

# Economic Development in Brief

A summary of new research findings, case studies and innovations relating to broadband's effects on economic growth and development.

## GE: Broadband-Enabled Productivity Gains Have Barely Begun

In its brief existence, the Internet has created digital products and services that never existed before. It has made markets more efficient by slashing information costs. It has reduced the need for travel and shipping. It has lowered the cost for workers to upgrade their skills.

But, to quote the great Al Jolson, you ain't seen nothing yet.

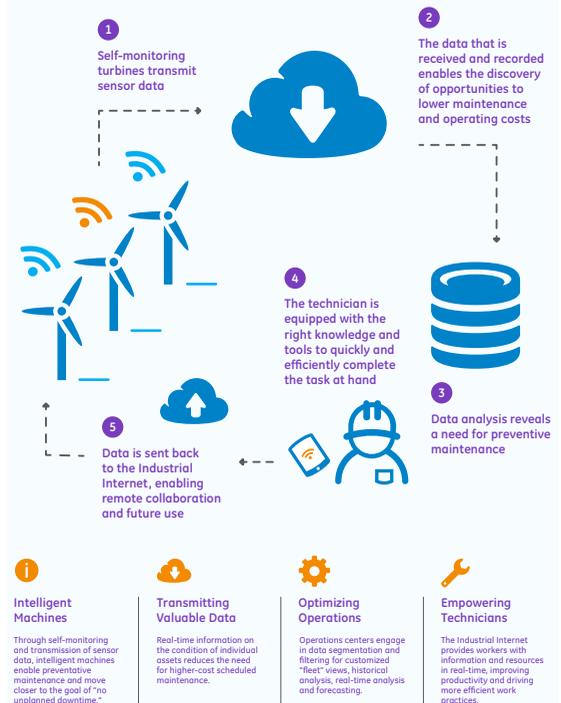
Today, ultra-broadband is converging with cloud computing, arrays of low-cost sensors and controllers, and tools for analyzing big data. This convergence makes possible what GE calls the "industrial Internet" – a set of platforms and applications that will allow companies to control equipment remotely and aim for zero unplanned equipment outages.

Airlines, railroads, hospitals, utilities and manufacturers will be able to manage and operate machines such as jet engines, CT scanners and gas turbines in the cloud, moving from a reactive to a predictive industrial operating model. GE forecasts that this will ultimately allow companies to solve problems in new ways and yield such results as highly accurate health care treatments and extreme levels of energy efficiency.

One recent analysis estimates that the industrial Internet will create \$1.3 trillion in annual value by 2020, with a 149 percent return on investment for industrial Internet applications. Another says this

new wave of innovation could boost global GDP by as much as \$10 to 15 trillion over the next 20 years through accelerated productivity growth.

The Industrial Internet is transforming the way people service and maintain industrial equipment, medical devices and other machines.



Source: "The Industrial Internet@Work," by Marco Annunziata and Peter C. Evans, GE

## Broadband Drives Innovation

By Dr. Bruno Lanvin / Executive Director ECI, INSEAD

*(Excerpted from “The State of Broadband 2013: Universalizing Broadband,” a report by the UNESCO Broadband Commission.)*

Successful innovation is based on a complex ecosystem in which investments in R&D take place against a background of efficient infrastructure, talent and a socioeconomic environment rewarding creativity and risk as paramount.

Where such an ecosystem is lacking, investments in R&D do not generate their full returns. Indeed, the “middle-income trap” risks becoming a “middle innovation ranking trap”: Many emerging economies that had made spectacular progress in innovation rankings over the last few years have proved unable to maintain their rates of progress, despite continuing or accelerating investments in R&D.

Ecosystems of innovation do not happen overnight. Efficient financial, educational, legal and regulatory frameworks are needed, which typically take more than a generation to build.

Broadband could generate “innovation-as-a-service” in ideas across emerging economies via telepresence, crowdsourcing and remote collaboration. Innovators can also reach venture capitalists in other regions more easily.

Innovation is a four-faceted mindset, involving people, ideas, finance and market. Yet history often provides accelerators that have proven beneficial to innovation.

Broadband is one such accelerator, driving rapid change across these four pillars of innovation. Broadband deployment can accelerate innovation by promoting academia-business alliances, leadership across borders, metrics and local dynamics. For people, ubiquitous broadband will benefit first and foremost the education sector by contributing to the detection,

stimulation and blossoming of talent.

Combined with cloud computing, broadband could generate “innovation-as-a-service” in ideas across emerging economies via telepresence, crowdsourcing and remote collaboration. Broadband also improves financing by allowing innovators to reach venture capitalists in other regions more easily. Broadband enables firms and individuals to “move beyond mere Web presence” and reach consumers worldwide through secure platforms, interactive virtual shop windows, and local and targeted advertising.

## In Rural Areas, Broadband Adoption Is Key

Adoption is the most important – and possibly the only – variable that relates broadband to rural economic growth in the United States, according to a new study, “Broadband’s Contribution to Economic Health in Rural Areas,” by Brian Whitacre of Oklahoma State University, Roberto Gallardo of Mississippi State University and Sharon Stover of the University of Texas.

