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# ITU NEWS

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## ***What should be in a national broadband plan?***



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# Smart regulation for a broadband world

Dr Hamadoun I. Touré  
ITU Secretary-General



Editorial

■ National broadband plans, mobile banking, intellectual property rights, open access — there is no single blueprint for best practice, but learning from countries' experiences is possible. This edition of *ITU News* highlights current thinking and experience on these topics which, along with many others, form the agenda of the Global Symposium for Regulators, taking place in Armenia City, Colombia, on 21–23 September 2011. I am delighted to see this event take place in the Americas for the first time.

The rapid growth of the digital economy presents huge opportunities for development, creating global markets for applications and services, reducing the cost of doing business, and unleashing creativity and innovation. Extending broadband networks will accelerate this trend.

In an era in which broadband is increasingly considered the right of every citizen, smart regulation will have to continue evolving on a path towards greater openness, offering incentives while turning challenges into opportunities. When drafting national plans, policies and strategies for broadband deployment and take-up, wide-ranging public consultations will help ensure that the investments ahead are based on the collective decisions of government, industry, and society.

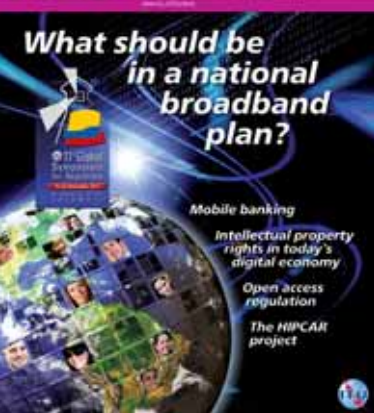
Supportive policy and good governance are essential for the success of broadband deployment and take-up. Where returns are insufficient to attract private investment, public funds can be mobilized through public-private partnerships.

Policy-makers and regulators can provide incentives for private-sector investment by adopting enabling policies, simplifying licensing regimes, reducing obligations, and offering tax breaks. Making more spectrum available for broadband wireless services becomes a cornerstone of future growth of the digital economy.

Open access arrangements could maximize the economic benefits of broadband infrastructure across a broad base of users and suppliers. Regulators and policy-makers should aim for digital inclusion — in other words, broadband services for all citizens.

Countries with high levels of digital literacy are more innovative and productive, and are capturing a greater share of the world's trade, investment and better jobs. Regulators and policy-makers need to promote first-class training systems in all countries to ensure that their citizens can fully benefit from the opportunities of the broadband world.

We look to the 2011 Global Symposium for Regulators to identify and endorse best practice guidelines to advance the deployment of broadband, encourage innovation and enable digital inclusion for all! ■



Cover photos: ARENA Creative/  
Shutterstock, Earth photo courtesy of  
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ISSN 1020-4148  
www.itu.int/itunews  
10 issues per year  
Copyright: © ITU 2011

Editor-in-Chief: Patricia Lusweti  
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## ■ ICT industry backs green standards

The first ITU Green Standards Week closed in Rome on 9 September 2011 with a call on international bodies, nongovernmental organizations, standards bodies, governments, regulators, industry and academia to collaborate more closely on the application and development of information and communication technology (ICT) standards to help combat climate change. Particular emphasis was placed on a globalized method to assess the environmental impact of ICT, reducing e-waste, and the use of submarine cables for climate monitoring and disaster warning.

ITU has been working with industry and government to achieve an internationally agreed set of methods, to be approved by year-end 2011. Included is a method enabling ICT companies to measure their own carbon footprint, and one to estimate the considerable savings in global greenhouse gas (GHG) emissions and

energy that can be achieved in other sectors through the use of ICT. A single globally recognized method will give credibility to the various claims now being made about the benefits of ICT in addressing climate change and energy issues.

ITU Secretary-General Dr Hamadoun I. Touré says “By adopting globally agreed standards — green standards — we will help to create a smarter, greener, planet; a planet which will be full of opportunity and potential and which will help the next generation reap tremendous rewards.”

The increase in e-waste — generated by the expanding use of ICT and the decreasing lifespan of equipment — was highlighted by participants as an area of great concern, as was the export of e-waste to developing countries. As Malcolm Johnson, Director of ITU’s Telecommunication Standardization Bureau (TSB), says



AFP/China Xtra

"Production of ICT equipment must minimize the use of toxic material, and be designed to have a longer lifespan. Standardization is important in achieving this. ITU's universal charger is an excellent example of what can be achieved with international cooperation. E-waste that cannot be avoided must be recycled in an environmentally sound manner to extract valuable secondary raw materials." ITU is working on this issue with its membership and others including United Nations University; the United Nations Environment Programme (UNEP); the Basel Convention; the Center for Environment and Development for the Arab Region and Europe (CEDARE); and StEP — an initiative of various United Nations organizations with the overall aim to solve the e-waste problem.

Two high-level segments gave prominent public and private sector voices the opportunity to discuss how the ICT industry's climate change agenda may be promoted in the run-up to the 2011 United Nations Climate Change Conference, to be held in Durban, South Africa, at the end of the year. The sessions advised on how ICT

may aid in the implementation of the United Nations Framework Convention on Climate Change (UNFCCC) and the Kyoto protocol, how governments may set relevant and transparent policy objectives regarding ICT standards and the environment, as well as how governments and the ICT sector may effectively communicate and cooperate to achieve these goals.

Green Standards Week, jointly organized by ITU and the Italian Ministry for Economic Development, and hosted by Telecom Italia, took place in Rome from 5 to 9 September 2011. The event was also supported by Huawei, Research In Motion, Alcatel Lucent, Cisco, VRM Italy and Microsoft. The goal was to raise awareness on the role of ICT to promote environmental sustainability and in particular how standards can help to achieve this.

The body of the talks comprised three workshops: "Methodologies for environmental impact assessment of ICT", jointly organized with the European Commission; "Moving to a green economy through ICT standards", jointly organized with Telecom Italia; and "Submarine cables for ocean/climate monitoring and disaster

warning: science, engineering, business and law", jointly organized with the World Meteorological Organization (WMO) and the United Nations Educational, Scientific and Cultural Organization (UNESCO). The third workshop proposed the use of submarine communication cables for ocean and climate monitoring and disaster warning (see article in the January–February 2011 issue of *ITU News*). Workshop participants called on ITU, UNESCO and WMO to establish and coordinate a joint task force of experts from science, engineering, business and law to intensify study on the use of submarine

networks and to explore engineering and business potential in this realm.

Green Standards Week also awarded the winner of the first ITU Green ICT Application Challenge, a global competition organized by ITU and supported by Telefónica and Research In Motion to identify innovative apps that can help improve energy efficiency and combat climate change. Designed by Lis Lugo Colls, from Spain, the application "Smart Recycling" helps mobile users locate recycling schemes and refuse bins within their area, and provides advice to consumers and local authorities on the effectiveness of the schemes. ■

## ■ Kigali broadband meeting highlights role of youth and debates strategies for getting Africa online

Broadband commissioners and interested representatives of governments, private sector and civil society met in Rwanda's capital Kigali on 8–9 September 2011 to focus on challenges, priorities and strategies that can help wire the African continent to high-speed networks.

The meeting was held at the invitation of the President of Rwanda, Paul Kagame, who co-chairs the Broadband Commission for Digital Development with Carlos Slim Helú, Honorary Chairman of Grupo Carso. President Kagame is a staunch champion of the transformational power of technology, and has prioritized

the construction of ICT networks as part of his national rebuilding programme. The Commission's co-Vice-Chairs are ITU Secretary-General Dr Hamadoun Touré and UNESCO Director-General Irina Bokova.

The meeting started with a focus on the role of youth in defining new ICT services and driving take-up. In a continent where more than half the population has yet to reach adulthood, Rwanda has an exceptionally young population, with 42 per cent of people under the age of 15 years.





*From left to right: Dr Hamadoun I. Touré, Secretary-General of ITU; Paul Kagame, President of Rwanda; and Carlos Slim Helú, Honorary Life-time Chairman of Grupo Carso, at the Broadband Commission Consultative meeting in Kigali, Rwanda, on 8–9 September 2011*

“African youth possesses the energy, passion and dedication to use these technologies to address global challenges and truly benefit from ICT. Our duty as leaders is to build the right environment and promote the necessary investments to allow them to fulfil their potential. Let us not wait another century to recognize that broadband was another missed opportunity for Africa”, says President Paul Kagame.

Two high-level round table debates looked at the policies needed to help ensure that African youth gain access to online services such as education and health care, and considered how government and industry can support strategies to encourage youth entrepreneurship.

Participants included Max Ahoueke, Minister of Communications and New Technologies, Benin; Clotilde Nizigama, Minister for Finance, Economy, Cooperation and Development, Burundi; and Brahim Sanou, Director of ITU’s Telecommunication Development Bureau, as well as members of the Broadband Commission, such as Indrajit Banerjee, Director of the Information Society Division of UNESCO; Cheik Sidi

Diarra, Under Secretary-General, UN Special Adviser on Africa and High Representative for Least Developed Countries; Professor Jeffrey Sachs, Special Adviser to the UN Secretary-General for the Millennium Development Goals; Sunil Bharti Mittal, Chairman, Bharti Airtel; and musician Youssou N’Dour, among others.

Speaking at the opening of the Youth session, Dr Touré told participants, including 135 students from Kigali’s leading tertiary education institutions and from neighbouring countries, that broadband is the single most powerful tool available to accelerate progress towards achieving the Millennium Development Goals, and to drive social and economic development. “In the 21st century, with broadband, no young African should ever again need to be sent abroad in order to enjoy the benefits of an excellent education,” said Dr Touré. “If you are connected, it no longer matters if you are geographically or socially isolated; you are still connected to the information society. But if you are not connected, you are — literally — cut off from a whole portion of the world’s riches.”



The programme also featured an Innovation Competition showcasing 11 exciting new apps created by young Rwandan developers. Two winners will be sponsored to represent Rwanda at the forthcoming ITU Telecom World 2011 Digital Innovators competition in October.

The event also served as a preparatory meeting for the upcoming global Broadband Leadership Summit, which will take place in Geneva, Switzerland, on 24–25 October as part of ITU Telecom World 2011. The Summit will bring together heads of State, prime ministers, ministers, CEOs of major companies, heads of UN agencies and regulators from across the globe. It will allow leaders to connect, exchange knowledge, seal deals, share best practices, and help extend the social and economic benefits of high-speed networks.

## Broadband prices falling, but much of Africa remains unconnected

Figures released by ITU earlier this year show that worldwide, on average, consumers are paying 50 per cent less for high-speed Internet connections than they were two years ago. This fall is mainly a result of decreases in the extremely high cost of broadband in developing countries. In 32 countries, a broadband connection still costs more in 2010 than 50 per cent of monthly gross national income (GNI) per capita. And in 19 of those nations, the monthly price of a fast Internet connection was still more than 100 per cent of monthly average income.

Despite encouraging trends, Africa continues to stand out for its relatively high prices. Fixed broadband Internet access, in particular, remains prohibitively expensive. By 2010, only one out of nine people in Africa had access to the Internet, and fixed broadband penetration was just 0.2 per cent, compared to 24 per cent in Europe and 26 per cent in the United States. ■



AP/Imaginechina

## The broadband debate

### The need for speed?

■ There is a wealth of recent evidence suggesting that the Internet can contribute significantly to the economy, economic growth, job creation, and innovation in the development of new services and applications. For example, a 2011 analysis of 13 countries by the McKinsey Global Institute found that the Internet contributed 11 per cent of growth over the past five years. This important topic is examined in a report by the Broadband Commission for Digital Development, “Broadband: A Platform for Progress”, published in June 2011 (see June 2011 issue of *ITU News*).

The range and quality of services that can be offered over the Internet is greatly enhanced by faster data rates. High-speed infrastructure is surely a win-win situation — good for consumers, who enjoy greater choice of services; good for governments and

national competitiveness in their communications infrastructure and ability to attract foreign direct investment and create jobs in diverse sectors; and good for industry, where operators sell faster Internet connectivity to gain competitive edge and market share at higher prices and, potentially, higher margins (witness the 4G wars, for example).

But how fast is fast enough? And what factors need to be taken into account in setting targets for speed and deploying infrastructure? Speed does not always mean reliability — and the relationship between speed and reliability is not always easy.

*ITU News* and the Broadband Commission for Digital Development are launching a new series of mini-debates to promote the objectives of the Commission, underlining the



importance of broadband infrastructure in helping accelerate progress towards achieving the Millennium Development Goals. This first debate examines the need for speed.

### Slow, but steady?

Sometimes, it is basic connectivity that matters, regardless of the speed of the connection. The phenomenal growth of 2G mobile connectivity in the developing world has done much to empower the previously unconnected, whether by giving people livelihoods (for example, the Grameen “phone ladies” of Sri Lanka and Uganda) or simply by making people contactable and more available for work.

In the developing world, lack of infrastructure often prevents health workers from delivering health care efficiently to isolated patients in rural areas. Some of the gaps in local health systems can be mitigated using simple, locally appropriate communication technologies. In Malawi, Medic Mobile has used SMS and mobile open-source platforms (including Ushahidi, Google Apps and HealthMap) to mobilize communities for vaccination campaigns, collect data and map health services. Using text messages and mobile phones, St. Gabriel’s Hospital in Malawi has tracked new symptoms and doubled the number of patients being treated for tuberculosis, while saving thousands of hours of travel and work time. Medic Mobile is using mobile technology to great effect to monitor drug stocks in rural Ethiopia, track vaccinations in India, support the prevention of mother-to-child transmission of HIV in Malawi and streamline test result delivery for cervical cancer screening in Nicaragua.

