

# GLOBAL INFORMATION SOCIETY WATCH 2008

*Focus on access to infrastructure*



# Global Information Society Watch

## 2008



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# Trends in technology

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## Bandwidth, the petrol of the new global economy

Put simply, bandwidth is what carries voice and data from one place to another. Bandwidth is the petrol of the new global economy; and cheap international bandwidth is essential for any developing country to remain competitive in a changing world.

Arguably, the use of bandwidth will increasingly substitute for tasks previously done by saying “send a driver” in many developing countries. In July 2008, the South Korean government, which is almost completely dependent on imports for its oil, issued an instruction that all government vehicles should only be used every other day to cut fuel costs. So there is an imperative to address the cost of things like information collection and delivery, meeting people and gathering opinions, which were previously reliant on conventional means of transport.

Cheap and accessible bandwidth encourages information, ideas and money to flow quickly within a country and between countries. Despite the best efforts of backward-looking governments, it allows a country’s citizens to know what is happening in the world and what the world thinks about what is happening in their country. The world’s tyrants may still be able to dominate their citizens, but they are that bit more vulnerable when faced with a freer flow of information about their deeds. Recent crises in places as diverse as Burma, Tibet and Zimbabwe attest to the power of information to influence those in power, even if it does not necessarily change who is in power.

There is a connection between the social and the economic. If it costs your country USD 7,000-10,000 per megabit per second (Mbps) per month – one of the units used to price bandwidth – to communicate with the rest of the world, you are likely to do less of it than another country where the same bandwidth sells for below USD 1,000 per Mbps per month. Those developing countries that have access to cheap bandwidth have some chance of staying ahead in the “dog eat dog” world of the new global economy. They can respond to new needs in the global economy and not simply rely on the changeable fortunes of selling agricultural produce, minerals and tourism.

Used strategically, bandwidth can create new “think work” industries like business process outsourcing (BPO) and call centres. For example, a single company in Ghana, ACS, employs 1,200 people doing data processing. The

Indian Ocean island of Mauritius employs between 4,000 and 5,000 people in a combination of BPO and call centres. Over 10,000 people in the South African city of Cape Town work in these sectors.

If communications costs are not lowered, then the cost of financing trade and ultimately the price of the goods themselves will be higher than necessary for everyone. Many African countries rely on goods traded between themselves and nearby neighbours. The goods traded are not simply luxury goods, but also essential foodstuffs that make up the daily diet of all citizens. Cheap and accessible bandwidth encourages regional trade integration that helps reduce air miles: the product grown to meet local demand is not one that needs to be imported or exported half way round the world.

But perhaps the most crucial impact cheap bandwidth – taken together with competition – may have is on the cost of transferring money. There is considerable movement of people both between neighbouring countries and internationally. Take the example of West Africa. According to a report by the Organisation for Economic Co-operation and Development (OECD) Sahel and West Africa Club (SWAC),<sup>1</sup> there are three waves of population movement. Since the early 1960s, 80 million people have moved to the cities from rural areas. Populations also move from one country to another in West Africa, and this represents 90% of interregional migration. Finally, West Africans represent 3% of immigrants from non-OECD countries living in Europe.

Each of these people needs to be able to communicate with their family. The son who has gone overseas rings his mother back in West Africa. That same mother rings her grandmother in the village. Financial remittances flow all the way down this chain of communication and, according to the International Fund for Agricultural Development (IFAD), in 2006 these were worth USD 10 billion to West African countries. These remittances exceed the amount of money spent by international donors. But the cost of sending that money is around 12% of the total, whereas elsewhere in the world, such as Latin America, it has fallen to 6%. Cheaper communications and competition can bring cheaper transaction costs, and more of this money will arrive in developing countries.

The first wave of the communications revolution in Africa was the spread of mobile phones, which are now within reach of 60-70% of the continent’s population. By contrast, the internet is only accessed by 12-15% of the population. Until recently, the experience of the internet in Africa has been like having to eat a three-course meal by sucking it through a straw: time-consuming, unreliable and expensive.

<sup>1</sup> The OECD SWAC report defines West Africa as comprising fifteen ECOWAS member states as well as Mauritania, Chad and Cameroon.

While new mobile interfaces will increasingly allow mobile internet access, the second wave of the communications revolution will be the spread of relatively cheap internet use. For developing countries, particularly in Africa, the internet has been the poor cousin of much more widely distributed technologies like mobile phones and radio. However, despite the limitations of speed and cost, a surprisingly large number of people use it.

Based on national survey samples from a range of twelve African countries of different income levels,<sup>2</sup> between 2-15% of the population use the internet (except in the two poorest countries) and 1-8% use it on a daily basis (except for the four poorest countries). On this basis, there might easily be tens of thousands or hundreds of thousands of broadband subscribers depending on the size of the country. Literacy plays a part, but probably not as big a part as price.

