Chapter 5
Why Broadband Internet Should Not Be the Priority for Developing Countries

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With broadband Internet connectivity progressing and rapidly moving to a fiber access platform, the focus of attention has shifted to those left behind. The shorthand word for this concern is the classic "digital divide." Underlying virtually every discussion about a gap in broadband penetrations is the implicit assumption that overcoming such a divide is a priority (Meschi et al., 2004; Crandall et al., 2007). But maybe we first should pause for a moment and understand the implications of ending this divide. If we do that, we might end up changing our perspective on Internet policy in an important way: away from a focus on high-speed *broadband Internet connectivity*, and towards universal connectivity and the creation of *E-transactions*, *E-commerce*, and *E-content*.

With present trends continuing, Internet connectivity will soon be near universal in rich countries, like electricity or television. For the affluent world, therefore, the universality of Internet connectivity will not be an issue. It is more likely that an Internet differentiation will emerge for high-speed broadband. Next-generation high-speed broadband Internet access that is powerful enough for quality video entertainment requires an upgrade of the infrastructure – whether telecom, cable, or wireless. Income, location, and demand factors will be factors for bandwidth consumption. High-speed broadband quality will therefore be the digital-divide issue for wealthy countries.

But the transformation of the divide into a gentle slope in rich countries does not mean that the issue will not persist for the poor countries of the developing world (International Telecommunication Union, 2007). In an interdependent world, this is problematic not just for the South but also for the North because such a gap will inevitably lead to international friction.

In talking about high-speed broadband for poor countries, it is easy to feel like a modern day Marie Antoinette. *Let them eat megabytes*. Of course, high-speed Internet is important. Who outside of North Korea would deny that? But is it a priority? It is important to distinguish between three kinds of gaps. The first gap is

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that of *telecommunications connectivity*. This gap is being closed by investment in infrastructure and by policy reform. In consequence, the telephone penetration of the developing countries has been improving, especially through wireless networks (International Telecommunication Union, 2008). Governments have been making telecom connectivity a priority.

The second type of gap is for *basic Internet access*. The vast majority of Internet hosts are domiciled in OECD countries. Telecom and Internet are related, of course. Internet usage is more expensive in most developing countries, both relative to income and in absolute terms. Progress is being made in basic Internet connectivity in LDCs (Meschi et al., 2004). But closing this gap also will prove to be, relatively speaking, an easy task. In fact, it is an easier gap to overcome than the gap in telecom infrastructure. Once telephone lines exist, it is not very difficult to connect a computer or a simple Internet device to them. Some specific policies to encourage basic Internet usage are (1) establish flat rate telecom pricing on local calls and data plans for wireline and wireless, (2) accept widespread use of IP telephony, (3) create public Internet access points such as kiosks at public places, government departments, or post offices, and (4) use e-mail for some government businesses with citizens.

But what about broadband connectivity (Badran et al., 2007)? There is a real difference here to basic narrowband connectivity insofar as major network upgrades are needed. Of course, it is preferable to have an Internet connection that runs at 10 Mb/s rather than a slow dial-up service which might be almost 1,000 times slower. But such an upgradation is not cost free. It costs about $250 of new investment and labor per DSL Internet subscribed and over $1,000 for a still more powerful fiber-based Internet connection. For poor countries, is this money well spent at a time when few people in poor countries have phone connectivity of any kind? The money for broadband upgrade could instead support basic connection of new users to a network.

Should broadband upgrade, or should basic connectivity receive priority? Broadband benefits the urban professional classes; universal service benefits the rural areas and the poor. Faced with the unpalatable choice, and with the high-tech siren songs of equipment vendors and network companies, most policymakers will simply deny the existence of this choice.

Even in rich countries, the migration to broadband has taken a definite historic path. First, basic telecom connectivity for everyone was achieved, a process that took a century, until the 1970s (Noam, 1992). Wireless mobile communications followed. Narrowband Internet started in earnest with the Web in the early 1990s, and has now reached near saturation for those likely to use it. Broadband Internet has now reached a majority of households. Fiber upgrades are being initiated today. In other words, rich countries at first expanded their basic services across society and only then embarked on bursts of upgrades.