In agriculture, e-Krishok is an initiative launched by the Bangladesh Institute of ICT in Development in Bangladesh, which aims to provide farmers with both general information and answers to specific questions through a web-portal. This project has grown from just ten locations in October 2008 to 100 centres with Internet and mobile access by February 2010, as e-Krishok

has become the preferred source of information for the many farmers reached by the campaign.

These real-life examples show how even basic ICT can make a real difference to the way people live, work or get health care. Part of the success of these projects is attributable to the use of robust technologies and simple devices that are reliable and do not need a lot of power.

### Faster is automatically better?

If these are the gains that can be achieved through low-speed applications, imagine how much more could be achieved through high-speed connections. Although a precise definition of broadband is elusive (speed of upload versus download, and whether this capacity is sustained in data transfer rates to the exchange or end user), broadband as a concept embraces high-speed, high-capacity, always-on access to ICT services capable of providing various services (voice, video and data).

ITU recognizes fixed (wired) broadband services as subscriptions to high-speed access to the public Internet (over a TCP/IP connection) at downstream speeds equal to, or greater than, 256 kbit/s. Booz & Company note, for example, that speeds of up to 100 Mbit/s are needed for some telemedicine and distance learning applications, compared to 4–6 Mbit/s required for web-based teleconferencing.

The Phoenix Center in the United States sees the true value of broadband access to a society as varying according to its use, connection speed and method of access. Some countries (such as Denmark) have set national targets for achieving specified levels of coverage with certain speeds by set dates. France and the European Union are seeking to provide universal coverage of broadband Internet access. The UK’s Digital Britain Plan envisages 100 per cent coverage of rural areas with 2 Mbit/s service, in part as the minimum speed needed to deliver iPlayer, the BBC’s Internet TV service, although this target has been deemed



© Fredrik Skold/Alamy

modest by some observers. Other countries are now including broadband Internet in their definitions of universal service.

National targets for coverage and transmission capacity (speed) are an important signal by governments of their commitment to establishing the foundations for a modern economy with advanced infrastructure.

### Fast enough?

In order for broadband to thrive, and for the market to grow successfully, national targets and operators' deployment plans should take account of customer needs and the geography of the areas, as well as what the technology is likely to be used for. How fast is fast enough depends on these, more specific factors.

In an era where data usage is growing at an explosive rate, sometimes at a cost to quality of service, operators have

to deploy technologies to meet the needs of specific markets or specific geographies in certain areas (for example, urban versus rural), according to the distribution of customers — for example, Clearwire's selection of new markets for the deployment of mobile broadband in certain areas of the United States. A mismatch between speed and usage may mean that consumers in developing countries find that technologies are not locally appropriate to their real needs. Consumers in developed countries are already finding that brakes are being applied to their data capacities — both for fixed as well as mobile service. In the United States, AT&T has set limits on customers' use of its high-speed network (with charges for additional capacity), and similar arrangements are common in Canada, Asia and Europe. Matching speeds to needs seems to be the way to go. ■



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## Message

Brahima Sanou  
Director of the ITU Telecommunication  
Development Bureau

# Global Symposium for Regulators

■ The 11th edition of the Global Symposium for Regulators (GSR) is being hosted by the Colombian authorities in Armenia City, Colombia, on 21–23 September 2011. It is my first GSR as Director of the ITU Telecommunication Development Bureau, and I am delighted to see such great interest in this event at the highest level of government, with the Presidential segment on “Broadband for all and the future of telecommunications and information and communication technologies.” The large attendance for the 4th Global Industry Leaders’ Forum, preceding the Symposium on 20 September, is equally gratifying.

Both events are organized by ITU, in collaboration with the Ministry of Information and Communication Technologies and the Communications Regulatory Commission of Colombia. In both events, under the theme “Smart regulation for a broadband world”, participants will examine measures that regulators can take to achieve broadband for all, foster innovation, and address the complexities and challenges of the broadband ecosystem.

GSR has a full agenda focusing on m-banking services and the role of regulators; wireless broadband spectrum pricing; satellite regulation; open access regulation; setting national broadband policies, strategies and plans; financing universal access/service; e-waste and recycling and the role of regulators;

protecting the rights of all stakeholders in the digital ecosystem; and regional initiatives to foster broadband connectivity. We are pleased to announce that in order to foster interactivity and networking among GSR participants we are providing for the first time an online networking platform.



The many contributions received for this event have been coordinated by Cristhian Lizcano Ortiz, Executive Director of the Communications Regulatory Commission of Colombia. Discussion papers too have been written on these agenda topics. Some of the papers are highlighted in this edition of *ITU News*. Others, covering the impor-

tant topics of regulation of global broadband satellite communications, strategies for financing universal broadband access, and who is responsible for e-waste, as well as a report exploring the economic valuation and social value of spectrum, will be covered in future issues of *ITU News*.

To ensure that all citizens can reap the benefits of living in a broadband world, policy-makers and regulators need to foster affordable access and spur growth. I believe that this is a unique opportunity for regulators to come together to further advance the commitments of the World Summit on the Information Society (WSIS), the Millennium Development Goals, and the decisions of the World Telecommunication Development Conference, held in Hyderabad, India, in May–June 2010.





## What should be in a national broadband plan?

■ *A national broadband plan is as much a social contract as a plan of action to develop the industry base. It can be understood as bringing about a stronger foundation for effective governance, private investment and more active citizenship, leading to a desirable social and economic future.\* This article examines the many considerations which go into the formulation of a national broadband plan.*

\* A discussion paper entitled "Setting national broadband policies, strategies and plans: A practical step-by-step approach" is expected to lead to fruitful exchanges at the 11th ITU Global Symposium for Regulators, to be held in Armenia City, Colombia, on 21–23 September 2011. The paper was written by Dr Bob Horton, consultant for the ITU Telecommunication Development Sector (ITU-D).

### Main characteristics

A broadband plan needs to be forward looking with a detailed outlook of say, five years, which is not too long that technology solutions might have radically changed, but which covers a longer time frame than electoral cycles.

A national broadband plan should become a permanent fixture of economic development and the embodiment of a shared vision. The plan should be resilient to the checks and balances brought about by politics. It needs to be endorsed by all policy-makers at the time of conception. The respective roles of public and private sector participation, and the potential for partnerships, are all important.

Generally, the private sector should assume primary responsibility for investing in the development of broadband. But this may not always be the best solution, and a central role for the public sector may be needed, at least for a temporary period. Addressing market failure



and the need for intervention with universal service objectives will remain an important role for government.

As an aggregating anchor tenant, governments can contribute to demand through e-services for health, education, public administration, public safety, and the establishment of expertise centres to spread broadband expertise and knowledge. Demand aggregation through the offering of government services online and capacity building, or training through community centres, are particularly important for developing countries, as can be gleaned from the Dominican Republic.

### Addressing goals and targets

Governments need to itemize the different goals which can be achieved through a national broadband plan. Such goals may include: universal access and associated guarantees; incentivizing competition and innovation through policies and regulation; and the creation of new industries, exports and jobs.

The plan also needs to identify realistic targets. Broadband targets should be transparent and amenable to market and social analysis, economically justified by a cost-benefit analysis, and unrelated to political cycles. Broadband infrastructure should be seen as a long-term undertaking.

Targets should be sound, realistic and reasonable, taking into account a country's national circumstances. Targets can be based on percentage penetration levels, as in many developed and developing countries, or on speeds representing the boundaries of technologies which can be reasonably afforded, a combination of both these objectives, or — most likely — a tiered approach which takes into account geographic factors and market supply responses.

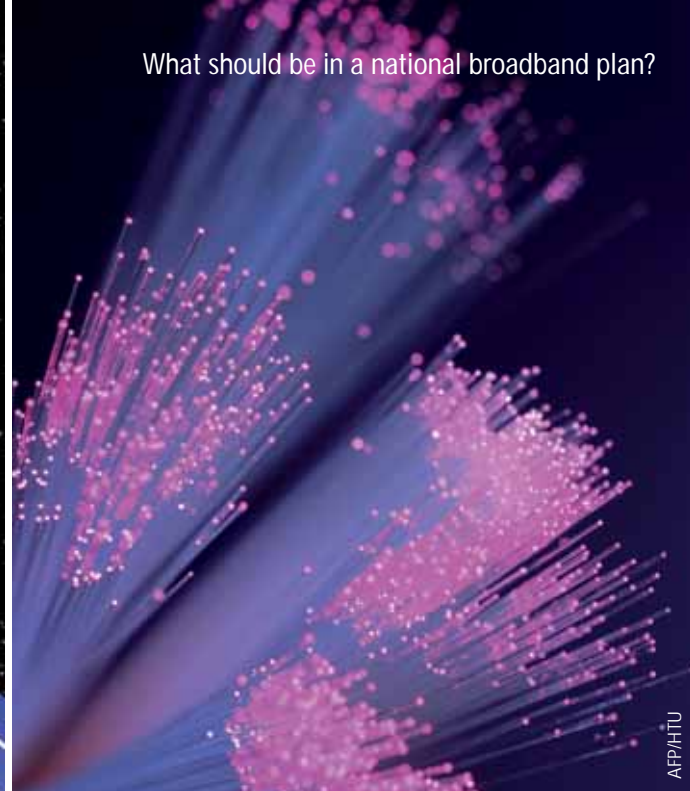
Studies are required to estimate the level of demand at determined prices that are attractive to the population. Following this, an estimate of the minimum level of investment to satisfy this demand can be made, together with estimates of the potential rates of return for investors and operators.

In the case of developing countries, and especially in rural areas, there are barriers to obtaining reliable demand estimates. The difficulties and costs of obtaining primary service data, and the scarcity of historic traffic data can make this problematic.

To overcome these obstacles, some regulators, for example in Peru and the Dominican Republic, use a practical approach which involves superimposing a known working example of rural telecommunications and Internet usage onto the demographic distribution of all rural communities throughout the country. Also of great value to developing countries are the case studies of other developing countries, which may have already moved ahead in developing broadband. Both of these tools can make up for a lack of historical traffic and service data for econometric analysis.

### Industry structure and regulatory measures to stimulate the market

The structure of the telecommunications industry is still generally asymmetric, with a strong incumbent matched up against new entrants to the business. The essence of the regulatory challenge is to introduce competitive dynamics into the market, because the instinct of competitors in a healthy market is to grow the business, to increase vertical integration in order not to limit diversity, to continuously innovate, and to maintain investment as technologies and network solutions



mature. A strong competitive environment ensures that market forces work to achieve these outcomes, and the benefits which accrue to consumers are a genuine choice in price, quality and range of service.

In many countries, the tools for regulation of access, interconnection and market behaviour have been introduced, and given to an independent regulator to administer, often through schemes of negotiation or arbitration and lighter regulatory requirements such as codes and standards.

However, given the legacy of services being provided as a natural monopoly, many preliminary efforts to regulate for a competitive market have foundered, resulting in market failure or otherwise disappointing achievements. A number of incumbents have applied their creative talents to the protection of their historic position and purposely avoided significant new investment, which in itself might benefit new entrants.

As a result, some countries have resorted to operational or structural separation of the incumbent in order to reset the industry framework. This has occurred notably in the United Kingdom, New Zealand, Singapore and Australia, where there has been a determined policy

choice to augment the regulatory structure. The stick has replaced the carrot — with potential denial of spectrum access, or a threat to future partnership participation in broadband network developments.

A recent lesson is that the regulation of access, interconnection and market behaviour in itself needs to have incentives built in to encourage movement up the value chain by new entrants. And entrants need to acquire capital assets progressively as they achieve customers and revenue growth.

## Models for financing broadband infrastructure

The different models of financing the implementation of broadband infrastructure are influenced by legacy infrastructure and this determines the extent of direct government involvement. Ultimately, the primary funding for broadband should be privately based, but many markets are not sufficiently developed to offer sound financial investment opportunities.

Two routes are available to government — direct entry as a service provider and later privatization, or

stimulation of the market and taking a share of the risk through partnership arrangements.

Where competition exists between vertically-integrated operators that manage their own network infrastructure and have sufficient stand-alone capacity for investment and innovation, the role of government and the regulator is limited to facilitation of fair market competition and behaviour, and the timely and prudent access to public resources such as spectrum and property rights of way. Regulators have a responsibility to encourage infrastructure sharing among competitors (for example, backbone and towers). This alleviates cost pressures, especially where a mix of broadband infrastructure is not sustainable.

Where private investment is reluctant to enter the market, the government can step in as risk taker and enter into public-private partnerships. These can be contracts with an incumbent or with new entrants, and in effect operate as a temporary wholesale monopoly — though based upon open access principles which differ from the traditional public switched telephone network (PSTN) monopoly — until competition is better established.

An inventive partnership contract devised in New Zealand grants the government an initial 100 per cent stake, which is then progressively bought out by the commercial partner as uptake occurs. Capital is returned to the government through this process, and this can then be reinvested in ultra-fast broadband networks. This arrangement essentially operates as a rotating line of credit.

Many developing countries now impose a universal service levy, and this accumulated resource might be applied in the future to bring broadband to underserved

and unserved areas under contractual partnership with government.

### The need for cross-sectoral considerations

In promoting broadband adoption, demand-side policies might involve tax incentives, the development of various e-government services, an enabling environment for small and medium-sized enterprises, export incentives, and the development of human capacity and resources.

This calls for an overarching strategy involving the consideration of cross-sectoral measures, and education of the broad base of society and industry in order to enjoy fully the benefits which broadband offers.

