages. The future was dark as the declines appeared permanent.

But as the first decade of the new century was drawing to a close, two companies had opened state-of-the-art, high-tech centers in Russell County that are providing hundreds of new, relatively high-paying jobs.

The county's transformation took many collaborators. One was Virginia's Distributed Services Initiative. This plan targets IT companies in the state that are considering moving some portion of their business overseas, and seeks to educate them about the opportunities available should they instead relocate to low-cost areas within the state. Russell County was one of several rural areas recruited by the initiative, which assisted the county in making its case.

CGI officially moved into its new Southwest Virginia Center of Excellence in January 2006. A software development and systems integration facility, the SWVA Center currently provides nearly 500 IT jobs in the region. In addition, Northrop Grumman opened its Southwest Enterprise Solutions Center, which serves as a call center and backup data center. It, too, is slated to bring hundreds of jobs to the area. Both facilities are in the Russell Regional Business Technology Park and are the product of intergovernmental efforts over the past decade to stem the region's decline.

The companies' decision to relocate in Russell County spawned an employee recruiting campaign reaching out to high school and college alumni who had left the area. However, it became evident that the key long-term effort was to develop the workforce from within. Collaboration between CGI and Southwest Virginia Community College brought a new technology program with guaranteed job interviews for all participants. With two other nearby community colleges, SVCC developed a scholarship fund for IT students. In addition, area public schools beefed up their technology classes.

The jobs the two companies have brought to the county pay well above the average salary for the region. In fact, a 2005 study performed for CGI by economic forecasting firm Chmura Economics & Analytics of Richmond, Va., titled "The Economic Impact of CGI-AMS Southwest Virginia Expansion," suggested that with 300 employees, CGI's total impact on the local economy would be \$68.5 million.

Underlying Russell County's economic turnaround, both figuratively and literally, is a fiber-optic backbone born of the county's visionary plan for attracting 21st-century development and built using federal funds. According to a December 2009 report by the President's National Economic Council, "Recovery Act Investments in Broadband: Leveraging Federal Dollars to Create Jobs and Connect America," Virginia's Mid-Atlantic Broadband Cooperative (MBC), created in January 2004, used \$6 million in seed money from the U.S. Commerce Department and a matching state grant of \$6 million to build a 700-mile fiber-optic network. Additional state funding helped extend it to 800 miles, and it continues to grow throughout Southern Virginia across 60 business and technology parks. For the IT companies that moved to Russell County, broadband availability and capacity were essential location factors.

Lessons from Russell County

In Russell County, broadband expansion brought sustained economic development and job creation because it was supported by:

- A high degree of collaboration between government units and the private sector
- Advanced planning on the part of state, local and regional government entities
- The astute combination of resources from a variety of government and non-government sources.

LESSON 1: Regional collaboration is essential.

Regional collaboration ranged from physical infrastructure to workforce development to the seeding of future human capital. The success of Russell County and Lebanon relied heavily on the participation and commitment of many Southwest Virginia communities. The employment effect is

spread across a number of these communities because many people chose not to relocate to other areas and commute.

LESSON 2: Advanced planning is necessary, and efforts must continue.

Communities recognizing the need for economic change and looking for opportunities must understand the new paradigm of local economic development. It is no longer only about structural infrastructure, such as buildings and industrial parks. Today, it is about the advanced infrastructure fueling those structures — for example, broadband capacity and human capital. Focusing on these and other unique aspects of a location is key to understanding the potential for economic change.

LESSON 3: A successful outcome depends on combining resources from a variety of sources.

The combination of federal and state funds was necessary to build the requisite advanced telecommunications infrastructure to attract IT industry. Yet beyond the amount of money and level of government supplying the funding, combining resources to create myriad types of federal, state and local financing — from grants to financial incentives — for workforce development, scholarships, broadband, land and facilities is critical.

Broadband for Recovery and Beyond

There are signs that federal and state officials are applying lessons from broadband-based economic transformation in places like Russell County. At the federal level, NTIA and RUS appear to have embraced their role as the necessary glue to bind partners from industry and government, education and nonprofits together for collaborative economic development. For example, NTIA officials announced in January 2010 that during the second

broadband funding window, they would give special priority to public-private partnership applications that include anchor tenants — hospitals, community colleges, government agencies and the like.

