



# The Road to Next-Generation Broadband

Daniel Correa • *The Information Technology and Innovation Foundation*

Next-generation broadband promises to usher in a digital future in which it will be possible, for instance, to have a high-definition videoconference examination with your doctor from the comfort of your own home. Japan and Korea in particular are much closer to this sort of digital future than most countries, including the US. Public policy must play an important role in making tomorrow's broadband a reality in America.

**B**roadband has become an increasingly contentious issue in Washington, DC, with most observers aligning into one of two camps: those who argue that the US is falling behind in broadband penetration and those who believe that it isn't. Predictably, these same observers break into similar camps over broadband policy. Those who see a problem argue for a policy solution, whereas their opponents – skeptical of the heavy hand of government regulation – find nothing for policy to redress.

Although both questions warrant frank discussion, the truth is that they're too often conflated. Your political philosophy shouldn't inform an opinion on fundamentally empirical issues such as international broadband rankings. This article's aim is to help sort out the issues by offering a guide for how best to approach international broadband statistics and broadband policy, with an emphasis on the importance of connection speeds.

## Navigating the Numbers

Several organizations publish international broadband penetration statistics, which track either the number of subscribers or subscribing households in a given population. Although the various surveys differ in methodology (some count broadband lines, others survey subscribers), the results are often similar.

So what do we know? It's useful to take a closer look at the Organization for Economic Cooperation and Development's (OECD's) semiannual broadband

statistics, which assess the broadband penetration of member nations and are the most widely cited international measure. Although critics in the US are quick to disparage the OECD's numbers in their efforts to refute this country's lagging performance, the truth is that the OECD statistics are generally better than the suggested alternatives.

In fact, if we use the US as an example, we find that the various sources of broadband statistics produce roughly similar findings. The latest OECD statistics rank the US 15th in per capita penetration, which translates to 12th in household penetration because of different household sizes. (The OECD measures penetration on a per capita basis because comprehensive data on household penetration is generally unavailable, although OECD data likely includes some DSL business subscribers, so the conversion is only approximate.) The most recent publicly available statistics from the International Telecommunications Union from January 2006 put the US behind 12 OECD nations in per capita broadband penetration, which is exactly the OECD's ranking one month prior ([www.itu.int/osg/spu/newslog/ITU+Broadband+Statistics+For+1+January+2006.aspx](http://www.itu.int/osg/spu/newslog/ITU+Broadband+Statistics+For+1+January+2006.aspx)). Point Topic, a British consulting firm that compiles a popular measure of household broadband penetration, ranks the US behind 17 OECD countries in its most recent statistics and 25th overall ([www.websiteoptimization.com/bw/0704/](http://www.websiteoptimization.com/bw/0704/)). Certainly, we see a disparity between the Point Topic numbers and OECD's, but this shouldn't comfort the OECD's detractors in the US.

Although casual observers might find the different surveys and methodologies confusing, anyone can see that the US is lagging by simply examining its performance over time according to any consistent methodology. And there's no question that the US has fallen in rank according to these surveys. Indeed, the OECD ranked the US 4th in 2001, but by late 2006, after several years of declining rank, it had fallen to 15th.

Nonetheless, the OECD's statistics suffer from two important drawbacks. First, they omit important nonmember countries, such as China and leading broadband nations like Hong Kong and Singapore. A 2006 Point Topic report estimated that China has roughly 41 million broadband subscribers – second only to the US – and just above 3 percent penetration on a per capita basis ([www.websiteoptimization.com/bw/0607/](http://www.websiteoptimization.com/bw/0607/)). This places it with Mexico at the bottom of the OECD rankings. Another recent Point Topic survey estimated Hong Kong and Singapore's household broadband penetration at 79.8 percent and 69.6 percent, respectively, better than all but a handful of OECD nations. Indeed, these numbers would put Hong Kong and Singapore near the top of any comprehensive international broadband penetration rankings.