In general, it is appropriate for developing countries to consider mobile and wireless broadband as a way of addressing the digital divide. There appears to be a continuous increase in wireless broadband services in developing countries, with the deployment of 3G-enabled handsets and devices.

Some developed countries already have strong inter-platform competition between cable-based Data over Cable Service Interface Specification (DOCSIS) systems, fibre-optic systems, and wireless systems evolving to the fourth generation (4G) with Long Term Evolution (LTE) or WiMAX. This forms a firm foundation for healthy competition in the marketplace. Another observation is that while regulatory attempts in those countries have been biased towards service-based competition, they have had less impact (in fact a deceleration of investment) on developing a competitive market than the inherent facilities-based competition already in existence in their markets.





In other developed countries, where optical fibre (for FTTx and backbone needs) is seen as the wholesale platform for future growth of competition, there is nevertheless an acknowledgement that wireless, satellite and cable-based technologies might need to serve at least part of the market, which market demand should be left to determine.

This points to the need for policy-makers and regulators to maintain a neutral stance on the application of technology. It is better not to pick a single technology national champion to implement broadband because of the wide skills required to cover all technologies.

In the long run, the most mature markets, for which consumers will most benefit, are those that enable inter-platform competition, and multiple network providers using separate technologies. In countries where inter-platform competition has emerged, such as in the Republic of Korea, the Netherlands, Japan, Germany, and to a certain extent the United States, there has

been no noticeable market failure with regard to the development of broadband.

### Where to start?

A national broadband plan is as much a social contract as a plan of action to develop the industry base. It can be understood as bringing about a stronger foundation for effective governance, private investment and more active citizenship, leading to a desirable social and economic future.

There is no total blueprint for best practice, but a systematic approach using a decision tree (see article on pages 22–23) will help to ensure that all relevant factors are considered. Learning from other experiences at each level of decision making is possible. This article may assist with some pointers of where to look when tailoring the cloth to suit a particular set of national circumstances — for both developed and developing countries. ■

# Drawing up a broadband plan

## Searching for best practice?

### ■ The decision tree

There are many levels of decisions which apply in drawing up a broadband plan. A wealth of information exists from countries which have already taken decisions on a number of these levels. A decision tree can assist governments in establishing best practice for their broadband plan.

A decision tree is a decision support tool which uses a tree-like model of decisions and their possible outcomes or consequences. It comprises three types of nodes:

- ▶ decision nodes (represented by squares)
- ▶ chance nodes (represented by circles), and
- ▶ end nodes (represented by triangles).

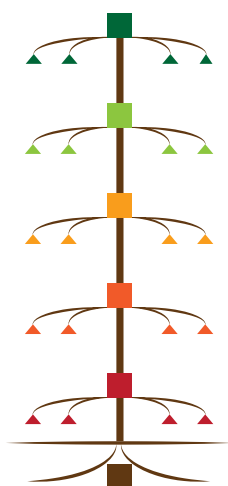
The squares represent the focus of a fundamental decision to be made and the triangles provide the set of options or solutions which are available to the decision-maker. The circles usually sit between the squares and the triangles and they introduce a probability (where appropriate) to further assist the decision-maker.

In applying this concept to the creation of a national broadband plan, the challenge can be captured by six

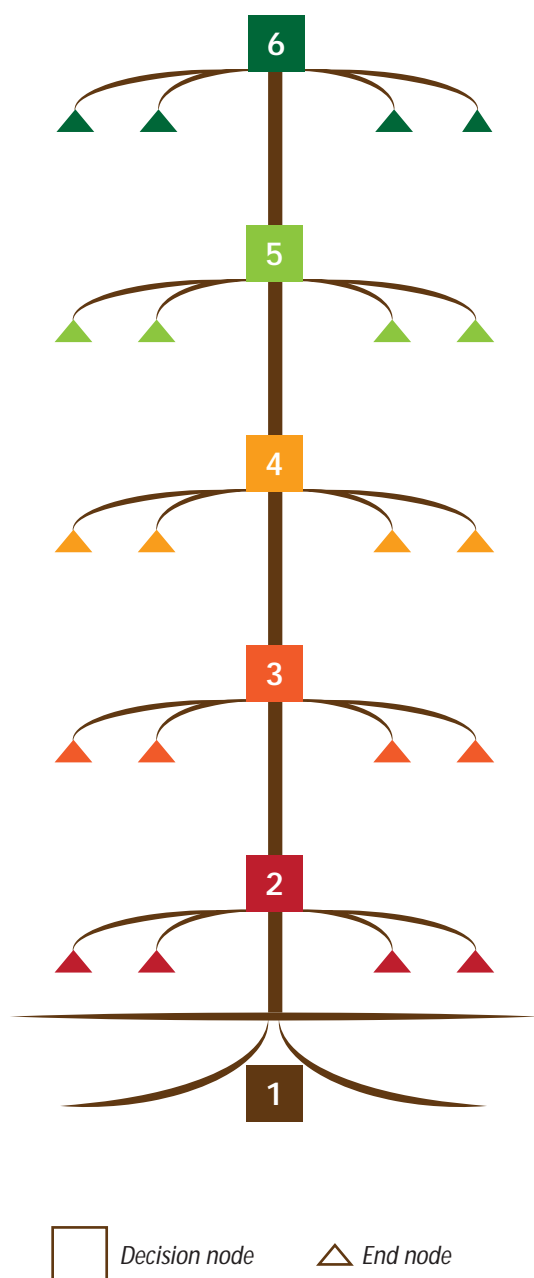
levels of decision nodes (see chart). The decision tree shown does not contain chance nodes, for two reasons. First, because the subjective probabilities associated with any chance node will vary from country to country. Second, while chance weightings could be introduced based on, say, the number of countries deciding on particular options, this may not lead to best practice, but only indicate a herd mentality.

In ascending the tree, there need not be strict adherence to the numerical sequence of decision nodes. Many countries have followed a varying sequence. In general, however, levels 1 and 2 would be the most efficient and logical starting sequence, as well as the lowest risk for a well-informed national plan. The advantage of using a decision tree is that, at each level, there is the experience of several countries to turn to for formative thinking.

While the end nodes depicted in the chart represent the nominal range of options available to a country at the decision point level, there can in some cases be a combination of options. At each level there is the experience of at least several countries to turn to for formative thinking. ■



## Decision tree: The six levels of decision nodes

**6 Industry structure**

*The conceptual approach to the ultimate industry structure needed, or that which is already achieved and which best serves the needs of the broadband plan.*

**5 Infrastructure investment**

*Measures to assist and encourage industry and service development for example, direct investment by government, private industry investment, and public-private partnership schemes.*

**4 Regulatory support mechanisms and initiatives**

*Which are relevant to enabling the best and practicable solutions for a particular country in order to successfully achieve the vision and outcomes. The culture and attitude of the regulator are important.*

**3 Institutional form of regulation**

*This relates to the form and responsibilities of the regulator. Is it an independent, converged, integrated (dealing also with service pricing and consumer issues), or industry specific regulator?*

**2 Goals and targets**

*These should not be set lightly or slavishly. They can appear deceptively simple but to be set properly they require comprehensive understanding and application of several dimensions, together with an appropriate definition of "broadband".*

**1 Foundation**

*The initial consideration and consultation which informs and engages broad stakeholder involvement in creating the broadband vision of the future.*





## Argentina connected

- *The Government of Argentina recognizes the importance of broadband for social and economic development, and last year launched a major plan to increase broadband connectivity for individuals, businesses, educational institutions and government offices across the nation.*

### Developments in broadband and digital television

Argentina's President Cristina Fernández de Kirchner presented the country's National Telecommunication Plan *Argentina Conectada* (Argentina Connected) on 18 October 2010. The plan combines under a single connectivity initiative several other efforts already under way, the main thrust of which is public investment for the deployment of communications infrastructure, equipment and services. In particular, it integrates ongoing programmes aimed at digitizing terrestrial broadcasting, providing information and communication technology (ICT) equipment and

training to public-school students, extending connectivity to remote areas, and establishing public access ICT centres.

The strategic orientations of *Argentina Conectada* are digital inclusion; optimizing use of the radio-frequency spectrum; developing universal service; national production and creation of employment in the telecommunication sector; training and research in telecommunication technologies; infrastructure and connectivity; and capacity building.

In order to give effect to the plan, the government has declared the development, implementation and operation of the federal fibre-optic network entrusted to the *Empresa Argentina de Soluciones Satelitales SA* (AR-SAT), a government-owned corporation, to be a public interest project.

President Cristina Fernández says with great pride, "The Plan 'Argentina Connected' means above all the democratization of access to information and communication technologies for all sectors of our society." The plan is built upon the premise that the development of broadband requires not only the availability of basic data transport infrastructure and affordable connectivity

services, but also appropriate applications and content, a large installed base of terminal equipment, and the expansion of ICT skills among citizens.

Argentina has a long tradition of well-developed public utilities, and ranks high within Latin America in broadband adoption. In September 2010, the number of residential broadband connections reached 4.5 million (an increase of 30 per cent from the previous year) in a population of some 40 million.



*Carlos Lisandro Salas, Argentina's Secretary of State for Communications, with Dr Hamadoun I. Touré, Secretary-General of ITU*

## Rolling out a 12 000 km fibre-optic network

The plan directs the investment of more than USD 1 billion (ARS 4.24 million) over five years to expand broadband Internet access and free-to-air digital terrestrial television to the whole country.

The investment will be used in rolling out a 12 000 km fibre-optic network — to which must be added the further kilometres laid under capacity acquisition and exchange agreements with provincial and private operators — and installing 47 digital transmission towers to provide 75 per cent of the country's population access to the free-to-air digital terrestrial television service, according to the President.

AR-SAT will deploy and operate the new fibre-optic network. Under the terms of the project, AR-SAT will fulfil connectivity demands in the public sector and operate under open network

principles in the wholesale data transport market. This strategy is complemented with financial incentives to local operators to encourage them to provide last-mile connectivity and to establish public access centres across the country. The goal is to expand broadband access to more than 10 million households by 2015.

## The role of satellite

In April 2011, ITU Secretary-General Hamadoun I. Touré visited the INVAP fa-

cilities in the city of San Carlos de Bariloche in the Province of Río Negro to see how, Arsat-1, the Argentine geostationary satellite is being built. He also toured AR-SAT's Earth station and satellite control and monitoring centre in Benavídez in Buenos Aires. Arsat-1 is planned for launch in mid-2012, and will provide data transmission, telephone and television services mainly across all of Argentina, Chile, Uruguay and Paraguay.

"Satellites provide invaluable solutions, particularly in hard to-reach rural areas and for essential backhaul capacity needed by other operators. We will closely pay attention to the whole process until its launch," Dr Touré said at the "Telecommunications Forum 2011: Argentina Connected" in Buenos Aires on 27 April, where he was invited by the Ministry of Federal Planning, Public Investment and Services. "The success of this project will confirm that developing countries have the knowledge and the tools to participate on an equal footing with developed countries in sophisticated technological markets. We hope that AR-SAT, which

is playing a leading part in this project and is a Sector Member of the ITU Development Sector, will be soon sharing its experience with the rest of the ITU family," Dr Touré added.

### Free-to-air digital terrestrial television

The National Government, through the implementation of open digital television, will foster democratic access to communications, as a tool for social inclusion, providing all the country's inhabitants with the opportunity to enjoy free-to-air digital terrestrial television, with diversity of information and high picture and sound quality.

In contrast to what has happened in most countries that have switched from analogue to digital television, in Argentina the technological leap began with the poorest households. Before the 2010 Football World Cup, the government distributed free converter boxes so that families with the least resources could use the new technology on their old television sets.

According to Télam, the national news agency of Argentina, by May 2011 the government had distributed 400 000 converters to low-income groups, so now more than one million Argentines have access to the free-to-air digital terrestrial television service.

The digital signal now covers a population of more than four million. The 18 transmission towers installed to date allow 15 free signals to reach homes that previously had no access to television or could only watch one channel. There are also plans to distribute 120 000 special converters to people with visual or hearing impairment.

The transition from analogue to digital broadcasting was considered by the World Telecommunication Development Conference in Hyderabad, India, in May–June 2010, as one of the key issues for the Americas region. "In this sense, we know that Argentina is working with all the countries that have already adopted the ISDB-T International standard on speeding the

transition. The ITU, where this standard was approved, is ready to support a smooth transition through the identification of appropriate mechanisms of conversion; the elaboration of comprehensive guidelines; and the training of human resources; among other activities," says Dr Touré.

### ITU support for digital inclusion in Argentina

The ITU Telecommunication Development Bureau (BDT) has long collaborated with the *Secretaría de Comunicaciones* (SECOM) in Argentina. Since 1998, ITU has worked with SECOM to help install community technology centres throughout the country. A USD 3 million cooperation project, signed in 2010, aims to help reduce the digital divide.

In line with the National Telecommunication Plan, and working together with national, provincial and municipal governments, ITU and SECOM's *Programa Sociedad de la información* (PSI) is now equipping 19 *nucleos de acceso al conocimiento* — NAC (knowledge access centres) in public spaces, such as community centres, throughout the country. These centres will provide free public access to ICT, and hence to knowledge, entertainment and training, thus fostering people's capacity to learn, develop skills, and participate more fully in community and civic affairs.

Each centre will contain: a computer laboratory and training room; a Wi-Fi room for those wishing to connect with personal computers and mobile devices; an audiovisual room with access to free-to-air digital terrestrial television; and the latest generation game consoles. "I am very pleased with ITU's ongoing collaboration with SECOM on this project, which fully reflects our commitment to bringing the benefits of ICT to all members of the community, so that they can fulfil their potential and are empowered to make a valuable contribution to society. The *Connect Americas Summit*, which will be held in July 2012 in Panama, will



provide an opportunity to boost investment and foster partnerships for similar projects throughout the region,” said Brahima Sanou, Director, of the ITU Telecommunication Development Bureau.