If high-speed broadband were a second telecom priority for poor countries, second to basic connectivity, will they suffer for it? Not really. First, the expanding base of basic phone and wireless users would also raise the number of narrowband or intermediate speed Internet users. The extra speed of broadband is convenient but

not essential. There are few things one could not do on narrowband outside its use for music and video. Yes, there are important applications, such as telemedicine and distance education that require great speed and upgraded infrastructure. For those, broadband may be justified in institutional settings, and they could grow into shared community high-speed access points. But that does not mean that high-speed broadband is essential as a residential and consumer service.

The second prong of an Internet strategy for developing countries should be to focus on applications, in particular on E-commerce (Lefebvre and Lefebvre, 2002). Progress in overcoming the first and second gaps described above may exacerbate the third gap, that of E-applications and E-transactions. To understand why this is so, let us make three observations about the global dynamics of E-transactions and E-content:

(1) The price of international transmission is dropping rapidly.
(2) Domestic Internet penetrations are increasing rapidly.
(3) Most E-commerce applications have strong economies of scale.

Low-cost global transmission leads to a great rise in electronic transactions with consequences for business. Traditional ways of doing business will not disappear, just as the mom-and-pop store did not vanish when supermarkets emerged; but the energy and dynamism will be in electronic modes of commerce. And here, firms from rich countries will be most successful. They will be technologically at the leading edge, with risk capital at their disposal. They also will enjoy the advantages of being an early entrant and having a large home market. Once a firm establishes a successful model for the domestic market, invests the fixed costs, and brings transmission prices to near zero, there is no reason to stop at the border.

The implications are that E-commerce will be dominated by firms from electronically advanced countries. Closing the first two gaps exacerbates the third gap by creating the highways and instrumentalities for rich countries to sell in poor countries. Of course, it is not purely a one-way street. The Internet also provides poor countries with opportunities to participate and share information. We all have heard stories about how a local craftsman in a remote village can now access the world market for his wood carvings. And it is true that for certain types of products, marketing becomes easier. But for most mass products, the complexities of sophisticated E-commerce sites are great. They are greater still for information products and services, and will be even greater in a broadband Internet environment where the production costs of attractive E-sites are high.

What counts is not absolute but relative cost reductions, and the relative advantage of E-commerce goes to advanced countries. One lesson we have learned the hard way is that it is expensive to do E-commerce well. E-commerce operations are difficult. They are vastly more involved than simply running a Web site and a shopping cart. Multiple systems need to be in place and integrated. Some of the elements needed include supply chain EDI, payment systems, integration with financial institutions, fulfillment systems, customer data mining, production, customization, community creation, and the creation of consumer lock-in by additional features. Intermediaries need to be reshaped. Processes are accelerated domestically and

internationally at lightning speed, with great reliability, easy scalability, and flexibility of configuration.

All this is truer still for the emerging high-speed broadband Internet. The costs for consumer E-commerce sites will rise considerably. Text and stills will not be good enough in a competitive environment, and expensive video and multimedia will be required.

What are some of the implications? Instead of being the frictionless competitive capitalism that people have rhapsodized about, many parts of the new economy will actually be fortresses of market power. Economies of scale are returning. On the supply side, the fixed costs of E-commerce operations tend to be high, but the variable cost of spreading the service to the entire world is relatively low – the classic attributes of "natural" monopoly. On the demand side, there are "positive network externalities" of having large user communities. Put these three things together – high fixed costs, low marginal costs, and network effects – and there are real advantages to being large.

The Internet is a revolution, and it is characteristic of revolutions to create many losers. Banks will be threatened by electronic global financial institutions. Universities will find students migrating to online education. TV broadcasters will be bypassed by global video servers, etc. Most institutions will lose the protection of distance and will be exposed to world markets.

It is characteristic of losers, especially if they are domestically still large and powerful, to seek protection through the political sphere. There will be, therefore, an inevitable global political backlash against E-commerce. This backlash is likely to take the form of restrictions by countries on the wrong side of the gap for E-commerce, and there will be a strong likelihood for new-style international trade wars.

The main alternative to future conflicts over trade is for developing countries to create progress in E-commerce that makes the electronic highways into two-way routes. But what can a developing country do, concretely? This is much more difficult than catching up with telecom and Internet densities because it is a question of general societal modernization, not just of an infrastructure construction program.

There is no single strategy, no silver bullet. But here are several suggested elements.

