

Topics in Economic Development

A roundup of recent research on broadband and economic issues

Benefits of Electric Co-ops' Investments in Broadband

A new paper from Purdue University projects the net benefits that could result from installing rural broadband in the areas served by rural electric member cooperatives (REMCs) in Indiana. Seven Indiana REMCs were studied, and their benefit-cost results were extrapolated to the entire state. Benefits included savings from telemedicine, education, business investment, consumer savings and farm income.

The benefit-cost ratios ranged from 2.97 to 4.09 for the seven REMCs. From a societal perspective, extending this investment through the rest of Indiana is clearly quite attractive. However, the anticipated revenue from customers is not adequate to cover the total system costs, so some form of external assistance

will be needed to incentivize the investments.

The sum of net present value of benefits for the seven cooperatives was \$2.25 billion, or \$24,293 per member. Extrapolating the net benefits for these seven REMCs, the total for the state of Indiana would be \$12.0 billion if the broadband investment were made statewide. That translates to \$1 billion per year annuitized over 20 years at a 6 percent interest rate.

In addition to the benefit-cost analysis, the report quantifies additional state and federal tax collections and cost savings as a result of the broadband investments in these seven REMCs. These tax/cost enhancements amount to \$56.5 million in year three, or 27 percent of the total net benefits of \$208 million.

See: "Estimation of the Net Benefits of Indiana Statewide Adoption of Rural Broadband," by Alison Grant, Wallace E. Tyner and Larry DeBoer, August 2018, Purdue University Center for Regional Development, www.pcrd.purdue.edu/files/media/006-RPINsights-Indiana-Broadband-Study.pdf

The New Urban Economy

Smart cities enabled by broadband technology can play key roles beyond traditional economic development, according to a new study published by ABI Research. Cities can redefine and restructure their economies through the deployment or stimulation of new economic paradigms, such as smart contracts for trade, distributed microgrids for energy and shared mobility for automotive and transportation. New paradigms include the following:

- **Sharing Economy:** Consumers and enterprises abandon asset ownership and instead use pooled assets in a more efficient,

“as a service” manner. Examples include future driverless car sharing.

- **Peer-to-Peer Economy:** A special case of the sharing economy, peer-to-peer models link consumers directly in a disintermediated way. Examples include car sharing as well as home and office space sharing. Other examples include parking space and electric vehicle charging station sharing. Peer-to-peer models are still based on private asset ownership. Consumers and small enterprises can also engage in peer-to-peer lending as well as invest in each other's

projects, practices explored by startups such as MyBit.

- **Crowdsourced Economy:** Citizens can collectively contribute to information services, engage in city project crowdfunding initiatives and send back surplus energy locally generated through microgrids.
- **Service Economy:** Suppliers and vendors can sell services linked to their physical products as a way to derive additional revenue streams. Examples include over-the-air software updates and real-time cybersecurity monitoring.
- **On-Demand Economy:** Near-real-time delivery for e-commerce purchases (Amazon Prime's one-hour delivery guarantee), mobility as a service and e-freight address a growing need for instant gratification within a real-time economy increasingly organized around offering services immediately whenever or wherever they are required. Accomplishing this

New economic paradigms can generate \$10 trillion in additional GDP over 10 years.

necessitates fundamental changes in generating and sourcing assets and services as well as decentralized demand-response approaches.

- **Decentralized, Distributed Economy:** New industrial practices such as microgrids and additive manufacturing hold the promise of moving to a more decentralized manufacturing and service delivery economy, which will be critical for realizing on-demand and crowdsourcing models.
- **Autonomous and Intelligent Economy:** To fully realize many of the new economies outlined above, various forms of automation will be required, ranging from driverless cars to AI-driven, holistic demand-

response energy networks.

- **Green, Sustainable Economy:** Cities are currently the largest polluters, but they hold the promise of becoming eco-oases because of their scale and density.
- **Digital Economy:** Technologies such as blockchain can drive a revolution in trade and financing. Examples include the deployment of smart contracts and e-freight brokerage for e-trade, virtual currencies, and crowd- and peer-to-peer funding.

This structural smart urban economy growth is forecast to yield a recurring, sustainable growth of 2.8 percent by 2026, with \$10 trillion incremental GDP generated in the next 10 years.

See "Role of Smart Cities for Economic Development," by Dominique Bonte, January 2018, ABI Research, www.abiresearch.com

Broadband Adoption Predicts Economic Outcomes Better Than Availability

To test the assumption that broadband access strengthens a region's economy, Will Rinehart of the American Action Forum used a linear regression model to examine the effects of broadband coverage by census tract on various economic indicators.

He found that the percentage of the population with access to 25 Mbps/3 Mbps broadband didn't explain the unemployment rate, median household income, change

in employment or rate of population change in rural regions. An analysis using the 4 Mbps /1 Mbps standard for broadband similarly turned up no connection. Rinehart says this analysis calls into question whether the 25 Mbps download/3 Mbps upload metric, the older 4 Mbps download/1 Mbps upload metric or any other availability standard provides a reasonable understanding of the underlying economics of rural communities.