Among other e-inclusion strategies, ITU/ BDT and PSI/SECOM are, in particular, cooperating to foster the digital inclusion of women and youth living in poor, rural or isolated communities.

*View of the main antenna transmitting free digital television signals in high or standard definition, on the roof of the Argentine Social Development and Health Ministry with a steel sculpture of Evita in Buenos Aires*



AFP

## Universal service, a fundamental tool for digital inclusion

Universal telecommunication service plays a key role as one of SECOM's strategic objectives and constitutes a fundamental tool for the regulator in fostering universal access to ICT. The major objective of the universal service programmes is to promote digital inclusion for groups of people who are deprived of access for geographical, social or economic reasons. The programmes range from building infrastructure to providing connectivity for specific population groups and for institutions such as schools or public libraries. Furthermore, universal service is a dynamic concept whose aims can be adjusted to keep track of social changes and the policy requirements they generate in relation to the use of ICT.

## Implementing the National Telecommunication Plan

*Argentina Conectada* is the product of months of collaboration among many government agencies and extensive consultation with the private sector, academia and other civil society organizations. This multi-stakeholder approach is reflected in the plan's implementation strategy.

Under the leadership of the Ministry of Federal Planning, Public Investment and Services, the Planning and Strategic Coordination Commission will be responsible for the overall implementation of *Argentina Conectada*. The Commission will articulate the efforts of several working groups, which bring together government and non-governmental actors. These groups will focus on the plan's strategic goals: digital inclusion for all citizens; optimizing use of the radio-frequency spectrum; integrated management of universal service; creation of employment in ICT, in particular in research and development, and in content creation; and fostering competition in telecommunication services.

Clearly, the government has a key role to play in promoting balanced growth of the broadband ecosystem and in ensuring that the benefits of such growth are widely distributed across all the country's provinces and social groups. This is exactly what *Argentina Conectada* does by:

- ▶ orienting private investments to ensure wide regional coverage of advanced services;
- ▶ promoting service affordability and appropriate service quality benchmarks;

- ▶ stimulating broadband demand through complementary investments in digital literacy, content and applications, research and development, and public access centres.

*Argentina Conectada* provides an example that has elements which should appeal to both developed and developing countries. The regulator plays a key role, which will evolve as implementation progresses.

## Emergency telecommunications in the Americas

Brahima Sanou, Director of the ITU Telecommunication Development Bureau

*At a workshop on emergency telecommunications, hosted by the Government of Argentina in the beautiful city of Mar del Plata on 29 August 2011, I was pleased to see so many of our Member States come together to share with us their recent experiences in responding to disasters. The event was jointly organized by ITU and the Inter-American Telecommunication Commission (CITEL).*

Emergency telecommunications can contribute hugely to reducing risks and building disaster preparedness, through early warning and disaster response. During my term of office, I have prioritized emergency telecommunications, linking our efforts in that area with our development work.

I believe that there is no meaningful development work that does not take into account effective disaster management for public safety. Earthquakes in Costa Rica, Haiti, Nicaragua, Peru and Chile have claimed thousands of human

lives, displacing households and entire communities, and destroying basic infrastructure. Heavy rains, floods and typhoons in Colombia, Suriname, and the entire Central America and Caribbean regions have resulted in untold human suffering and economic loss.

Thanks to the support of the ITU membership, we have been able to assist countries in the region to more effectively respond to emergencies. But more needs to be done, in the spirit of the decisions of the World Telecommunication Development Conference and the 2010 Guadalajara Plenipotentiary Conference, to prepare countries to cope with disasters and to reduce their impact. This could be through rolling out national emergency telecommunication plans, multi-hazard early warning systems, national climate adaptation plans, and e-waste programmes. Bringing all these efforts together in a national telecommunication plan would streamline their deployment and reinforce their effect.



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# Hong Kong China

## Some valuable pointers

- *Hong Kong China could act as a test laboratory for the rest of the world for high density, high penetration broadband roll-out.*

Hong Kong is one of two Special Administrative Regions of China. Its government's Census and Statistics Department puts the population at 7.1 million, in an area of 1104 square kilometres (covering Hong Kong Island, Kowloon, and the New Territories and Islands). This makes Hong Kong China one of the most densely populated areas of the world. Under the principle of "one country, two systems" Hong Kong Special Administrative Region has a different political system from mainland China, with an independent judiciary that functions under the framework of common law.

As one of the world's leading international financial centres, Hong Kong has a service economy characterized by low taxation and free trade. The lack of land area coupled with a large

population has led to a demand for high density building. The city is noted for its modern architecture and has become the world's "most vertical" city.

Hong Kong China also has a leading telecommunications economy, with world-class infrastructure. Digitized since 1995, the Special Administrative Region has been wired extensively with optical fibre cables. The vast majority of households are covered by the extensive broadband network. Ha Yung Kuen, Deputy Director-General of the Office of the Telecommunications Authority (OFTA) notes that the roll-out has been characterized by the use of practically every type of technology. Hong Kong is naturally a key regional telecommunications hub and as such is the landing point for a significant number of strategically important submarine cables. Television is a substantial market in the economy, with an estimated customer base in 2011 of over 2.2 million households (99 per cent).



## Policy settings

General guiding principles for government are simple: “big market, small government” and “market leads, government facilitates”. The role of government is to provide a facilitating environment and to intervene only where there are obvious imperfections in market mechanisms.

This macro-economic policy applies to the telecommunications sector, which has been liberalized since the 1990s, resulting in one of the most competitive markets in the world. The government has not provided any direct investment or any forms of subsidy for network construction or for providing telecommunication services in Hong Kong. But there has been no shortfall either in consumer demand or in private-sector investment.

Even during the 2009 global financial crisis, this approach prevailed, despite the soul searching questions at the time of whether Hong Kong China should depart from its proven pro-market policy, whether regulatory holidays or financial incentives should be offered to the industry, and whether public funding should be injected to stimulate investment in telecommunications infrastructure.

## The role of regulation

The telecommunications regulator, OFTA, is central to the implementation of government policy. It has responsibility for the regulation of competition in telecommunications, licensing, technical regulation, spectrum, and consumer matters. It is thus a totally converged and integrated regulator.

In October 2010, at an International Regulators Forum in Barcelona, the Director-General of OFTA, Eliza Lee, laid out some examples of how her organization dealt with the trying times of the global financial crisis. Ms Lee recalled that at the height of the financial collapse, in January 2009, OFTA proceeded with a spectrum auction to ensure the timely introduction of Long-Term Evolution (LTE), WiMAX and other broadband technologies in Hong Kong China. The reserve price was kept unaltered and the auction left to market forces. The auction was a success. A total

of 90 MHz in the 2.5 GHz band was acquired by three successful bidders at a price of USD 197 million.

Private investment continued, and a new LTE technology centre was set up along with a state-of-the-art laboratory. More jobs were created. One of the successful bidders announced deployment of the world's first dual-band network in Hong Kong China in early 2011.

The regulatory action paved the way for new business opportunities for developers of applications, content providers and on-line advertisers. This will, in turn, expand the industry and further spur the telecommunications market.

With hindsight, it is clear that an integrated and converged regulator was able to smoothly harmonize the technology pathways to the broadband future. It seems that, with a sufficiently high degree of facilities-based competition, the government does not need to provide funds to finance the development of broadband infrastructure.

During the financial crisis, however, the outcome was uncertain, and OFTA raised this matter with industry. The majority of industry representatives supported the continuation of a pro-market policy. The consensus was that investment and construction of telecommunication networks should continue to be based on the business plans and commercial decisions of the private sector. The view was that this would confer the greatest degree of the flexibility required for business operations.

That said, OFTA has contributed a number of facilitating measures to assist the continuous roll-out of broadband networks by industry. One is the introduction of a registration scheme for buildings connected by fibre-to-the-home (FTTH) or fibre-to-the-building (FTTB) in order to support public awareness of fibre-based facilities. Another is a consultancy study into streamlining of the landing of submarine cable systems in Hong Kong China. OFTA has also facilitated the deployment of mobile broadband services through the timely release of spectrum, and has allowed mobile operators to use hill-top sites for base stations and backhaul.



There has been sustained private investment and impressive customer take-up of broadband services. For example, in Hong Kong China as at October 2010, there were seven operators providing fixed-broadband services using various technologies at speeds up to 1 Gbit/s.

Also, by January 2011, a total of 2.1 million subscribers were using broadband services, representing a household penetration rate of 83 per cent. About 86 per cent of households are served by at least two self-built networks, and close to 70 per cent are served by three. According to a survey published by the Fibre to the Home Council in February 2010, Hong Kong China ranked third among all the economies that have deployed FTTH or FTTB, with household penetration of around 33 per cent.

Deregulation of fixed-mobile interconnection charges in April 2009 by OFTA aimed to facilitate cross-platform competition in the era of fixed-mobile convergence. OFTA's ability to act in this area represents another advantage of a converged and integrated regulator that is attuned to the market and does not impose any technology choices.

Fixed operators used to impose an interconnection charge on mobile operators, but OFTA considered this practice to be dubious and took steps to put a stop to it. Initially the fixed-network

operators cried foul and sought a long transition period to minimize the impact of the loss of payments. OFTA nevertheless proceeded with its approach and now, except for a single case of dispute between the incumbent fixed operator and a mobile operator, most fixed and mobile operators have been able to reach some form of understanding on interconnection charges, based on the "bill and keep" model.

### Pro-market approach

With a high density population in an urbanized environment and high penetration rates, Hong Kong China has opted to remain faithful to pro-market mechanisms, facilities-based competition, technology neutrality, light regulation, and a dependence on totally private investment in telecommunications. As a result, the Special Administrative Region has been able to maintain consistency, continuity and certainty in its policies for the telecommunications sector and in encouraging innovation.

While these circumstances are not reflected in most economies, Hong Kong China nevertheless gives us some understanding of what the future holds as penetration of broadband increases and urban population density grows.



AFP

## Mobile banking\*

■ *This article focuses primarily on m-banking services as they apply to developing countries. But it is important to note that there are also m-banking and m-payment systems deployed in developed countries. In general, these services tend to be bank-based, offering customers mobile access to the accounts they hold in traditional banks. Such systems are seeing rapid adoption, particularly as smartphones, tablets and other hand-held devices become the primary means for people to get online.*

*For example, a study released in May 2011 showed that 20 million mobile users across five European markets (United Kingdom, France, Spain, Germany and Italy), representing 8.5 per cent of mobile subscribers in these markets, accessed their bank account via a mobile handset in March 2011.*

More than 2.5 billion adults in the developing world are said to be “financially excluded” or “unbanked”, according to a study from the Telenor Group. This means that they have no access to basic financial services such as bank accounts.

The good news is that with more than 4 billion mobile phone subscriptions in the developing world today, access to a variety of financial services is possible through mobile devices (“mobile banking” or “m-banking”). This accessibility changes the landscape for the unbanked, as well as offering an alternative means of accessing services to those who already have a bank account.

As Jon Fredrik Baksaas, President and CEO of Telenor Group explains, “The mobile phone is emerging as a key tool for

\* The GSR discussion paper, “Mobile banking”, on which this article is based, was written by Janet Hernandez, President, Telecommunications Management Group, Inc. (TMG). The paper examines some of the ways in which m-banking has been introduced around the world. It also addresses the key regulatory issues that have emerged with respect to m-banking and analyses the ways in which governments, particularly telecommunications and financial service regulators, can help to promote m-banking in their countries.



bringing financial services to unbanked populations. It allows users to complete basic payments and remittances via the mobile phone, and have easier access to savings, credit and insurance products.”

There are a variety of m-banking models, and these fall into two main categories: a bank-based model and a non-bank-based model. The approach or model that a company implements to roll out m-banking services is often dependent on a country's financial laws and regulations and the degree of flexibility the financial regulator wishes to allow.

A number of countries permit individuals and legal entities to be agents for banks. In India, for example, post offices and mobile network operators can act as agents. In Kenya, any for-profit organization (such as a grocery store or other local retail establishment) can act as an agent. This article looks at the different types of m-banking services, and considers the roles of regulators in regard to m-banking.

## Bank-based model

In the bank-based model of m-banking, banks make some of their services available through the use of a mobile device. A bank enters into an arrangement with a mobile operator to offer financial services either through text messaging or more

elaborate smart phone applications. Customers can carry out a range of financial transactions without having to go to a physical bank facility. The customer establishes a direct contractual relationship with a licensed and supervised financial institution, although an agent may provide customer service, keep records, handle cash and manage liquidity.

Bank-based models generally target existing bank customers, offering a convenient way (in addition to credit cards, automated teller machines and the Internet) to manage money without having to handle cash. But, where there are regulatory constraints in the provision of financial services, some bank-based m-banking services target the unbanked. This is the case in Pakistan, where regulations specify that the banking institution is fully liable for providing the service. As m-banking services develop, and more companies want to get involved, we are seeing varied arrangements of the bank-based model (see table).

### “easypaisa” and “Omni” in Pakistan

Telenor Pakistan and Tameer Microfinance Bank launched easypaisa, an m-banking service, in Pakistan in 2009 in a one-to-one arrangement. Services include bill payment, and local and international remittance. More than 1.5 million transactions are conducted every month through easypaisa, which targets the unbanked population.