The agencies also have demonstrated that they understand the need to encourage collaboration to ensure that broadband sustains development by multiplying the effect of ARRA spending. In a November 2009 request for information, for example, they sought input on determining how to “encourage appropriate levels of non-federal (state, local and private) matching funds to be contributed so that the potential impact of Federal funds is maximized.”

Though the current economic downturn adds a significant degree of difficulty to the job-creation recommendations that grew out of Southwest Virginia and other economic transformations, the lesson that collaboration counts is more applicable today than ever.

Multiplying and extending the effects of Recovery Act broadband funding will require collaboration not only among federal, state and local governments and across regions of the country, but also among the federal agencies responsible for providing stimulus funds. Federal agencies can share their expertise and cooperate to fund the most promising proposals. They can encourage state and local governments, nonprofits and companies to collaborate when they apply for funding. They can distribute funds broadly to ensure that grants go to a variety of recipients and proposed solutions.

The recommendation to encourage exchange between educational institutions and industry also applies equally to deploying broadband to stimulate job creation locally and to sustain recovery on the national level. Many states focus on human capital development as part of their science and technology or technology-based economic development policies. Under those policies, state governments bring together stakeholders from

public education, nonprofits, and private industry to determine the skills employees will need in the future. These interactions allow industry to articulate desirable workforce competencies and let universities transfer research discoveries to industry.

As Russell County’s experience shows, the bases for sustainable job creation and economic development through broadband are human capital and a green, clean and lean infrastructure. Thus, the federal government can help ensure sustained recovery by focusing its investments on developing these critical assets.

Another critical support for broadband-based development is entrepreneurship in taking full advantage of the innovative infrastructure. States provide research and incubators to support entrepreneurs, university researchers, venture capitalists and other innovative R&D interests. For example, Kentucky’s Innovation and Commercialization Centers and Virginia’s Center for Innovative Technology steer entrepreneurs through the commercialization process. Pennsylvania’s Ben Franklin Technology Partners provides grants to match universities’ applied research with startup companies, and administers the Labor Department’s Workforce Innovation in Regional Economic Development grant for the state.

However, the economic downturn has limited states’ ability to invest in innovation and R&D. To ensure the effects of stimulus are sustained, the federal government can increase its investments in R&D and entrepreneurship while states are strapped, and support them in continuing to include such investments in their future finance strategies.

Government Actions to Support Job Creation

The research performed for “Creating Jobs in America” about job creation in Southwest, Va., and other rural and smaller metropolitan areas led to recommendations to help federal, state and local governments create conditions conducive to sustained economic development. These recommendations also can help pave the way for sustainable national broadband-based job growth and economic development.

For the Federal Government

1. Work with state and local governments to diversify the economic base through investments in human capital and support of innovative industries. Localities and regions can and should be the targets of strategic federal action — the “necessary glue” to collaborative economic development around innovation involving partners from industry, education and nonprofits. The federal government should target and leverage local and regional efforts that seek to diversify and strengthen local economies by channeling investment into human capital, and supporting innovative industries with significant research and development expenditures.
2. Fund technical assistance for local economic development strategies. Through the departments of Commerce and Labor, the federal government should provide technical assistance grants to help rural and smaller metropolitan areas determine what type of “new economy” industry would be most suitable for their regions.
3. Link workforce and economic development efforts. The federal government should create comprehensive programs that link both economic and workforce development and use the expertise of multiple federal agencies. Creating “communities of practice” on economic and workforce development could enlist policy-makers with similar interests but divergent backgrounds. The localities for which these programs are intended would be better able to see the connections among disparate programs and to understand the need for collaboration.
4. Create collaborative exchanges between education and industry. Federal education and workforce grants should institutionalize the collaborative efforts of education and industry. A mutual education-industry exchange would encourage discoveries in a substantive field to filter back to industry, fostering applied knowledge and innovation.

For State Governments

States also can require collaboration between education and industry for their own workforce development grants. Beyond this, two recommendations emerged for state governments.

1. Encourage regional collaboration. The national economy is not so much a collection of state economies as of regional economies that often cross state borders. States could overcome structural hurdles by adapting and merging accountability and responsibility among functions in the same economic region to encourage jurisdictions to work together. Actions that facilitate and provide incentives for collaboration will have more success than regulations enforcing it.
2. State governments should create a single point of contact for economic development. One focal point of contact is a key resource for business, economic, educational and local government stakeholders.