The FCC adoption index was also tested using the same model. This index is extremely imprecise; adoption is reported by a score of 1 through 5 rather than by actual percentages of households with broadband connections. However, even with this imprecise measure, Rinehart found that adoption explained economic trends four times better than access to 25 Mbps/3 Mbps broadband.

See "A Look at Rural Broadband Economics," by Will Rinehart, American Action Forum, August 2018, www.americanactionforum.org/research/a-look-at-rural-broadband-economics

Benefits of the UK's Superfast Broadband Program

The British government sponsored a study of its superfast broadband program, which subsidized the rollout of advanced broadband (originally mostly fiber to the node, but more

recently fiber to the home). Between 2011 and 2016, about 2.5 million premises received internet speeds above 24 Mbps that would not have done so without the program, and others were

upgraded sooner than they would have been. Average take rates reached 38 percent for premises upgraded in the first phase of the program.

Unemployment fell as a result of the U.K.'s subsidized rollout of "superfast" broadband.

- Making superfast broadband speeds available improved local economic performance. In postcodes with subsidized coverage, employment rose by 0.8 percent (49,000 jobs), and company revenue grew by 1.2 percent (\$11.6 billion per year) in response to the upgraded infrastructure. Productivity of local economic activity, approximated by revenue per worker, increased by 0.32 percent as a result of faster available download and upload speeds. More than 80 percent of these impacts were driven by the relocation of firms to postcodes receiving subsidized coverage. In firms that did not

relocate, productivity increased by 0.38 percent.

- Exploratory research suggested that the economic impacts of broadband increase substantially with faster speeds.
- Subsidized coverage supported reductions in unemployment. The number of individuals claiming Jobseekers Allowance fell by 8,800 by 2016, and the number of long-term claimants fell by 2,500. These impacts are estimated to have increased national economic output by \$49 million by June 2016.
- Households in areas that received upgrades tended to use social

networks more frequently and considered the internet to have a more important role in connecting them to others in this way. Similarly, those in upgraded areas were more likely to consider the internet essential to accessing entertainment content. The role of the internet in accessing educational content also emerged as an area of growing importance.

- Econometric analysis suggested the program had a positive effect on well-being, although effects varied across age groups. These benefits were valued at \$286 per premises upgraded per year.

By 2016, the program is estimated to have delivered a benefit-to-cost ratio of \$1.96 per \$1 of gross public sector spending. As benefits will continue into the future, this understates the overall benefit-to-cost ratio.

See "Evaluation of the Economic Impact and Public Value of the Superfast Broadband Programme, Final Report," prepared for the Department for Digital, Culture, Media and Sport by Ipsos MORI, Simetrica, George Barrett and Dr. Pantelis Koutroumpis, August 2018, https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/734855/Superfast_Integrated_Report.pdf

Least Developed Countries Benefit From High-Speed Internet

Broadband is a transformational tool that can help least developed countries (LDCs) overcome vulnerabilities, grow economies and enhance livelihoods, according to a new report from the UN Broadband Commission for Sustainable Development. However, broadband use is not yet high enough to have a measurable impact on these economies.

The report highlights progress in four LDCs – Cambodia, Rwanda, Senegal and Vanuatu – in expanding infrastructure and improving affordability of broadband.

- Rwanda is building a 4G/LTE wireless broadband network that will cover 95 per cent of its population by 2018.
- Senegal has made effective use of public-private partnerships to achieve broadband access for all.
- Vanuatu has an initiative to achieve

98 per cent broadband coverage by 2018.

- Cambodia has some of the least expensive mobile internet prices in the world.

All four study countries made progress in connecting government institutions and digitizing back-office administrative processes. In Rwanda, there are also online public services aimed at businesses and citizens.

The four countries have examples of innovative broadband interventions in health, such as online exchange of medical images and the use of drones for dispatching blood and vaccines to hard-to-reach areas. In education, multimedia teaching materials have been developed, and online learning is available at postsecondary institutions. CCTV and drones are used in Vanuatu for disaster monitoring.

Still, most of these interventions are pilot programs driven by development partners.

Narrowband services, such as text messages in the health and agricultural sector and mobile money, have already helped improve livelihoods, says the report. A study of mobile communications in Senegal showed that each 10 percentage point increase in mobile penetration increased GDP by 0.5 percentage points.

The report notes that the use of broadband has not grown to match its increasing supply because of challenges such as low digital literacy, unaffordability and lack of relevant local content and applications. Much work remains to be done, including making a strategic commitment to broadband, expanding digital literacy and awareness and supporting local e-businesses to make productive use of broadband.

See "Broadband for National Development in Four LDCs: Cambodia, Rwanda, Senegal and Vanuatu," July 2018, <http://broadbandcommission.org/Documents/publications/wgmostvulnerablecountries.pdf>