## Different arrangements of the bank-based model

Arrangement	Description
One-to-one	Exclusive arrangement between a bank and a mobile operator.
One-to-many	The bank provides m-banking services through multiple operators or a mobile operator provides m-banking through multiple operators.
Many-to-many	The banks and mobile operators all provide m-banking services, and exclusivity is not permitted.

Source: Telecommunications Management Group, Inc.

Customers can register for a mobile account from any of the Telenor franchises, Tameer Bank branches, or Telenor or Tameer Bank sales and service centres. The customer representative captures the customer information in the system, takes a photograph and copies the thumbprints of the customer, and prints out a receipt for the fee for opening the account. The customer receives a verification call from the bank within three hours and, after successful verification, an account is opened for the customer.

Some banks allow their m-banking services to be used by customers of any mobile operator, in a one-to-many arrangement. For example UBL, one of Pakistan's largest commercial banks, which began offering services (also in 2009), has built its own agent network under the brand "Omni" and can serve the customers of any mobile operator with an account that can be accessed via phone or card.

### Non-exclusivity in Ghana and Bangladesh

The Bank of Ghana's guidelines of 2008 support a bank-based model of m-banking using non-bank retail agents (such as merchants, gas stations, or the post office), and prohibit exclusive partnerships to deliver services. In the resulting many-to-many arrangements, banks and mobile operators are able to "entertain each other's customers." Customer accounts reside with the bank. Now three m-banking services are provided by mobile operators in partnership with banks: MTN Mobile Money; Airtel Money; and Tigo Cash.

In Bangladesh, three banks currently offer m-banking services. Dutch-Bangla Bank Limited introduced m-banking services through mobile operators Banglalink and Citycell, primarily using these operators' retail outlets and agents. Islami Bank Bangladesh Limited entered into an agreement with Software Shop Limited Wireless to provide m-banking services to its existing customers. And on 22 July 2011, BRAC Bank launched what it describes as Bangladesh's "first complete mobile financial service", offering mobile subscribers a range of banking and other

financial services via their mobile phones, regardless of whether they have a bank account or not. The service is being offered through bKash Ltd, a subsidiary of BRAC, in partnership with mobile operator Robi (Axiata Bangladesh).

Robi customers are provided with a bKash mobile wallet account, developed on a VISA technology platform and fully encrypted to enable secure transactions. Customer accounts can be credited with electronic money, as salary, loan or local remittance. The cash can then be moved out as electronic money to any of the cash-out agents assigned by bKash.

### Non-bank based model

In the non-bank based model, a formal bank typically serves only as a holder of deposits, while the customer relationship is managed by a non-banking entity — usually a mobile operator. Customers have no direct contractual relationship with the regulated financial institution, and conduct transactions at a retail establishment that serves as an agent for the service. The customer's "money" is recorded in a virtual account on the server of the non-bank entity.

Non-bank based models typically target the unbanked. Customers can order payment of funds to anyone participating in the system and can receive payments from them. Customers can also transfer money between accounts and pay bills.

Two mechanisms are typically used to conduct transactions: a point of sale network and a phone-based system. In a point of sale network, customers must visit a participating retail agent every time they want to conduct a transaction. In a phone-based system, customers have to visit a retail agent in order to deposit cash or convert stored value back into cash.

### "GCASH" in the Philippines

Mobile provider Globe Telecom in the Philippines offers the GCASH m-banking service. GCASH allows a mobile phone to be

used as a mobile wallet to send money to — and receive money from — other GCASH users. Retail agents conducting cash-in and cash-out functions are required to register with the Central Bank of the Philippines and to send personnel for training on anti-money laundering practices. While the bank handles the mobile banking and supervises the telecommunication companies, these companies are solely responsible for their agents.

#### “M-PESA” in Kenya

Perhaps the most successful non-bank m-banking service is M-PESA, a mobile money transfer service launched in Kenya on a pilot basis in October 2005 by Safaricom and Vodafone, and commercially launched in March 2007. The M-PESA stored value accounts are carefully structured so as not to constitute a “banking activity” under the Kenyan Banking Act. To address liability

concerns, Safaricom — in consultation with the Central Bank of Kenya (CBK) — invests an amount equal to M-PESA’s net deposits in commercial banks in order to ensure the safety of customer deposits.

M-PESA targets unbanked pre-paid mobile phone subscribers. Following a simple registration process to establish an M-PESA account, a customer can deposit, transfer and withdraw cash at any of Safaricom’s many distribution agents. Only Safaricom customers can register for M-PESA, but recipients of transfers do not need to have an M-PESA account or be a Safaricom subscriber.

CBK saw the number of formal bank accounts in the country increase by nearly 150 per cent between the end of 2005 and the end of 2008. CBK attributes much of this increase to formerly unbanked consumers gaining familiarity with banking concepts

Non-bank model variations				
	MNO as bearer	MNO as application	MNO/Bank joint venture	MNO as bank
Churn reduction	No reduction in churn as any MNO can offer the service	Reduction in churn	Definite reduction in churn	Definite reduction in churn
Regulatory and licence constraints	No impact	Low impact PCI compliance	Banks typically facilitate regulatory compliance	High regulatory and licence requirements
Brand	Not used	Not used	MNO brand	MNO brand
Banking system	None required	Financial switching only	Some required	High infrastructure requirement
Distribution chain for cash handling	Not used	Not used	MNO and bank	MNO only
Transactional risk	None	Some	Half of the risk	All of the risk
Cost Revenue	Marginal Low	Some cost Good	High cost High	Very high costs High



through Safaricom's M-PESA service. In terms of revenues, for the year ending March 2010, commissions from M-PESA accounted for 9 per cent of revenues or some USD 94.26 million (around KSH 7.56 billion).

## Regulatory aspects

M-PESA is exceptional in terms of not requiring a licence to provide its services. Since M-PESA was an early entrant into the m-banking business, it was able (arguably) to take advantage of more openness and flexibility from the regulatory framework. In many other jurisdictions, m-banking services are subject to licensing requirements. In the Philippines and Bangladesh, non-bank companies offering m-banking services must be licensed by the central banks of those countries.

Under Bangladeshi regulations, payment service agents are licensed to operate settlements between participants, the principal participant being a bank that maintains adequate cash reserves in an account with Bangladesh Bank. The payment service provider must also have an account with Bangladesh Bank that meets cash reserve requirements. The Bank undertakes corrective and remedial measures to protect against any violation of the licensing terms and conditions. It has the power to suspend or revoke the licence, impose fines and order compensation.

Responsibility for anti-fraud measures may fall under the jurisdiction of law enforcement agencies, the financial sector regulator or the telecommunications regulator, or some combination of those agencies. Ultimately, fraud prevention is the responsibility of the m-banking service provider, regardless of the m-banking model employed. An example of a telecommunications regulator with significant responsibility for preventing electronic forgery and fraud is the Communications Commission of Kenya.

## Telecommunication regulators

According to the GSM Association (GSMA), as of July 2011, there were 122 live deployments of m-banking systems. As m-banking grows, telecommunication regulators will need to determine what changes — if any — are needed to existing regulations. Because of the involvement of mobile service providers in the transmission and storage of funds, m-banking services increase the responsibility of telecommunication regulators to ensure the security of the communications infrastructure.

Telecommunication regulators may be responsible for overseeing or facilitating emerging m-banking services. Other areas of responsibility may include customer protection, interoperability, accounting requirements, universal service obligations, tariff regulation, and SIM registration. But does the telecommunication regulator bear responsibility for ensuring the safety and accessibility of e-money?

Telecommunications, financial, and competition regulators have sometimes overlapping issues to address, while m-banking providers must navigate the regulatory requirements from all three regulators to ensure that their services comply with all relevant laws and regulations.

Telecommunication regulators need to work with financial regulators to understand which types of m-banking systems are permitted under current telecommunications and financial regulations. For example, the Pakistan Telecommunications Authority is working with the State Bank of Pakistan to develop revised guidelines on how the bank-based model operates in Pakistan.

Competition regulators are also likely to be involved in two key areas of m-banking: the acceptable boundaries of cooperation in payment infrastructure; and the risks of anti-competitive "lock in" of a particular service.



### Interoperability

The lack of interoperability agreements between providers of m-banking services leads to the unfortunate practice, as found for example in Kenya, where consumers transfer money between m-banking services by visiting an agent to cash out the desired amount of money from the first service, then carrying cash to an agent of the second service to cash in. As m-banking services continue to expand, the issue of interoperability — or the ability to transfer e-money from one m-banking service to another — will become important.

Financial and telecommunication sector regulators could encourage interoperability of m-banking systems, but need to weigh the benefits of that approach against the risk of stifling innovation and investment.

Meanwhile, the mobile telecommunications industry and financial service providers have taken steps to facilitate interoperability without a regulatory mandate. The GSMA, for example, has established a global mobile money transfer (MMT) initiative

to address interoperability, messaging and financial transfers through an international, multilateral “hub”. In this networked approach, each operator connected to a multilateral hub is able to send a remittance to any mobile phone user in the world on any other participating network.

### International remittances

Remittances sent via m-banking services can reach recipients who may have limited or no access to the formal channels for money transfer. However, in the absence of greater interoperability, there are relatively few options for sending international remittances to a user’s m-banking account. Some m-banking operators, such as Globe and SMART in the Philippines and M-PESA in Kenya, have entered into arrangements with Western Union to provide a channel for remittances. The service allows senders in selected countries to use Western Union’s agents to send money directly to the m-banking accounts of mobile subscribers. ■



## Intellectual property rights in today's digital economy

■ The rapid growth of the digital economy, enabled by broadband penetration, and coupled with increases in computing power and storage, creates global markets for content and rights holders. But it also creates a threat that — without adequate controls — piracy will damage the creative industries. The discussion paper on which this article is based, “Intellectual property rights in today's digital economy”, therefore focuses in particular on the ways that the growing digital economy is impinging on copyright.

### Creativity versus piracy

Intellectual property rights provide the foundation upon which innovation is shared, creativity encouraged and consumer trust reinforced. But the digital world poses a new challenge — how to manage the balance when the consumer is the creator, when the marginal cost of copying is zero, when enforcement of existing law is extremely difficult, and when “free” access to information and content is considered by many to be a right.

Estimates by Frontier Economics for the International Chambers of Commerce suggest that digital piracy accounted for about USD 75 billion in 2008, and project that it will reach USD 215 billion by 2015. Music piracy is at the forefront of this activity, but peer-to-peer networks, coupled with higher broadband speeds, are

\* The GSR discussion paper on “Intellectual Property Rights in today's digital economy”, on which this article is based, was written by A. Denton, Senior Telecommunications Expert.



increasingly being used to share television programmes and films.

Lost Series 5 was the most pirated show in 2010, with over 2 million downloads in the first week and reports of over 100 000 people sharing a single "torrent" (metadata file for peer-to-peer sharing). Within 20 minutes of the broadcast of the final episode of Lost, a subtitled version in Portuguese reportedly appeared on a pirate website.

Endemic copyright infringement facilitated by broadband infrastructure is increasingly drawing the telecommunications and Internet communities into the debate on intellectual property rights. The film, music, publishing and television industries are putting pressure on Internet carriers and service providers to play a more active role in addressing both commercial copyright infringement and infringement by consumers.

Telecommunication regulators are increasingly being looked to as the authority to implement rules that protect copyright, while at the same time protecting consumer interests and encouraging investment and service innovation within the digital economy.

## Patents

In the technology sector some companies have evolved business models that are entirely based on inventing new technologies, patenting the invention and then licensing the rights without ever manufacturing goods. Qualcomm, which has a market capitalization of USD 96 billion, has a business model successfully founded on creating and licensing intellectual property rights. The company's valuation is the result of an estimated USD 12 billion investment in research and development since its foundation in 1985. The value of patents was

also recently demonstrated when Google placed a USD 900 million bid for Nortel's portfolio of 6000 patents, only to lose to a USD 4.5 billion bid by a consortium including Apple, RIM, Ericsson, Sony and Microsoft.

The protective power of patents can be abused. In commenting on its bid for the Nortel patents, Google stated, "The patent system should reward those who create the most useful innovations for society, not those who stake bogus claims or file dubious lawsuits". This concern about patent "trolls" is widespread. Commenting on the United States 2009 Patent Reform Act, the Coalition for Patent Fairness (whose partners include Apple, Google, Cisco, Verizon, Dell, Intel and SAP) stated that reform is needed to protect "inventors and innovators from unjustified lawsuits and to allow them to continue to make products and services that will help the US economy grow". In May 2011, Microsoft became a member of a crowdsourcing service designed to challenge and invalidate specious software patents and to avoid litigation costs.

The rapid growth in the volume of patent applications is creating patent "thickets". These occur where interrelated and overlapping patents result in a lack of clarity of who owns the patent and, as a consequence, where to go for the licence. The technology sector has become increasingly litigious, which becomes a problem when it stifles innovation or acts as a barrier to new market entrants.

ITU's Telecommunication Standardization Sector (ITU-T), in conjunction with the International Organization for Standardization (ISO) and the International Electrotechnical Commission (IEC), have been active in developing common patent policies. These policies have been designed to ensure that

patents used in technology standards encourage patent holders to share their intellectual property, in the knowledge that their interests are protected.

## Copyright — A closer look

Illegal copying and distribution of copyright materials has had a hugely disruptive effect on a range of copyright industries, including music, film, television, publishing, games and software.

Digital technologies, the companies that exploit them, and the business models they facilitate are all potentially affected by copyright. So too is the vast amount of user-generated content.

### Social networking sites and user-generated content

Social networking sites are widely used for publishing and sharing user-generated content. The opportunity for users to post copyrighted material — whether inadvertently or intentionally — is significant. For example, there are now 750 million Facebook users, one billion tweets are sent per week via Twitter, more than 48 hours of video are uploaded every minute on YouTube, Flickr hosts more than 5 billion images, and in July 2011 the Apple App store announced that 15 billion applications had been downloaded since the opening of the store in 2008.