(1) *Telecom policy of entry and investment* based on market forces. Use government as a lead user, to help create domestic critical mass and experts. There is a history here: The US military was successful in getting the Internet started in the first place. Government operations such as procurement should move to the Web. This would create transparency, reduce procurement cost, and force domestic suppliers to move to electronic marketing. Governments could also provide some services electronically, such as the filing of forms and applications or posting information on subjects such as health, education, taxes, and agriculture.
(2) *Focus on export.* It takes much time to develop new domestic consumer markets. The focus should instead be on the global market, mostly business-to-business. In most developing countries, the domestic consumer market is relatively small, but the global Internet market is huge and open. The creation of national free trade zones for E-commerce is one concrete step in that direction.

(3) *Develop niche markets*. Leverage cultural proximity. Examples could be:

- *Regional hub*: Tunisia for North Africa
- *Language*: Brazil for Portuguese speakers
- *Economics*: Dubai for the oil industry

(4) *Reform the legal system* to make E-transactions possible. Commercial codes need to be adapted to the online environment. Rules applying to liability, contract, privacy, and security issues ought to be updated.
(5) *Strengthen the physical delivery infrastructure and investments in it.* One cannot sell abroad if one cannot ship it quickly. This is one of the secrets of Singapore's success. This includes the physical delivery infrastructure of harbors, airports, and export facilities.
(6) *Strengthen the investment climate.* Provide tax incentives for E-commerce and E-exports, offer low international telecom rates, support microcredit institutions, encourage local entrepreneurship and co-ops, and support the venture capital industry and incubators.
(7) *Support technological education.* Investments are important, but not as important as IT skills and a new economy mindset. There are 3.8 R&D scientists and technicians per thousand people in developed countries and only 0.4 percent per thousand in developing countries.
(8) *Create wealth incentives.* Permit E-commerce entrepreneurs to become rich through the Internet, thereby fueling the emergence of local start-ups.
(9) *Encourage foreign investment.* Scarcity of capital is a common problem for developing countries, especially in a global recession such as now. Do not erect barriers to foreign investment that can help fund the development of domestic E-commerce capabilities.
(10) *Provide back-office functions* to major E-commerce sites as a way to establish experience. India and Jamaica are examples.

The challenge to developing countries is *to get moving*, but in the right direction. To deal with the first gap, that of telecommunications connectivity, by investment and policy. This will also close the second gap, that of narrowband Internet access. And to deal aggressively with closing the third, the E-commerce gap, because it is the real, critical, and fundamental threat – as well as major opportunity – to poor countries, and to economic relations around the world.

The conclusion is therefore that the IT priorities of poor countries should be to expand basic network connectivity both through wireline and wireless, by public investments and by market structures that encourage private investment in self-sustaining network growth. It should also be to develop a base of relatively narrowband applications and content providers. High-speed broadband platforms such as residential fiber, however, make sense only selectively. Their society-wide spread should not be the priority. Indeed, absent the development of domestic providers of transactions, it might actually backfire in terms of national economic development. It is more glamorous for advanced and articulate users, providers, and international funders to focus on leading edge networks. But sometimes it makes more sense to build back roads and auto repair shops than superhighways.

References

Badran MF, Sherbini AE, and Ragab A (2007) What determines broadband uptake in emerging countries? An empircal study. International Telecommunication Union. http://www.itu.int/md/D06-DAP2B.1.3-INF-0001/en Accessed 19 May 2008.

Crandall R, Lehr W, and Litan R (2007) The effects of broadband deployment on output and employment: A cross-sectional analysis of US data. Issues in Economic Policy. http://www.brookings.edu/~/media/Files/rc/reports/2007/06labor_crandall/200706litan.pdf Accessed 19 May 2008.

International Telecommunication Union (2008) Mobile cellular subscribers. http://www.itu.int/ITU-D/icteye/Reporting/ShowReportFrame.aspx?ReportName=/WTI/CellularSubscribersPublic&RP_intYear=2007&RP_intLanguageID=1 Accessed 19 May 2008.

International Telecommunication Union (2007) Top 30 economies in terms of broadband subscribers per 100 population. http://www.itu.int/ITU-D/ict/statistics/at_glance/top20_broad_2007.html Access 19 May 2008.

Lefebvre L and Lefebvre E (2002) E-commerce and virtual enterprises: issues and challenges for transition economies. Technovation 22: 313–323.

Meschi M, Waverman L, and Fuss M (2004) The Impact of Telecoms on Economic Growth in Developing Countries. http://www.london.edu/assets/documents/PDF/L_Waverman_Telecoms_Growth_in_Dev_Countries.pdf Accessed 19 May 2008.

Noam E (1992) Telecommunications in Europe. Oxford University Press, New York.