For Local Governments

Economic development must include actors from government, education, business and nonprofits and development organizations and must draw from entire regions, not just localities. Three recommendations can help local governments foster this kind of interaction.

1. Focus on regional collaboration. When regional actors pull together to undertake economic restructuring, results are enhanced and further collaboration ensues. Regional approaches are especially effective in workforce development and improvement of physical infrastructure, particularly telecommunications. Regions that collaborate better understand and develop industry clusters of interconnected firms, whose interactions spur innovation and create higher wage jobs.
2. Create public-private economic development organizations. These groups can become safe spaces for collaboration that naturally involve educational organizations and nonprofits in regional economic development.
3. Plan for the future of the region. Localities seeking change or focusing on new industrial directions should undertake advanced strategic planning that includes regional assessments and a cycle of evaluating, improving and refocusing development strategies for sustainability. Local governments also should build leadership capacity in economic development. Strategic planning can ensure that the vision for the future is based on community ideas and needs.

How Broadband Can Sustain Jobs After the Stimulus Ends

The recommendations developed from the experience of Russell County and other places that have used broadband as a springboard to economic transformation feed the recommendations for using it to sustain recovery nationally. Just as in Southwest Virginia, government has a role to play nationally in supporting investment in human capital and entrepreneurial industry. Recommendations to encourage collaboration at many levels also carry over, as does the need to support research and development.

Beyond those common recommendations are new needs on the national level — to promote innovation in financing and regulation, for example, and to plan ahead to ensure broadband is deployed at speeds and prices that ensure maximum long-term impact.

Recommendations for the Federal Government

1. Encourage increased collaboration across federal agencies to leverage funding, expertise and policy tools.
2. Use sustainability as a criterion for economic development investments by focusing on critical assets such as human capital; green, clean and lean infrastructure; and entrepreneurship.
3. Increase investment in innovation and research and development.
4. Ensure the nation's investment in broadband organizes key resources for maximum long-term impact.
5. Promote innovative approaches to investment, financing, distribution and regulation of broadband.

1. Encourage increased collaboration across federal agencies to leverage funding, expertise and policy tools.

State and local governments could be better served if current grant funding and future appropriations allowed for greater leveraging of funds, expertise and policy tools. This would facilitate interagency and intergovernmental collaboration and increase program flexibility. Collaboration is vital to multiplying the effects of investment. That's why NTIA and RUS encouraged state and local government collaboration in proposals, and NTIA suggested that broadband grant applicants review the ARRA portfolio for sources of funds from other agencies.

Interagency coordination could help federal agencies more effectively share funds and expertise, and could promote collaborative funding proposals from state and local governments and nonprofit and private sector organizations. Increased flexibility in federal programs could improve proposed solutions and results. Categorizing funds too strictly limits the variety of grant recipients and proposed solutions. Distributing broadband funding between wired and wireless networks and among urban, suburban and rural entities as well as municipal cooperatives and public-private partnerships can provide insight into the likelihood that different models of deployment will succeed.

Stimulus programs also could be coordinated. For example, Recovery Act highway projects could include installation of broadband conduits — tubes that hold fiber-optic cables. This could create long-term savings in two ways. First, digging up a road to lay fiber and then repairing it is vastly more expensive than installing fiber when the road is being fixed or built. Second, every cut into and repair of a road decreases its life. With conduit already in the ground, fiber-optic cable can be added later without such expensive side effects.

The effect of federal investment also can be multiplied through public outreach and education. Funding plans could explain, for example, that broadband can be an enabler of further development if recipients plan for it and capitalize on it in a coordinated and collaborative fashion.

Leveraging policy tools also holds promise in helping sustain the effects of broadband deployment. In “Securing America’s Future: Responding to the Challenge,” published in September 2008 by the CGI Initiative and Johns Hopkins University’s Center for Civil Societies, Dr. Lester Salamon suggested that federal officials consider creating a national initiative to promote technology development in historically underdeveloped regions of the United States. Among his recommended strategies was to review and consider modifying grant, loan, tax and procurement policies and programs to stimulate expansion in lagging regions.

Salamon suggested modifications such as broadening IT infrastructure loans and grants (as ARRA is doing with broadband), providing tax incentives for investments in technology ventures, low-cost loans or loan guarantees for such investments, enhanced Pell Grant assistance for IT workers who serve for a specified time in disadvantaged areas, and the like. Federal agencies could consider similar policy modifications to achieve sustained job and economic growth based on broadband spending under the Recovery Act.