Under pressure from the creative industries, Google implemented a number of policies in December 2010 to help dissuade people from searching for illegal copyright material. MySpace has introduced a “take down stay down” service that not only removes improperly posted video or audio content, but also marks it with a digital “fingerprint”. This prevents the user from simply reposting the content under a different user name. YouTube operates a similar content identification system, which not only filters content, but also offers rights holders the opportunity to monetize their content.

## Music

Commercial music piracy (generating income from unlicensed sales) and private copying of music are responsible for much of the copyright infringement. The International Federation of the Phonographic Industry estimated the number of files illegally shared at more than 40 billion in 2008, a piracy rate of about 95 per cent. Drawing on industry figures for retail pricing and the volume of illegal downloads, Frontier Economics has estimated the commercial value of all recorded music digital piracy at between USD 17 and 40 billion in 2008, representing a commercial loss to the industry of between USD 3.5 and 8 billion annually.

## Film

The commercial success of legal online film services such as Netflix, LOVEFILM, the Internet Movie Database, iTunes and Blinkbox reflects the technological viability of delivering film over the Internet. It also tempts pirates. In July 2010, the United States government shut down nine websites offering free access to films. The sites, some providing access to films just hours after their official cinema release, had nearly 7 million subscribers each month and — like many illegal music sites — made money from advertising revenue and donations. In May 2011, it was reported that Voltage Pictures was suing 24 583 BitTorrent users, mainly in the United States, for illegally downloading “The Hurt Locker”. The Korean Film Council estimates that 50 per cent of households in the Republic of Korea have illegally downloaded films, representing a loss to the industry, particularly the DVD market, of perhaps USD 1 billion.

## Television and broadcast industries

A study by Screen Digest for the World Intellectual Property Organization highlighted four forms of “unauthorized access to broadcast signals”: physical piracy; hardware-based unauthorized access; unauthorized



re-broadcasting; and extra-territorial television access. In Asia and the Arab States, unauthorized rebroadcasting is a big problem.

Commercial streaming of “live” sports events by pirated sites is an area of increasing concern for the industry, as it technically becomes more feasible for the pirates. They can now effectively transmit in real time, using unicast (one-to-one) or peer-to-peer transmission — they have the ability to compete directly with the rights holder. For consumers, it can be difficult to differentiate between legitimate and illegal services.

### Publishing

The development of e-readers offers a new distribution channel for books and other published materials but opens up the possibility of widespread sharing of copyright material. The impact of piracy seems to be less severe than in other media. Nigel Newton, founder and chief executive of publisher Bloomsbury, recently said “We should reflect on how lucky we are that we are winning this war and that the public accept they should pay something for e-books.” However, from January to June 2011, the Publishers Association noted

copyright infringement online of 31 000 titles on more than 80 000 web pages.

### Software

The software industry suffers from both physical and digital piracy. The Business Software Alliance issued 7.5 million take down notices to peer-to-peer and BitTorrent sites in 2009 in regard to the distribution of illegal software online, and suggests that piracy accounts for approximately 40 per cent of the global market. In some countries, most of the software used is sourced illegally. Under-licensing (where companies buy a limited user licence and then install the product on many personal computers or servers), counterfeiting and digital piracy are all challenges for the industry.

### Games

Games and entertainment software have been reasonably resilient to piracy, mainly because of the technical difficulty of “hacking” games consoles. The games industry has developed business models that are resistant to piracy, for example through monthly subscriptions and value-added services for games.







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## Open access regulation in the digital economy\*

■ *This article highlights the importance of open access regulation in the digital economy and discusses the key issues to be addressed by regulators, especially in developing countries. Different regulatory approaches are illustrated looking at the different layers of the Open Systems Interconnection (OSI) model, including Australia's public funding of its new national broadband network, Mozambique's infrastructure-sharing regulations, Singapore's structural and operational separation, and the steps being taken in a number of African countries to ensure open access to international submarine cables.*

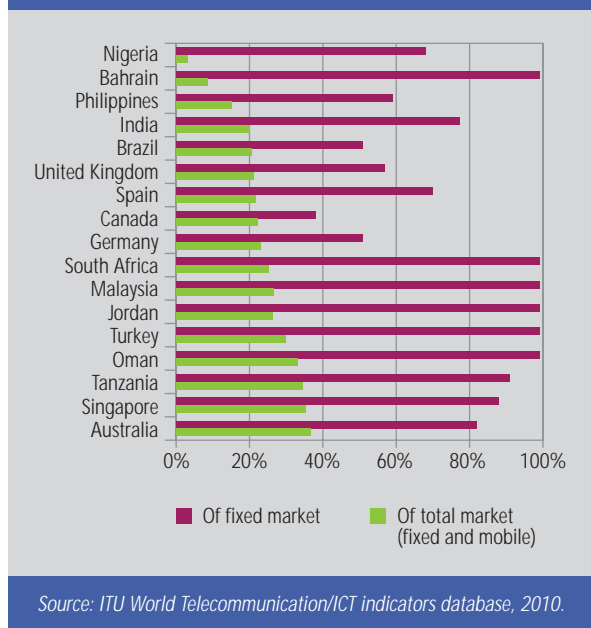
### What is open access?

Open access is "the possibility for third parties to use an existing network infrastructure", according to the Best Practice Guidelines for Enabling Open Access, adopted by the 2010 Global Symposium for Regulators. Other definitions exist, each implying a different extent of openness. But there seems to be agreement that open access applies to infrastructure, and means that all suppliers are able to obtain access to network facilities on equal terms. The regulatory model and the conditions of access will vary, but open access is paramount if the new digital economy is not to fall back into monopoly.

In many countries, public ownership of telecommunication networks was instituted specifically to enable the large-scale investment in networks needed to provide affordable, ubiquitous telecommunication services. The market liberalization of the past 15–20 years has been achieved by facilitating open access to incumbents' networks while encouraging the parallel growth of mobile networks. So successful has this strategy been that the former monopolies — now largely privatized — have lost more

\* The GSR discussion paper on open access regulation in the digital economy, on which this article is based, was written by M. Rogerson, Director, Incyte Consulting Ltd.

Figure 1 — Market share by revenue of fixed network incumbent by country



than half their market share in many countries and have seen traffic growth diverted to mobile and other platforms. The picture is similar in the developed and developing world (see Figure 1).

Legacy networks cannot keep pace with the growth of bandwidth-hungry applications. Huge investment is needed. The benefits of competition are evident, but some new regulatory thinking is now required for a successful transition to the digital economy.

A number of countries (Australia, Qatar, Malaysia and Singapore, among others) have embarked on the creation of entirely new national broadband networks, deploying fibre-optic technology throughout the core network and, crucially, in the access networks that reach out to the end users. Investments in these networks are huge (Australia's network, for example, is costing USD 45 billion) and this has led some countries to

re-nationalize infrastructure so as to benefit from economies of scale and preferential borrowing rates.

Other countries (for example in Europe) are trying to find ways to improve investment incentives for network operators, while maintaining competitive supply. This involves removing some of the regulatory layers that have built up around dominant operators (operators with significant market power) to support or reward the development of ubiquitous broadband networks.

Developing countries such as Tanzania and Mozambique lack not only the public funds for full national broadband networks, but also fixed-network infrastructure. These countries are therefore pursuing hybrid solutions, which typically involve public investment (generally low-interest and loan-funded) in a fibre-backbone network, coupled with various forms of support and encouragement for privately funded access networks using a range of technologies.

## Infrastructure-sharing regulations in Mozambique

Regulated open access is often limited in scope to passive infrastructure (ducts, poles, towers, exchanges and so on). The infrastructure-sharing regulations in Mozambique provide a typical example.

In December 2010, the regulatory authority in Mozambique published infrastructure-sharing rules that require all network operators to provide open access to passive infrastructure. The basic requirement is to publish a reference sharing offer and then negotiate individual sharing agreements with requesting licensees. There are also stipulations concerning capacity and quality of service, to ensure equal treatment for all operators. Pricing is to be fair and reasonable, and based on defined costing principles. Existing operators are required to take into account the needs of new entrants, for example by building capacity.





## Open access is critical for national broadband networks

Open access is essential in the case of publicly funded national broadband networks, and generally required wherever there is the likelihood of economic bottlenecks preventing competitive supply. However, if the regulations offer sufficient incentive to encourage infrastructure investment, and if open access exists at the lower layers of the Open Systems Interconnection (OSI) model, as shown in Figure 2, then the importance of requiring open access decreases moving up the layers.

Recent work on open access in the European Union has focused on the need to ensure fair and transparent access to broadband network infrastructure. The European Regulators Group (BEREC) has observed the use of the term open access in the context of “facilitating broadband roll-out, particularly in relation to the roll-out of next-generation access (NGA) networks” and “in relation to the provision of additional current-generation broadband services in under-served areas”.

There is an emerging regulatory consensus that there should be open access to national broadband infrastructure. Even in highly developed markets, the scale and scope of investment required for broadband networks tends to create a dominant provider. Fibre access pipes represent an essential utility, and

— except in densely populated areas — duplicating that infrastructure is neither commercially nor economically viable.

A monopoly on infrastructure, particularly in rural areas and developing countries, seems sensible. Regulatory action for broadband networks should therefore focus on ensuring access on fair, reasonable and non-discriminatory terms, rather than on encouraging infrastructure competition.

## Open access needs investment incentives

Open access is especially important where broadband and next-generation access roll-out is supported by public funding. In such circumstances, mandated open access can promote network investment, prevent the uneconomic duplication of facilities, and strengthen competition.

Under European State Aid rules, the provision of public funding to broadband infrastructure projects is dependent on a commitment to open access. The related guidelines consider open access to mean effective, transparent and non-discriminatory wholesale access to the subsidized network. In addition to open access obligations, the conditions for receiving aid include detailed mapping of private infrastructure, open tender processes, technological neutrality and claw-back mechanisms. These

Table 1 — Regulatory efforts towards infrastructure sharing

Question	Answer	Africa	Arab States	Asia–Pacific	CIS*	Europe	The Americas	Total
Is infrastructure sharing mandated?	Yes	18	12	8	1	24	17	80
	No	13	2	14	5	11	13	58
Is co-location/site sharing mandated?	Yes	14	12	9	2	26	20	83
	No	14	2	11	2	5	9	43
Region size		43	21	38	12	43	35	192

\*Commonwealth of Independent States

Source: ITU World Telecommunications Regulatory Datatbase ([www.itu.int/icteye](http://www.itu.int/icteye)).

safeguards aim to promote competition and avoid crowding out private investment, while fostering the wide and rapid roll-out of broadband networks.

Infrastructure sharing can be the basis for the competitive supply of services, provided that rival service providers all enjoy the same terms and conditions of access. Substantial regulatory effort is now being made to mandate open access to passive infrastructure as shown in the table.

## Open access is not always the right regulatory tool

If private capital cannot provide all the required investment, then investors (including the State) need support, and this has to be balanced against the desire for open access. In contrast, where a competitive market develops, the only regulatory interventions that are required concern competition, for example, to prevent anti-competitive mergers or acquisitions, or to prevent collusion. Between these two extremes, the need for regulatory intervention requires analysis and judgement.

Broadband service delivery constitutes a complex value chain, and competition may be facilitated at higher levels by a single provider being subjected to open access arrangements at

lower levels. Regulators ought therefore to start their analysis at the lowest network layer, implement open access remedies as required, and then work up the layers, taking account of the likely impact of the remedies introduced in the lower layers.

## Policy and regulatory tools

Open access is most effective in layer 1 of the model presented in Figure 2. Regulatory requirements at this layer can obviate the need for open access regulation at higher layers.

Many of the policy and regulatory tools for open access have already been deployed, and a range of regulatory remedies is available to curb anti-competitive practices. This is typified by the EU regulatory framework, which has been copied and modified in many other countries. In increasing order of severity, the remedies consist of:

- ▶ transparency, including the provision of a reference offer;
- ▶ non-discrimination, requiring the use of equivalent conditions in equivalent circumstances;
- ▶ obligations to provide access, specifically applied to unbundled facilities including the local loop, and the requirement to offer co-location;

- ▶ price controls, which may include limits to cost recovery based on specific costing methods;
- ▶ cost accounting obligations, including the requirement for external audit and the annual submission of separated accounts.

Such remedies support open access and facilitate service competition. This is especially important in developing countries, where low demand and limited supply options heighten the need for open access. Infrastructure-sharing regulations in Mozambique provide an example of effective regulation based on these remedies.

## Adapting policy and regulatory tools for the digital era

The major difficulty facing rival suppliers of retail broadband services is access to the customer. The standard regulatory response covers unbundled local loops and bit-stream access,

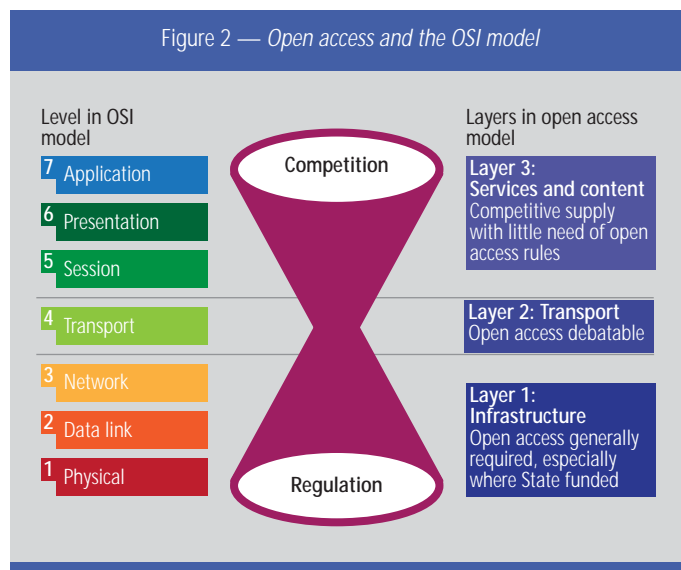
coupled with backhaul facilities from the local exchange to the operator's point of presence.