There is a clear link between the price of international bandwidth and the retail price of voice and internet services to the consumer. However, this link is not just a result of the price of international bandwidth, but also a reflection of both its cost and availability within a country. Cheaper international bandwidth means that there should be cheaper national bandwidth. Indeed, without this occurring, anomalies are found, such as where it costs more to communicate between neighbouring countries or two cities within a country than it does to link the capital and a European or North American destination.

Except with widely distributed rural populations where satellite is more appropriate, the cheapest bandwidth can be delivered using fibre.

International bandwidth prices in Africa have come down for a number of reasons. There has been an extended discussion about how to ensure open and competitive access to new international fibre-optic cables currently being built.<sup>3</sup> As part of this process, national internet service provider (ISP) associations have lobbied the telecoms companies selling bandwidth and achieved price reductions. At the same time, the presence of two to three cable projects on either side of the continent ensures that each offers competitive pricing.

Through a combination of these factors, the price of bandwidth has gone from USD 7,000-10,000 per Mbps per month to USD 500-1,000 per Mbps per month due to two new cables (called SEACOM and TEAMS) that will be completed in mid-2009. These low international prices will put pressure on national operators to lower national prices, as it will be difficult to charge more for taking traffic between

cities in an African country than for going all the way from that country to Europe.

Although market pressure has done a lot of the work in lowering prices, international organisations and African governments have also played their part. The World Bank's involvement in financing one of the cables (called EASSy) in a way that ensured open and fair access set the terms of the debate and also helped shape the market. In addition, the South African government declared a landing station for the SAT-3 cable, over which it has a monopoly, an "essential national facility". This has enabled the country's regulator to insist on co-location for a new competitor company, Neotel. The Mauritius regulator ICTA instituted a price determination against the monopoly fibre operator Mauritius Telecom that enabled much cheaper prices to be put in place.<sup>4</sup>

Once a fibre cable has reached the coast of a country, the key problem is then getting a truly national backbone in place. On the evidence so far, the private sector will only deliver national backbone capacity to a relatively small percentage of the population. Understandably, operators have to have a sufficient return to justify investing in relatively expensive capital projects like infrastructure. Except in the markets of larger countries or in the wealthier segments of national markets, there has been little incentive to invest. The effect of this is that traditionally there has only been one infrastructure operator, or "one and a half" infrastructure operators – the latter case being where competitors spring up in metro areas and on routes between main metro cities. So the issue is: how does one incentivise wider national roll-out without simply returning to the uncompetitive, monopoly position that was in place before liberalisation, and which resulted in high national rates?

While infrastructure competition does produce some level of price competition, its impact is limited. Two competitors on national backbone prices – even over busy national routes – rarely produce more than a 10-20% difference in price over the mid to long term. For example, in Uganda, where there are two infrastructure operators, the reduction in prices over three years has been 13%.

Africa's policy-makers and regulators have adopted a range of different approaches to creating infrastructure competition, not all of which are coherent, but will affect national backbone prices. The more liberal countries (such as Ghana, Nigeria, Kenya and Tanzania) have encouraged those who have built fibre for management purposes to sell their surplus. These entities include power utilities, railways, and oil pipeline and water companies. Alternative fibre operators have provided a competitive dynamic in some markets, but

2 EDGE Institute: [www.the-edge.org.za](http://www.the-edge.org.za)

3 Fibre for Africa: [www.fibreforafrica.net](http://www.fibreforafrica.net)

4 For case studies of countries on the SAT-3/SAFE cable, including Mauritius, see Jagun (2008).

## Technologies that may have an impact on lowering prices and widening access in developing countries

### VoIP

In its most immediate form (through things like Skype) it offers cheap international calling. This may become more widely available on mobiles in the not-too-distant future (see [www.vyke.com](http://www.vyke.com)).

### Wireless technologies

Wi-Fi and WiMAX are offering alternative operators ways of offering cheaper internet access. They can also be used to create municipal networks that offer local authorities cheaper voice and data services. If regulators allow it a competitive space, the WiMAX mobile voice standard (802.16e) may yet offer newer mobile operators a way of cutting costs and offering better rates to customers.

### Solar base stations

Indian start-up VNL is to manufacture a cheaper, solar-powered base station (see [www.vnl.in](http://www.vnl.in)). Given the absence of power supply and the cost of diesel for generators, this will have a clear impact on costs if its claims are verified in operational use.

### Fibre slung from power lines

Fibre slung on power transmission towers is considerably cheaper to roll out compared to fibre that needs trenches in the ground. A recent example from Africa illustrates the potential (see [www.balancingact-africa.com/news/back/balancing-act\\_416.html](http://www.balancingact-africa.com/news/back/balancing-act_416.html)).

### Mobile internet and short message service (SMS)

A significant percentage of people in developing regions use SMS on their mobile phones as their principal source of daily information. Newer handsets with intuitive graphic interfaces, like the iPhone, will extend this “mobile media” into the internet.

### M-money services

For the un-banked who may carry the risk of losing their cash, m-money services like Safaricom’s M-Pesa in Kenya (with 2.5 million users) will have an enormous impact. Remittances from diaspora communities are now more significant than aid flows in developing countries. New mobile-based services may help cut the cost of these transactions from around 12% to nearer 6%.