Second, the OECD's rankings – like virtually all other available measures – fail to account for the speed of broadband connections. Although the adoption rate is an important measure, it isn't sufficient to assess accurately a nation's relative position in broadband technology because all broadband is not equal. Increasingly, network speed and capacity are what matters in the digital economy. Fiber-optic broadband connections that offer speeds of 15, 30, or even 100 Mbits per second (mbps) give users access to a much more robust Internet than that experienced by users with only 200 Kbit per second (kbps) connections (the current minimum FCC "broadband" standard). Unfortunately,

**Table 1. Average broadband speeds for Organization for Economic Cooperation and Development (OECD) countries.\***

Rank	Nation	Average download speed (mbps)
1	Japan	61.0
2	Korea	45.6
3	Finland	21.7
4	Sweden	18.2
5	France	17.6
6	The Netherlands	8.8
7	Portugal	8.1
8	Canada	7.6
9	Poland	7.5
10	Norway	7.4
11	Austria	7.3
12	Belgium	6.2
13	Iceland	6.0
14	Germany	6.0
15	United States	4.8
16	Denmark	4.6
17	Italy	4.2
18	Luxembourg	3.1
19	Hungary	3.0
20	Slovak Republic	2.8
21	United Kingdom	2.6
22	New Zealand	2.3
23	Switzerland	2.3
24	Ireland	2.2
25	Turkey	2.0
26	Australia	1.7
27	Czech Republic	1.6
28	Spain	1.2
29	Mexico	1.1
30	Greece	1.0

\*Source: ITIF Broadband Rankings ([www.itif.org/index.php?id=57/](http://www.itif.org/index.php?id=57/)).

reliable measures of average broadband speed aren't widely available, but the Information Technology and Innovation Foundation has developed a composite index – the ITIF Broadband Rankings – using OECD data to compile a measure of penetration, average speed, and price ([www.itif.org/index.php?id=57/](http://www.itif.org/index.php?id=57/)). Table 1 shows the average broadband download speeds ITIF calculated for OECD countries.

## Speed Matters

It's no surprise that Japan and Korea leap to the top of the rankings. They

both have robust fiber-optic networks, which is the leading next-generation broadband technology. The OECD's December 2006 broadband statistics track subscriber levels of "fiber/LAN" connections for the first time, and according to these data, 24 percent of Korea's broadband connections fall into this category, compared to 31 percent in Japan. In no other leading country has the market share of these technologies reached even a third of the level in Korea. By comparison, fiber in the US – at 2 percent of all connections – is still nascent.

## Broadband Resources

For more information on broadband statistics and policy, the following resources are a good place to start:

- The most widely cited broadband statistics come from the Organization for Economic Cooperation and Development (OECD), which publishes figures every six months. The organization also produces periodic reports on speeds, prices, and policies at [www.oecd.org/sti/ict/broadband](http://www.oecd.org/sti/ict/broadband).
- For an in-depth international look at broadband, see *Global Broadband Battles* (Stanford Univ. Press, 2006).
- The academic journal *Telecommunications Policy* contains articles on broadband policy and other policy topics in telecommunications ([www.elsevier.com/wps/find/journaldescription.cws\\_home/304711/description#description](http://www.elsevier.com/wps/find/journaldescription.cws_home/304711/description#description)).
- For broadband policy analysis, particularly with respect to the US, visit the Progress & Freedom Foundation's homepage ([www.pff.org](http://www.pff.org)) and the Information Technology and Innovation Foundation's homepage ([www.itif.org](http://www.itif.org)).
- A whole host of Web sites let users automatically test the speed of their broadband connections and record it along with the user's location and broadband provider. One such site, Speedtest.net, has tallied more than 185 million speed tests worldwide (as of September 2007), and lets visitors see the results by country, region, and city ([www.speedtest.net](http://www.speedtest.net)).

Table 1 demonstrates that the US lags in the speed of its broadband infrastructure, ranking 15th among OECD nations. It's clear that the future belongs to next-generation broadband networks such as fiber. To be sure, these networks in the US are growing, as providers such as Verizon and AT&T continue to build out their fiber infrastructure, and cable companies like Comcast pursue next-generation technology such as DOCSIS 3.0, which promises to deliver fiber-like speeds. Nonetheless, the fact remains that other countries have more advanced broadband networks with more subscribers and faster speeds.

Yet, as surprising as it might seem, some would argue that countries such as Japan have *too much* broadband: government subsidies, they say, have pushed broadband speeds in these countries to unnecessary levels. But there can be little doubt that as more aspects of our lives move online and more high-bandwidth applications become available, our demand for bandwidth will only increase. Moreover, nations with faster networks are better equipped to develop and exploit

the next generation of high-bandwidth broadband applications such as high-definition video, advanced telecommuting capabilities, and telemedicine. Here in the US, awareness is growing that "broadband" takes on an entirely different meaning in countries with significantly faster Internet. A front-page article in *The Washington Post* in August 2007 called attention to the fact that broadband in Japan is many times faster than what's widely available in the US, chiefly due to the former's fiber-optic infrastructure.<sup>1</sup> Indeed, 100 mbps fiber-optic service is available to the majority of Japanese residents, typically for roughly US\$27 per month (purchasing power parity; see [www.itif.org/index.php?id=57/](http://www.itif.org/index.php?id=57/)).