Regulatory economists talk of a "ladder of investment" that service suppliers seeking access to customers ascend one rung at a time. Suppliers first take bit-stream plus backhaul. Then they build their own backbone infrastructure, so they no longer require the backhaul service. Then they deploy their own cables to the local exchange where, using co-location, they provide their own electronics, and they purchase just the unbundled local loop. They may even become wholesale providers, thereby improving their network usage levels and overall return on investment.

This is all well and good, but the regulatory arrangements may favour asymmetric digital subscriber line (ADSL) to the extent that it creates a barrier to moving on to fibre. This is especially true of unbundled local loops, where the point of co-location is often located within the boundaries of the copper network. The dominant operator's ability to upgrade to next-generation access technology may be restricted, or the rival operator may be obliged to roll out more infrastructure in order to retain its exist-

ing customer base. Some regulators (for example in Hong Kong, China) are withdrawing from unbundled local loops for precisely this reason.

Open access may discourage private investment. It is therefore no surprise that some governments make their own investments (for example in New Zealand and Australia) or provide soft loans to a generally compliant private sector (for example in the Republic of Korea and Japan). Developing countries cannot afford such approaches, so they need to establish greater investment incentives and rewards through the pricing arrangements associated with open access.





## ■ Tanzania

### Regulatory measures for future technologies

Bowing to economic reality, regulators may have to accept monopoly as a way of providing open access to passive infrastructure, although they can cut a fairer deal on pricing, to reflect the real cost of investing in infrastructure — one such arrangement exists in Tanzania. There should be a time-limit on the open access agreement, and designated review points along the way that allow the regulator to change the terms if necessary.

#### Managing the National ICT Broadband Backbone in Tanzania

With loans from the Chinese Government, Tanzania embarked, in 2009, on creating a USD 200 million National ICT Broadband Backbone. This involves rolling out 7000 km of national fibre backbone in four rings — north, south and west, plus metropolitan Dar es Salaam. The backbone provides a fibre-optic network, which is being managed and operated to provide high-speed broadband capability throughout the country at affordable prices. The national backbone also connects with the international submarine cables (SEACOM and EASSy) in Dar es Salaam, and provides land connectivity to Tanzania's neighbours.

The national fixed-network incumbent, TTCL, manages the backbone on an open access basis. All service providers have the right to use this capacity and all (including TTCL) are supplied on the same basis. TTCL retains a management fee, which is determined on the basis of the utility-level cost of capital and a government-determined cost-recovery period. Transparency in the management and operation of the backbone is assured by:

- ▶ accounting separation — the accounts for backbone operation revenues, expenses and capital costs kept separately from the accounts for TTCL's other business operations;
- ▶ independent audit of backbone operation accounts;
- ▶ publication of backbone operation accounts and of the auditor's certificate;
- ▶ equal access, under the same terms and conditions of use, for all backbone wholesale customers, including TTCL;
- ▶ preparation of a backbone reference offer from TTCL setting out the terms and conditions for access and use of the backbone facility and services, applicable to all wholesale customers;
- ▶ publication of the arrangements and processes to ensure the commercial confidentiality of backbone customer information and transactions.



## ■ Singapore

### National broadband network in Singapore

Singapore provides an example of extensive government activity and funding to develop next generation access networks, with the ultimate aim of providing high-speed broadband for all. A significant degree of separation is needed between industry participants to ensure that downstream operators have effective open access to the infrastructure. After extensive consultation, this separation has taken the form shown in the chart.

The supply structure is based on:

- ▶ operational separation between retail service providers and OpCo (wholesaler);
- ▶ structural separation between OpCo and NetCo (fibre network);
- ▶ structural separation between underlying infrastructure ownership (AssetCo) and management of the fibre network (NetCo).

At the core of the structure, NetCo (owned by a consortium comprising SingTel, AXIA, SPH and SPT) is responsible for the design, building and management of passive infrastructure. In order to make available the promised speed of 100 Mbit/s to 1 Gbit/s, NetCo has to roll out a new fibre-optic network to all Singapore households, using the existing passive infrastructure owned by AssetCo.

OpCo (totally owned by StarHub, but operationally separated from StarHub's other activities) is responsible for the management of active equipment. OpCo provides wholesale network services to retail service providers, which in turn provide service to retail customers.

To achieve its broadband vision, the government has funded 28 per cent of the investment in OpCo and 36 per cent of the investment in NetCo. The balance — more than USD 1.4 billion — will come from the private sector. The tender process for both

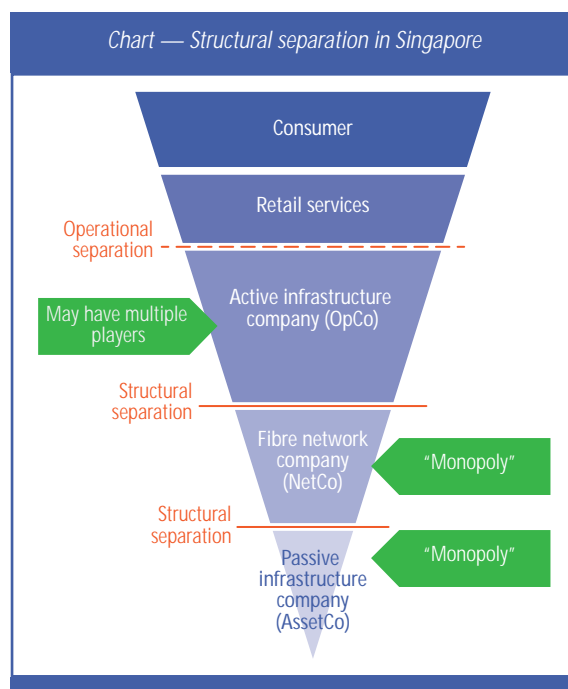
NetCo and OpCo included a funding requirement as part of the selection criteria.

Singapore has opted for structural and ownership separation to ensure non-discriminatory access to essential passive infrastructure facilities. The Singaporean regulator appears to have concluded that providing the passive infrastructure needed for the roll-out of high speed broadband access is not prospectively competitive and could create a bottleneck in the market. By separating ownership of these facilities from all market players (including SingTel), the approach removes the downside of vertical integration, though it is not clear at what operational cost to SingTel this was achieved.

As a small and affluent island State, Singapore is not a template for providing services to rural areas. Nevertheless, New

Zealand has recently opted for structural separation, and there is no reason why the approach should not work elsewhere.

The Singapore case raises some interesting points. One is that, even in an affluent city State where operational circumstances (high proportion of multi-dwelling blocks) are favourable, significant government funding is needed. This suggests that government funding may be needed in most countries. Another point is that the market may be satisfied with current speeds or unwilling to pay a premium for a faster service. This poses a significant market risk to both government and private investors. Also, if AssetCo is entrenched as a long-term monopoly, this may jeopardize efficiency, customer orientation and innovation.



## ■ The ACE project

### Open access to Africa Coast to Europe (ACE) submarine cable

ACE is a submarine cable system for West Africa, with landing stations in 20 countries stretching from France to South Africa. In each of these countries a terminal party is established to operate the cable landing facility, and to own and maintain the cable segments within the national territory. The terminal party comprises

one or more landing parties, each of which makes a designated minimum investment in the ACE landing point for that country. This investment depends on the number of investors and ranges between USD 25 million and 50 million. Generally, a special purpose vehicle (SPV) has been established to act as the terminal





party, and investment in the SPV may come from a number of sources, including operators, governments and international development agencies. For example, the SPV in Sao Tome and Principe is a limited company jointly owned by the government and the incumbent operator, and into which the government channels funds for the ACE project which originate from the International Bank for Reconstruction and Development.

SPVs have privileged access to international capacity, and sometimes an effective monopoly — especially where there is no other international access via undersea cable, and where satellite access is both expensive and limited in capacity. This gives the SPV significant market power, with the potential to act independently of rivals and contrary to consumer interests. National authorities therefore need to regulate SPVs (the West African Telecommunications Regulatory Authority has published guidelines for this purpose).

In Liberia, the regulator has recently commissioned a project to:

- ▶ identify the market for the international capacity provided by ACE;
- ▶ determine whether the Cable Consortium of Liberia (the terminal party for ACE) has significant power in this market;

- ▶ introduce regulations to ensure open access to the facilities of the Cable Consortium of Liberia and hence to the ACE cable, in a manner that both adequately rewards investors and ensures effective competition in international services.

This approach follows the EU regulatory framework and is an example of how regulators in developing countries can adapt best practice regulation from elsewhere to fit their circumstances.

One of the challenges faced by the Liberian Telecommunications Authority, and other regulators in similar positions, is to gauge future demand for the new facility. Identifying total cost is relatively straightforward: capital expenditure — depreciated over the 20-year lifetime of the cable — plus a return on investment and operating expenditure. To set prices, however, the total cost must be divided by some measure of demand. The difficulty is that demand is unpredictable, and may grow rapidly. Prices based on short-term forecasts will be too high and may stunt future growth of demand. Prices based on longer-term forecasts will initially be below cost, and the SPV's investment will not be recovered if the forecasts prove over-optimistic. Appropriate arrangements are therefore likely to involve a price cap, with an annual review that allows for any under- or over-recovery of investment to be carried forward and influence the following year's prices.



## Colombia

### *Computadores para Educar* "A road to knowledge"\*

In Colombia, the *Computadores para Educar* programme is reducing social divides and improving educational quality in the country by incorporating information and communication technologies (ICT) into basic and intermediate public education. This social programme, set up by the Ministry of Information and Communication Technologies and the Ministry of Education, was evaluated in a study conducted by *Universidad de los Andes* in 2010. The results are clear: ICT have a positive impact on educational quality and academic achievement. Provided that teachers are properly trained, students are more likely to move ahead to higher education, and social disparities will be reduced.

The Ministry of Information and Communication Technologies' *Plan Vive Digital* for the expansion of broadband technology is now taking up the challenge of increasing the reach and magnitude of *Computadores para Educar*. "Since *Computadores para Educar* reached our school, there have been some remarkable changes: the children are happy to come into the classroom and the teacher finds it easy to transmit knowledge", says Héctor José López Quintero, a teacher.

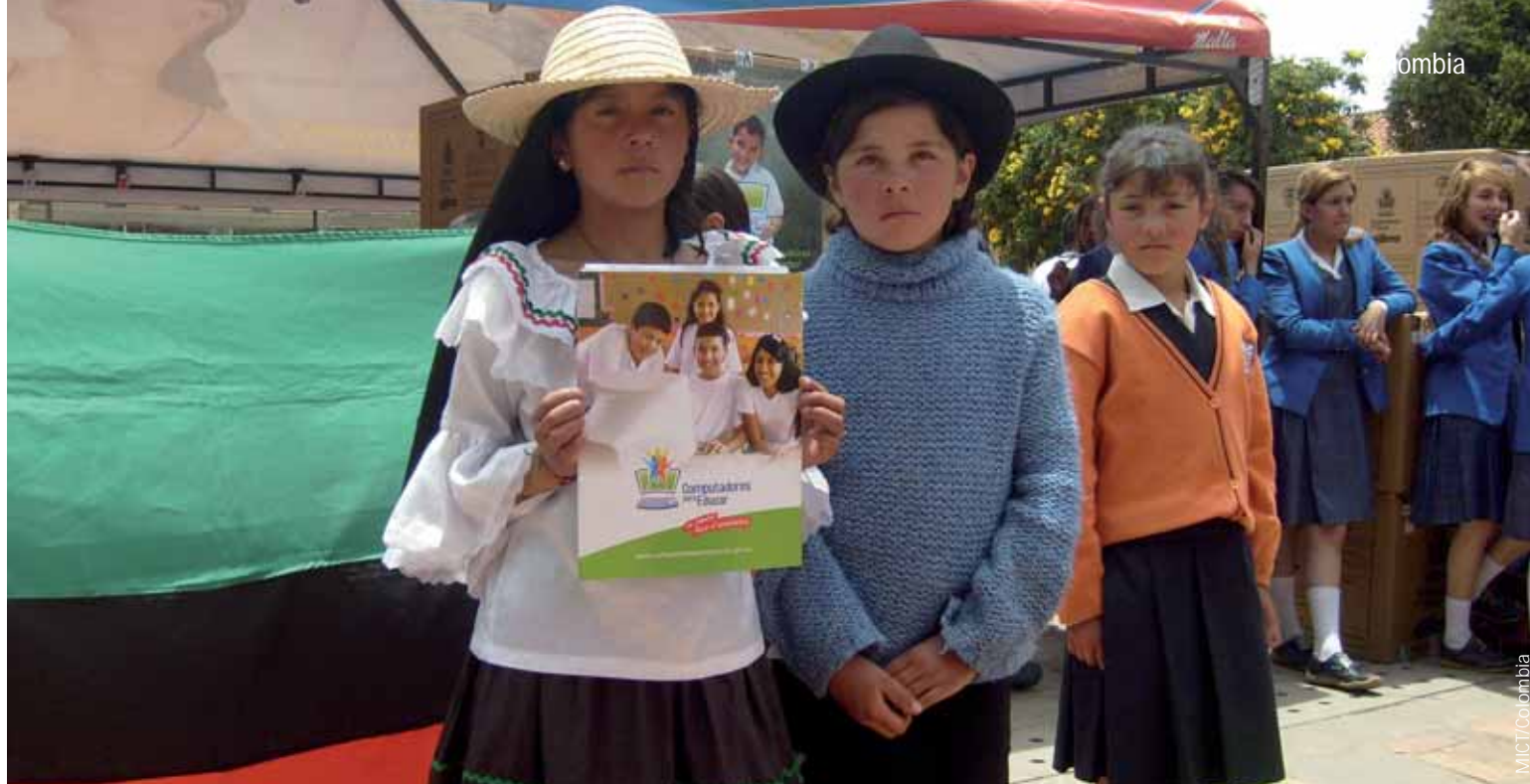
#### ICT and education

Over the past ten years, the *Computadores para Educar* programme has found ways to adjust its management model in the field, not only to make the programme more efficient and to improve the cost-benefit ratio, but also to make it more inclusive and sustainable for the community. This has also brought environmental and economic benefits, for example through the reconditioning and maintenance of old computers, and the efficient management of electronic waste.