Using FCC broadband adoption data, National Broadband Map infrastructure data and various measures of economic outcomes, the authors compared rural counties with counties that were similar in other ways except for broadband availability or adoption. They found the following:

- In counties with levels of broadband adoption above 60 percent, median household income grew faster and unemployment was lower compared with similar counties below this threshold. Where broadband adoption was below 40 percent, the number of firms and employees grew 3 percentage points less than in similar counties.
- In counties with broadband availability above 85 percent, income for nonfarm proprietors grew 5 percent *less* than in similar counties. This suggests that consumers may use e-commerce sooner than local businesses do and that the first effect of rural broadband is to give consumers nonlocal options for shopping.

Rural residents benefit, but local businesses may be at least temporarily disadvantaged.

- Download speeds greater than 10 Mbps appear to increase the percentage of creative-class workers and reduce the poverty level. However, average download speeds less than 3 Mbps are associated with marginally *higher* growth rates in median household income.
- Finally, increasing the number of broadband providers in an area does not by itself appear to affect economic health.

The authors recommend shifting the focus of rural broadband policy toward encouraging adoption in areas where broadband is now available.

## Cornwall Businesses Grow With Broadband

BT's new fiber network in Cornwall – a combination of fiber to the node and fiber to the home – has now passed 206,000 homes and businesses, or 82 per cent of the area, making Cornwall one of the best-connected areas in Britain and the best-connected rural region in Europe. New research by SERIO at Plymouth University and Buckman Associates shows the network is already providing a major economic boost to small and mid-sized businesses in the region.

After 12 months, 83 per cent of SMBs were saving time and money because of the faster speeds and innovative services that fiber broadband

enables. Nearly six of 10 SMBs surveyed said their businesses were growing because of the new technology, and more than a quarter either created or retained jobs as a direct result.

More than one-third of businesses completing the survey reported that superfast broadband had helped their business generate new sales, with a quarter of that group pointing to new trade overseas.

Adrian Dawson, head of projects and partnerships at Plymouth University, said, "What's important is not just having the infrastructure but knowing how to get the most from it, and we

work with a lot of Cornish companies harnessing the power of broadband to drive growth and create jobs."

One of those companies is the media and arts business Genius Loci, whose owner, Sue Aston, said, "Now I run teaching classes over Skype with students from around the globe. I have students in America, Japan [and] Italy and even a lady who lives on a boat in the Mediterranean. It is just as effective as a face-to-face teaching session, and it has opened up the whole world as a potential market. I can continue to develop the business internationally without any additional costs involved."

## Sweden Puts the Fiber in Innovation

By Karin Ahl / *President, FTTH Council Europe*

When it comes to innovation, Sweden punches above its weight. Sweden was ranked as the most innovative country in Europe in September 2013, using a new benchmark created by the European Commission. The "indicator of innovation output" measures the extent to which innovative ideas from several key industry segments – such as the environment, energy, ICT, health and high-technology industries – are able to reach the market.

In keeping with its reputation for being innovative, Sweden was one of the first countries to deploy FTTH networks. Today, more than 22 percent of households in the country have direct connections to fiber networks (Lithuania is the only European country with greater FTTH penetration). An early start in digital communications combined with a wide

range of open-access models – where an infrastructure provider grants access to all service providers on equal terms – laid the foundations for a vibrant and competitive broadband market.

In Sweden, we find plenty of concrete examples of FTTH-enabled innovation developed either in Stockholm or in other regions where FTTH is available. Commercial streaming music service Spotify started at KTH Royal Institute of Technology in Stockholm and today has more than 6 million active users. Magine, the streaming TV service that is often described as Spotify for TV, gained well over 500,000 subscribers in Sweden in under a year since its launch in November 2012. The founder of Giraff Technologies, who created a telepresence robot to help the elderly in their homes, packed his bags and moved his company to the Swedish city of Västerås in 2009. Both Stockholm and Västerås built citywide fiber networks in the early 2000s and have since connected the majority of households directly to fiber.

It's not just about communications networks, of course. Giraff also wanted to be close to its target market – a

country with a well-established social care system where looking after the elderly was a priority. The startup culture in science parks is also an important catalyst for innovation. Science parks are not unique to Sweden, but they are a strong feature of many universities. Incubators provide premises, mentoring and access to funding, making it easier to start a business. Science parks quite literally "suck in" startups from nearby regions, even from other countries, and the pull is especially strong in areas with good communications, such as Stockholm, Linköping and Malmö.

Perhaps the best-known Swedish startup is Skype, the Internet telephony service that was sold to eBay for \$2.6 billion in 2005, then to Microsoft for \$8.1 billion in 2011. Swedish entrepreneur Niklas Zennström co-founded the company with Danish colleague Janus Friis and a small team of computer developers from Estonia. The company's story is about bringing together talented people with the resources they need – and for a startup whose product doesn't exist without broadband, good communications are a given. ♦

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