2. Use sustainability as a criterion for economic development investments, focusing on critical assets such as human capital; green, clean and lean infrastructure; and entrepreneurship.

Another approach to promoting sustainable state and local economic development is for the federal government to support investment in critical assets. Recovery Act funds and future federal policy actions on economic development should focus

on these assets directly by supporting state and local governments in enhancing human capital and green, clean and lean infrastructure as well as in supporting entrepreneurship.

In the current economic downturn, such efforts have been stymied, if not completely curtailed. The ARRA’s down payment on these assets can help sustain these initiatives in the lean years. However, the federal government needs to play a role in providing a vision for the future and incentivizing sound strategic and capital plans so states will continue investing in these critical assets.

3. Increase investment in innovation and research and development.

As the federal government reduced its role in state and local economic development over the years, many states sought to create a supportive environment for innovative industries by writing policies that also transfer R&D through commercialization processes. Now, when states are less able to sustain such investments, the federal government could step in.

The support of R&D and the useful innovations it produces drive economies, helping spur progress and stability. Sustained focus on the intersection of R&D and critical assets creates a sound foundation that will generate greater payoff with future investments.

4. Ensure the nation’s broadband investment is designed to deliver long-term impact.

Broadband deployment supports the growth of jobs in R&D and innovative industries, both of which stimulate economic growth. In addition, the presence of broadband service has become a top criterion in corporate site selection because businesses require reliable, high-speed digital connectivity to compete. Broadband investments in European and Asian countries include higher speeds and greater affordability than in the United States, and often symmetrical capacity as well. The

United States, too, should keep long-term goals in mind so that what is built today can meet the requirements of tomorrow.

5. Promote innovative investment, financing, distribution and regulatory approaches to broadband.

Broadband is unlike other familiar utility infrastructures. It has different time horizons for return on investment and falls across different state regulatory regimes. Traditional capital and credit markets often cannot provide the flexibility broadband requires. In particular, broadband involves distributed production across geographies, thus challenging the standard approaches to calculating and spreading investment risk. In addition, broadband may not attain the same rural uptake that, for example, electric systems did. The federal government could help develop new risk-assessment techniques and financing tools to support broadband investments and deployment.

The federal government could work with lending institutions and state regulatory commissions to promote broadband expansion. The federal government will need to continue to address how broadband differs from traditional telecommunications systems. Officials will need to address competition-related issues, such as net neutrality and state and local government participation, in providing broadband services. The federal government can lead and support the development of new approaches to improve diffusion of innovative infrastructures, such as broadband, just as it did for previous disruptive technologies, such as railroads and electricity in their time.

Recommendations for State and Local Governments

1. Perform strategic reviews to assess progress in developing critical assets.
2. Ensure long-term commitment and

adequate investment in human capital; green, clean and lean infrastructure; and entrepreneurship.

1. Perform strategic reviews to assess progress in developing critical assets.

A necessary step in deploying broadband is assessing the base that exists and the networks that can use or support the required investments. Broadband deployment assessments that reveal the location and capacity of existing networks can help in planning everything from transportation to economic development. Although the ARRA provides some funding to assist with broadband mapping at the state level, a complete and frequently updated broadband map will require additional state and local resources. Creating a sustainable assessment function is essential to inform policy decisions as part of strategic planning for future economic development.

2. Ensure long-term commitment and adequate investment in human capital; green, clean, and lean infrastructure; and entrepreneurship.

The ARRA provides a down payment for some foundations of future economic growth and development, but short-term and one-time funding will not suffice. Long-term planning and investment are particularly important in developing human capital, and state and local governments have the most responsibility for generating future generations of talent.

State and local governments can facilitate open discussions with economic stakeholders from public education, nonprofits and private industry to determine which skills future employees will need, the types of business environments that best support entrepreneurship, and the infrastructure that is essential to developing these assets. The fiscal situation might limit investment in these critical assets in the short term, but states can integrate such investments into their capital planning and finance strategies for the future.

Conclusion

In a January 2009 study, “The Digital Road to Recovery: A Stimulus Plan to Create Jobs, Boost Productivity and Revitalize America,” the Information Technology and Innovation Foundation, a nonprofit, non-partisan think tank in Washington, D.C., found that 500,000 jobs could be created nationwide with every \$10 billion invested in fiber and wireless broadband networking.

