

## The Role of Income Distribution and Broadband Penetration in Developing Countries

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Broadband penetration rates have soared in most developed countries over the past several years, benefiting gross domestic product (GDP) growth by up to several tenths of a percentage point per annum.<sup>1</sup> A logical question is whether this growth can be matched in developing countries.

Broadband affordability is widely regarded as a major inhibitor to growth because many developing countries have per-capita GDPs that are often less than 10 percent of those in many developed countries. A country's income distribution can also inhibit growth; only a limited share of the population in countries with highly skewed income distribution can afford broadband.

Many forecasts of broadband penetration in developing countries are based solely on GDP or per-capita GDP. A recent report by the Organisation for Economic Co-operation and Development (OECD) found that the median monthly subscription charge for low-speed broadband in developed countries was roughly US\$26 as of September 2008.<sup>2</sup> (Other significant charges exist based on the volume of data downloaded.) On an annual basis, this subscription rate is equivalent to about 1 percent of income based on the average nominal (current dollar) per-capita income for developed countries—about \$31,600 in 2006. Thus, broadband affordability is not a material issue for the vast majority of these households.

At the same price, this relative percentage of income may be as high as 10 percent for many developing countries with smaller per-capita incomes. To forecast the broadband penetration rate in developing countries, it is necessary to determine which specific subset of the population can actually afford broadband. Generally, when the annual broadband expenditure is priced at more than 2 percent to 5 percent of a household's income, broadband is considered unaffordable.

### **Broadband Dynamic Value Assessment (BDVA)**

The Broadband Dynamic Value Assessment (BDVA) model—from the Cisco Internet Business Solutions Group (IBSG)—helps public sector customers analyze the impact of income distribution on broadband penetration rates. The model enables them to develop a countrywide strategy to identify broadband expansion programs and initiatives that maximize long-term impact on GDPs. The BDVA model is also part of a larger Cisco IBSG engagement process, led by the Emerging Markets Service Provider Practice, in which ideal broadband development strategies can be created and implemented.

To learn more about the BDVA model, please see “Broadband Dynamic Value Assessment: Understanding Possible Macroeconomic Benefits of Broadband in Developing Countries,” a Point of View from the Cisco IBSG Emerging Markets Service Provider Practice and IBSG Economics & Research Practice that discusses a sustainable broadband framework and details the BDVA model.

## **Determining Income Distribution**

### **Gini Coefficients**

Gini coefficients are one way to look at income distribution. A Gini coefficient measures the equality of a country's income distribution across its entire population as an index. A value of zero indicates perfect equality (all households make the same income), and a value of 100 indicates perfect inequality (one household earns all the income in a country, with the remainder of households earning nothing).<sup>3</sup> When a country's income distribution becomes increasingly skewed, the share of its citizens that can meet a specific broadband income threshold lessens.

In contrast to broadband penetration rates that increase roughly linearly with income, Gini coefficients vary less with income levels and, instead, depend on a country's social policies and historical legacies. For example, Canada's Gini coefficient is 32, but the value for the United States is 40.<sup>4</sup> The Gini coefficients among middle-income countries such as Mexico and Hungary, on the other hand, are 46 and 27, respectively. Canada's and Hungary's lower Gini coefficients are no doubt a function of these countries' more egalitarian roots than they are of current GDP levels. This raises a question: “How much can a more equitable income distribution improve broadband penetration rates?”

For example, Mexico's broadband penetration rate is forecasted to increase from 12 percent in 2006 to 57 percent in 2029, holding Mexico's current income distribution constant at a Gini coefficient of 46, according to the Broadband Dynamic Value Assessment (BDVA) model from the Cisco® Internet Business Solutions Group (IBSG) Emerging Markets Service Provider Practice. (This model is described further in the “Broadband Dynamic Value Assessment” sidebar.)

If Mexico's Gini coefficient falls to 40 by 2029, the broadband penetration rate will rise to 60 percent. That is, a slightly more equitable income distribution enables an additional 3 percent of the population, or 3 million people, to afford broadband using a 5-percent-of-income threshold. If Mexico's Gini coefficient falls to a value of 30, which is typical of many Central European countries today, then an additional 13 percent of the population will be able to afford broadband by 2029.

The relative price of broadband also is an important element of this analysis. If the price falls to 2 percent of per-capita income, then 82 percent of Mexico's population will be able to afford broadband by 2029. If Mexico's Gini coefficient also falls to 30, then an additional 3 percent of the population will be able to afford broadband services by then.

## Conclusion

Much has already been written on how developing countries should consider investing in more pervasive broadband for their citizens. To maximize the benefits of these broadband investments, countries should also consider complementary social policies that promote a more egalitarian income distribution. Such policies might include additional investments in primary and secondary education; tax breaks for the lowest income strata, particularly for broadband or IT equipment purchases; or regulatory or competitive policies that reduce the price of broadband.

## Acknowledgements

Additional contributions to this POV were made by Peter Ford, BDVA lead, Emerging Markets Practice, Cisco Internet Business Solutions Group.

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## Endnotes

1. Many academic papers measure one or more aspects of broadband growth. Some material can be found in a report by the Organisation for Economic Co-operation and Development titled "Broadband and the Economy: Ministerial Background Report DSTI/ICCP/IE(2007)3/FINAL," June 2008.

Ascertaining the specific impact of increased broadband penetration rates on economic growth is complex; the answers are commingled with the benefits of other IT investments and the time frames involved.

2. "OECD Communications Outlook," Table 7.16, Organisation for Economic Co-operation and Development, August 2009.
3. These values are examples of the most extreme situations. A thorough discussion of Gini coefficients can be found at [http://en.wikipedia.org/wiki/Gini\\_coefficient](http://en.wikipedia.org/wiki/Gini_coefficient)
4. International Financial Statistics Online, the Statistics Department of the International Monetary Fund, [www.imfstatistics.org/imf/logon.aspx](http://www.imfstatistics.org/imf/logon.aspx)

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### More Information

The Cisco Internet Business Solutions Group (IBSG), the global strategic consulting arm of Cisco, helps CXOs and public sector leaders transform their organizations—first by designing innovative business processes, and then by integrating advanced technologies into visionary roadmaps that address key CXO concerns.

For further information about IBSG, visit <http://www.cisco.com/go/ibsg>

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The Cisco Internet Business Solutions Group (IBSG) Emerging Markets Practice works with leaders of key national and regional government agencies, businesses, communities, multilateral institutions, and NGOs to turn their technology investments into strategic national assets. Serving as trusted advisers in varied assignments—from broadband connectivity, digital inclusion, and smart communities to business productivity—IBSG aligns information and communications technology with initiatives and programs that support socioeconomic development in emerging markets. Sustainable broadband expansion is IBSG's approach to harnessing the power of broadband connectivity to expand and serve a country's economic and community transformation in a sustainable way.



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