### Low-cost handsets and computers

The high cost of handsets or computers is one of the primary barriers to greater access. A range of handset manufacturers are focused on trying to reduce the costs of a basic handset (for commentary, see our report on spectrum management in this edition of GISWatch). Based on the same logic, computer manufacturers (including AMD and Intel) have been drawn into the race to provide low-cost laptops by Nicholas Negroponte’s One Laptop per Child initiative (see [wiki.laptop.org](http://wiki.laptop.org)).

have not really addressed issues like the need for wider geographic breadth of coverage.

The mobile companies have had to put up with high prices and indifferent service from many of the former incumbent telephone companies and, as a reaction, have almost all gone down the route of building all or part of their own backbone infrastructure. Where there are existing high national backbone prices, the financial incentive to build your own network is considerable: depending on the country, this may be as much as 50% cheaper.

A number of African governments have taken this insight and sought to create national fibre infrastructure companies: Ghana, Nigeria, Kenya, Rwanda, South Africa and Uganda are among their number. Often with the aid of government financing from Chinese vendor Huawei, the aim has been to create genuinely national networks as quickly as possible. This has raised a number of difficult issues.

In the first instance, a number of these countries have chosen the former incumbent (now usually privatised) to manage the resulting network. This is not something that creates trust among potential users that things will be any different from what went before. In addition, many operators have either already built some infrastructure or are about to do so. Unless the national infraco focuses on the more marginal areas, its impact will be to drive out potential investors.

But whether the policy route taken is to create a national fibre network or simply “in-fill” those places the market will not reach, these different approaches may all go some significant way to extending cheap bandwidth to nearly all of a developing country’s citizens.

The final piece in the jigsaw has been to find a technological solution that will deliver voice and data services into the most marginal “bottom-of the-pyramid” communities,

in a way that will create a business that will not require a constant drip-feed of donor aid. The larger and more centralised solutions have been offered by organisations like Grameen and the mobile companies. For example, Celtel Nigeria (shortly to become Zain) has offered entrepreneurs in Nigeria the opportunity to run the base station that delivers their voice service, as well as act as local agents for mobile phones. In other words, the entrepreneur remains in effect a franchisee of the larger company.

A more innovative and less centralised solution has been developed in South Africa by Dabba.<sup>5</sup> The idea was to create a microtelco operation from technology that could be supplied “out of the box”, for use without specialist knowledge. Dabba has partners who want to expand into the townships of Alexandra and Soweto in the greater Johannesburg area, and Khayelitsha in Cape Town.

The business is focused on working financially with only 1,000 subscribers. The user would get a cheap voice over internet protocol (VoIP) wireless handset from someone like UT Starcom. A “super node” will deliver a coverage area of two kilometres, but the phone’s range is only 100 metres. The alternatives are that there would have to be a greater density of wireless access points, or, as with the precursors to mobile phones, the access points might be physically marked and people could stand near them. The former would make sense for a large village; the latter might work in a smaller settlement.

Dabba is already interconnecting with South Africa’s four main voice carriers, but reactions are mixed. One of the larger mobile carriers has been very helpful, while a couple have been blocking calls. Dabba’s plan is to become an intermediary for the much smaller microtelcos, allowing them to aggregate traffic before entering the telco world, and providing much needed support. It will also enable the microtelcos to offer cheap calling to other microtelcos that work with Dabba.

For the mobile operator, it allows others to take the financial and control risks in areas of marginal business. And if it succeeds, it may offer valuable lessons in how to strip back capital expenditure to meet market demand in increasingly marginal areas. This will not prevent the more pig-headed mobile companies from trying to strangle it at birth.

It offers local entrepreneurs the opportunity to build a business. For the unspent millions in universal service funds all over Africa, it offers a new market-driven element that could energise the drive to reach the last 30-50% of Africans – and those in developing countries elsewhere across the world – who do not yet currently have access to voice or internet. ■

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5 For more details see: [manypossibilities.net/2008/07/village-telco-workshop](http://manypossibilities.net/2008/07/village-telco-workshop)

**GLOBAL INFORMATION SOCIETY WATCH 2008** is the second in a series of yearly reports critically covering the state of the information society from the perspectives of civil society organisations across the world.

**GLOBAL INFORMATION SOCIETY WATCH** or **GISWatch** has three interrelated goals:

- **Surveying** the state of information and communication technology (ICT) policy at the local and global levels
- **Encouraging** critical debate
- **Strengthening** networking and advocacy for a just, inclusive information society.

Each year the report focuses on a particular theme. **GISWatch 2008** *focuses on access to infrastructure* and includes several thematic reports dealing with key access issues, an analysis of where global institutions stand on the access debate, a report looking at the state of indicators and access, six regional reports and 38 country reports.

**GISWatch 2008** is a joint initiative of the Association for Progressive Communications (APC), the Humanist Institute for Cooperation with Developing Countries (Hivos) and the Third World Institute (ITeM).

**GLOBAL INFORMATION SOCIETY WATCH**

2008 Report

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