More often than not, broadband investment supports the growth of knowledge economy jobs in R&D and in industries that generate innovation and stimulate economic change and growth. These jobs often offer higher than average salaries. They also require investment in improving human capital resources, whose skill sets reflect not just years of education but also curriculums that emphasize creativity, innovation and the importance of networks of learning.

The long-term effect of broadband investment is central to our local, regional and state economies’ ability to compete globally. The level of state and local interest in the BTOP and BIP programs demonstrates the great need for increased broadband availability at higher speeds and more

affordable prices. Through the FCC’s National Broadband Plan and other initiatives, the federal government should prioritize broadband as an essential national infrastructure, and continue dedicating funds and policy guidance to facilitate its deployment in unserved areas and in situations that limit the full potential of existing networks.

If all levels of government are visionary in their strategic planning, collaborative in implementation, and bold in surmounting structural and jurisdictional boundaries, then broadband can play a critical role, spurring not only economic development in rural and small metropolitan areas, but also sustained economic recovery across the country. But wringing the full benefit from broadband deployment will require not just interagency and intergovernmental collaboration but support and involvement of private industry, educational institutions, nonprofits, community groups and other organizations. Governments will be challenged to use every policy and program lever available to help create the conditions to permit broadband, like the railroads and electrification before it, to open America to innovation and economic rebirth.

AUTHOR PROFILE

Dr. Darrene L. Hackler is an associate professor at George Mason University in the Department of Public and International Affairs, and a senior fellow at the Information Technology and Innovation Foundation (ITIF), where she is examining the role of green innovation in climate change and energy policy. She is the author of “Cities in the Technology Economy” (ME Sharpe 2006), which examines the effects of technology industries and infrastructures on cities and the local policy actions required for effective responses to these challenges.

Dr. Hackler’s research focuses on the political economy of innovation, entrepreneurship, the technology industry and telecommunications infrastructure. She has had grants and contracts from The Ewing Marion Kauffman Foundation to examine entrepreneurship, women’s business ownership and innovation; from the CGI Initiative for Collaborative Government to examine current local economic development practices; from a coalition of state and local associations to analyze future transportation policy alternatives; and from the Small Business Administration to look at the connection between human capital and women’s business ownership. She was also part of a research team that designed an Information and Communication Technology Comprehensive Economic Development Strategy for Orange County, Calif., under a grant from the Commerce Department’s Economic Development Administration.

She has work published in *Public Administration Review*, *Urban Affairs Review*, *Journal of Urban Affairs*, *Journal of Urban Technology*,

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Before joining George Mason University, she was an analyst for a telecommunications industry analysis firm RHK (OVUM), a senior research associate with Claremont Information Technology Institute, and an independent telecommunications consultant to executive developers of commercial real estate, resort communities and master-planned communities.

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Dr. Darrene L. Hackler

About CGI

Founded in 1976, CGI Group Inc. is one of the largest independent information technology and business process services firms in the world. CGI and its affiliated companies employ approximately 26,000 professionals. CGI provides end-to-end IT and business process services to government and commercial clients worldwide from offices in the United States, Canada, Europe and Asia

Pacific as well as from centers of excellence in North America, Europe and India. As of December 31, 2009, CGI's order backlog was \$11.4 billion. CGI shares are listed on the NYSE (GIB) and the TSX (GIB.A) and are included in the S&P/TSX Composite Index as well as the S&P/TSX Capped Information Technology and MidCap Indices. Website: www.cgi.com/usfederal.

About George Mason University

Named "the No. 1 national university to watch" by U.S. News & World Report, George Mason University is an innovative, entrepreneurial institution with global distinction in a range of academic fields. Located in the heart of Northern Virginia's technology corridor near Washington, D.C., Mason prepares its students to succeed in the workforce and meet the needs of the region and the world. With strong undergraduate and graduate degree programs in engineering and information technology, dance, organizational psychology, and health care, Mason students are routinely recognized with national and international scholarships. Mason professors conduct groundbreaking research in areas such

as cancer, climate change, information technology, and biosciences, and Mason's Center for the Arts brings world-renowned artists, musicians, and actors to its stage.

Mason's Masters in Public Administration program in the Department of Public and International Affairs is designed for people who hold or aspire to leadership positions in organizations that participate in the development and implementation of public policy. The program aims to give graduate students the opportunity to build their knowledge of politics, policy, and management and to enhance their analytic, problem solving, and communication skills.



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