But a glance at Table 1 indicates that fast speeds aren't unique to Japan and Korea. Indeed, a handful of European nations – including Finland, Sweden, and France – have achieved average speeds in excess of 15 mbps, largely through DSL and by exploiting their shorter local loop lengths. (In Europe, the copper loops between a subscriber and the phone company's central office are on average shorter

than those in the US, which allows for faster DSL speeds.) Still, it doesn't seem likely that Europe can continue down a DSL path because speeds are limited by the technology itself. Whether they can develop the faster networks of the future also isn't clear. Only time will tell if Europe faces a DSL "cul-de-sac."

## Policies and Competition

Many of the leading countries owe their advanced position at least in part to government policies. That isn't to say that factors such as population density are unimportant, but government policies – including incentives and subsidies – have certainly spurred deployment of fast networks in these countries. The Korean government, for example, has invested directly in its broadband infrastructure, offered favorable loans and tax incentives to broadband providers, and, in 2002, mandated local loop unbundling to promote competition.

In fact, most discussions about broadband policy focus on the issue of competition. Surely, competition has merit because it offers consumers choice and spurs companies to improve service quality while helping keep prices down. But is broadband like the banking, airline, and trucking industries, for which government has reduced regulation in favor of greater competition? I would argue that it isn't because DSL, cable, fiber-optic services, and, indeed, all wired telecommunications are natural monopolies. In this respect, they seem to share more in common with municipal water, electricity, and gas services.

However, the picture is complicated somewhat by the fact that broadband is offered over several delivery technologies. Even if these networks are natural monopolies, the fact that most homes already have both cable and telephone "pipes" (at least in the US, cable TV is available to more than 90 percent of homes) renders the case of broadband not so straightforward.

Although these networks originally developed under monopoly conditions, the evolution of technology just happened to allow each of them to offer broadband service over their networks relatively easily, resulting in a broadband duopoly. (In theory, satellite broadband offers a third pipe, but it's generally not a viable substitute for either technology because of higher prices and slower speeds.)

Certainly competition is good, but how much pipe competition beyond the current duopoly is too much? Although competition can help drive prices down and offer consumers more choice, more pipes would also increase total costs under the weight of duplicative infrastructure. Too many pipes can lead to network sizes that fall below optimal efficiency levels, thus reducing profits and making it difficult for the industry to adequately invest in next-generation infrastructure.

There's a similar risk with "unbundling," or policies to force incumbent broadband providers to share their lines with competitors, which the EU has embraced to create competition. Unbundling is especially popular in countries in which intermodal competition (such as DSL versus cable) is limited. But Europe faces the DSL cul-de-sac in part because such policies reduce the incentives for incumbents to expand the pipes (by, say, investing in fiber). Japan, nonetheless, has managed to promote competition by unbundling while also building extensive fiber networks, no doubt helped by generous government financial incentives and government ownership of a 40 percent stake in the incumbent provider.

As we contemplate government's role in bringing about next-generation broadband, all of these considerations are important. Short of following the Japanese/Korean path of heavy government involvement, which isn't a realistic option for the US, government shouldn't set out to upset the balance

between the efficiency of fewer networks and the competitive benefits of more networks, but it should take steps to spur investment in next-generation broadband. In other words, public policy should be neutral toward competition, and government shouldn't favor any particular technology, aside from removing any unnecessary barriers to competition. This means not offering special tax incentives or public funding for new pipes like broadband over power lines (BPL) or municipal broadband.

What, then, might an effective broadband policy look like? Although there isn't enough room here for a comprehensive outline, one central component should be as follows: the US Congress should allow companies investing in broadband networks to expense their first-year investments in any new high-speed broadband networks capable of delivering considerably faster speeds than today's average DSL or cable networks. Currently, companies must depreciate telecommunications network investments over a period of 15 years. Allowing companies to write off the investment in the first year reduces the costs of making these investments and spurs faster deployment of higher speed networks.

**H**ere in the US, it's time to acknowledge the scope of the broadband challenge we face. The weight of the evidence indicates that we're falling behind in broadband — a point emphatically made by examining the oft-neglected issue of broadband speeds. We must move on to the question of what our policy response should look like. By observing the principles outlined in this article, the US can move toward a comprehensive broadband policy and a future of ubiquitous high-speed broadband. □

#### Reference

1. B. Hardin, "Japan's Warp-Speed Ride to

Internet Future," *The Washington Post*, 29 Aug. 2007, p. A1.

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