From 2000 to 2010, *Computadores para Educar* provided 291 261 computers to 20 673 public schools (more than 53 per cent of all schools in Colombia), offering ICT access to almost 6 million children (65 per cent of children enrolled in the public system). Educational training was provided in 11 135 schools, enhancing the competence of 43 986 teachers (15 per cent of the total number of teachers in the country). A total of 78 327 computers were reconditioned, avoiding the disposal of more than 4000 tons of electronic waste.

The total social investment made by *Computadores para Educar* to groups in need in Colombia amounts to some USD 172 million over ten years. This investment has generated a social return of 2.4 times that amount.

\* This article is adapted from "WSIS success stories 2011", published by ITU in May 2011.



## Eliminating social exclusion

*Plan Vive Digital* aims to eliminate social exclusion in Colombia by guaranteeing access to ICT to the entire population of the educational sector by 2014. The plan seeks to provide connectivity, together with capacity for use, so that learning environments are enriched. It also seeks new forms of access to knowledge, and contributes to knowledge production. *Plan Vive Digital* will benefit not only public educational institutions, but also cultural centres and public libraries across the country.

## Protecting the environment

*Plan Vive Digital*, through *Computadores para Educar*, offers a model for the integral management of electronic waste, complementing its strategy for re-conditioning and assembling computers. Thousands of tons of outdated computers and terminals have been saved from inappropriate forms of open-air disposal or discharge into landfills, which would have had serious environmental consequences because of the hazardous waste they contain.

## Maintenance and support

When the computers are delivered to their recipients, they come with a one-year guarantee. *Computadores para Educar* offers a preventive and corrective maintenance service to prolong the useful life of the equipment and to guarantee the sustainability of educational processes initiated with the introduction of ICT. The idea is to generate a culture of use and care of computers.

But it is not enough just to deliver educational tools to schools. An entire process of training and support is needed to ensure that the tools are used effectively. Strategies are needed to incorporate ICT in the most effective way into the educational processes of each individual establishment.

## Technology reinforces traditional teachers

The integration of computers into pedagogical processes promotes collaborative learning, creativity, new ideas, and the personal and professional growth of students and teachers alike. This has a positive impact on the development and productivity of communities.





Children make robots with waste materials

But simply providing access to ICT does not guarantee a real improvement in educational quality. Therefore, more than six years ago, *Computadores para Educar* started to train teachers and managers in order to improve not only their technological competences, but also their basic skills. In particular, the scheme supports the teaching of natural sciences, mathematics and social sciences. “There are the dynamics and personal relationships, because we have made the ICT room a space for coexistence and for the development of values”, says Héctor José López Quintero.

The training of teachers in the use of new technologies is what turns the teacher into a dynamic agent, able to develop creative and innovative qualities among students by using technological tools. In fact, technology reinforces the valuable work of traditional teaching.

The scheme also promotes community development. Producing useful products creates wealth for the population living around the schools that benefit from *Computadores para Educar*.

## Measuring success

According to research published in 2010 by the Centre for Studies on Economic Development of *Universidad de los Andes*, *Computadores para Educar* has a positive and measurable impact on students in schools. Students from disadvantaged groups are less likely to drop out, more likely to achieve better academic results, more likely to move ahead to higher education, and can expect higher levels of income when they move into employment.

The research suggests that the use of ICT in education reduces the gaps in knowledge between rural and urban pupils, and between boys and girls. It benefits the poorest students and those with parents who have the lowest level of education. There is evidence that the educational use of ICT increases the possibility of access to higher education among the poorest groups.

Educational policy can be a decisive factor in inclusion and social mobility. In particular, the use of ICT in education, along with appropriate support and training, has the potential to reduce social and regional disparities.





Electronic waste materials are recovered and used as raw materials

MICT/Colombia

## Facing the challenge of full coverage

The *Computadores para Educar* programme is ready to be rolled out to every public school in Colombia. But there are two major reasons why this cannot happen immediately.

First, there are more than 11 500 schools, covering almost 1 million children, in the most vulnerable regions of Colombia. One difficulty is that the children in these schools have never had the opportunity to see or touch a computer. An even greater difficulty is that 89 per cent of these schools have only 20 students, and 70 per cent do not even have electricity.

Second, there is the more general problem that 60 per cent of the teachers in public schools do not know how best to take advantage of ICT as an educational tool. Thus, there is a need to increase the coverage of pedagogical training in ICT.

Research done by *Universidad de los Andes* has confirmed that the use of ICT in education, coupled

with the support and training strategy developed by *Computadores para Educar*, will have a positive and quantifiable effect in reducing social and regional disparities by contributing to improvements in educational quality, reductions in drop-out rates and increasing the probability that young people in public schools will be admitted to higher education.

The challenge in Colombia over the next four years is to roll out the *Computadores para Educar* programmes to 100 per cent of the 43 000 public schools. In effect, the challenge is to reach the 11 500 schools where students have never had access to ICT, and to provide technological training to all teachers who deal with digital competences. The impact of ICT in Colombia will increase by a significant order of magnitude if the benefits of the *Computadores para Educar* ICT programme can be extended to all the schools in the country. ■

# The HIPCAR project

## Harmonization of ICT policies and legislation across the Caribbean

■ *The HIPCAR project — “Enhancing Competitiveness in the Caribbean through the Harmonization of ICT Policies, Legislation and Regulatory Procedures” — is one of three regional projects under a broader global initiative being implemented by ITU in partnership with the European Commission. HIPCAR is a USD 3 million project, funded by the European Commission at 95 per cent, with ITU as the executing agency and the Caribbean Telecommunication Union as the project advisor.*

### Why HIPCAR?

Launched during a multi-stakeholder meeting in Grenada in December 2008, the HIPCAR project responds to requests from the Caribbean Community (CARICOM) and individual Caribbean countries to ITU and the European Commission for assistance in harmonizing their policies, legislation, regulatory processes and procedures in information and communication technologies (ICT) in order to create an enabling environment that promotes competition and fosters investment and socio-economic development in the region. Prime Minister Kamla Persad-Bissessar of Trinidad and Tobago recognizes that HIPCAR “seeks to fill a significant policy gap within CARICOM by initiating dialogue on the many areas of ICT policy.”

Most Caribbean countries have enacted telecommunication laws, established telecommunication regulatory bodies, and dismantled monopolies. However, few have a fully liberalized telecommunication market, and the level of liberalization differs across the region. The HIPCAR project is designed to assist these countries in improving their competitiveness by harmonizing approaches to ICT policy, legislation and regulation, taking account of these differences and of best practice in the region and around the world. As Minister of State Darcy Boyce from the Ministry of Finance, Telecommunications and Energy of Barbados stresses, “our legislation and our policy must be geared towards improving the competitiveness of our countries”, adding that competitiveness using ICT must be placed very high on national agendas.

The HIPCAR project targets 15 beneficiary countries: Antigua and Barbuda, the Bahamas, Barbados, Belize, Dominica, the Dominican Republic, Grenada, Guyana, Haiti, Jamaica, Saint Kitts and Nevis, Saint Lucia, Saint Vincent and the Grenadines, Suriname, and Trinidad and Tobago.

HIPCAR is an integral part of the region’s efforts to develop the Caribbean Single Market and Economy through progressive liberalization of its ICT services sector. The project supports the CARICOM Connectivity Agenda and the region’s commitments to the World Summit on the Information Society, the World Trade Organization’s General Agreement on Trade in Services and the Millennium Development Goals. It also relates directly to promoting competitiveness and enhanced access to services in the context of treaty commitments such as the CARIFORUM States’ Economic Partnership Agreement with the European Union.



## Priorities

At the launch of HIPCAR, stakeholders comprising participants from the beneficiary countries, regional organizations, associations of operators, services providers and the private sector agreed on nine priorities, categorized under two main work areas as follows:

- ▶ **ICT policy and legislative framework on information society issues:** electronic commerce (transactions), electronic commerce (evidence), privacy and data protection, interception of communications, cybercrime, and access to public information (freedom of information).
- ▶ **ICT policy and legislative framework on telecommunications:** universal service and access, interconnection and access, and licensing.

Stakeholders also agreed to establish a Steering Committee with an overall monitoring and advisory role for the project. The Committee is chaired by the Caribbean Telecommunications Union (CTU), and its members include: ITU; representatives of the CARICOM Secretariat; the Eastern Caribbean Telecommunications Authority (ECTEL); the Caribbean Association of National Telecommunication Organisations (CANTO); and the Caribbean ICT Virtual Community (CIVIC).

## Implementation

During HIPCAR's first phase (2009–2010), teams of regional and international experts assessed existing legislation of beneficiary countries as compared to international best practice, in the context of harmonization across the region. These teams worked closely with Caribbean multi-stakeholder working groups and developed model legislation and model ICT policy guidelines in all nine priority areas listed above.

The model policies and legislative texts represent international and regional best practice. They use language and terminology that are broad in scope and flexible enough to allow for adjustments according to a country's needs.

The working groups ensured broad stakeholder input and relevance to each country. Members of these groups were designated by Caribbean governments and included: specialists from ICT agencies, justice and legal affairs and other public sector bodies; national regulators; and country ICT focal points. Operators, academia, regional and civil society organizations participated as well. This broad base of public-sector participation representing different sectors allowed for a cross-section of views and interests.

To review and adopt by broad consensus the assessments carried out in the 15 beneficiary countries, as well as the model policy and legislative texts\*, five regional workshops were held: Trinidad and Tobago (October 2009); Saint Lucia (March 2010); Suriname (April 2010); Saint Kitts and Nevis (July 2010); and Barbados (August 2010). In addition, a cost modelling workshop was organized in collaboration with the ITU Centre of Excellence Nodes of the University of West Indies in Kingston, Jamaica (October 2010).

In November 2010, the model policy guidelines and model legislative texts were presented to the 13th General Conference of Ministers of the Caribbean Telecommunications Union, held in Trinidad and Tobago, to the 5th CARICOM Regional ICT Steering Committee meeting, held in Barbados, and in May 2011 to the CARICOM Secretariat's 36th Special Meeting of the Council for Trade and Economic Development (COTED) — Information and Communication Technologies, held in Grenada.

At its 5th meeting in Barbados in June 2011, the HIPCAR Steering Committee agreed to officially request the CARICOM Secretariat to bring the project's outcomes to the attention of the Heads of Government and the Regional Legal Committee. This is an important step enabling the new model guidelines to be incorporated at CARICOM level and into national legislation and regulatory frameworks as and when they are revised and updated.

## National transposition

Now in its second phase of implementation (since the beginning of 2011), HIPCAR is offering technical cooperation assistance to countries to help them transpose the regional model policy guidelines and model legislative texts into national legislative

frameworks. So far, the following nine HIPCAR beneficiary countries have requested direct in-country assistance: Barbados, Dominican Republic, Grenada, Jamaica, Saint Kitts and Nevis, Saint Lucia, Saint Vincent and the Grenadines, Suriname, and Trinidad and Tobago, with more countries having expressed interest in assistance.

Countries throughout the Caribbean are at different stages of legislative development. The HIPCAR model texts therefore need to be customized in each case, and the transposition process adapted to local circumstances. Harmonization nevertheless remains an essential goal of this process.

In order to address the limited human and technical resources throughout the region, capacity building is also an essential part of the HIPCAR project. Consultation and training workshops are designed to allow broad-based multi-stakeholder involvement at country level. The training aims at raising awareness of the updated legal framework in order to foster an understanding of the roles and responsibilities of those involved in implementing the legislation.

To date, consultations and capacity building workshops have been conducted in four countries — and more are planned. So far, information society topics covered in the second phase of HIPCAR include e-commerce (transactions) in Trinidad and Tobago, and e-commerce (evidence), interception of communications and cybercrime both in Barbados and in Saint Kitts and Nevis.

Assistance to Saint Lucia has covered interception of communications, access to public information (freedom of information), and telecommunication matters related to universal access and service, interconnection and access, and licensing. Chief Public Utilities Officer in the Ministry of Communications and Works, Barrymore Felicien, explains "We are trying to work into our legislation the modern practices taking place so that we in Saint Lucia would be better prepared to face the technological challenges facing us."

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\* *The Model Policy Guidelines and Legislative Texts are available on the ITU's HIPCAR website at [http://www.itu.int/ITU-D/projects/ITU\\_EC\\_ACP/hipcar/](http://www.itu.int/ITU-D/projects/ITU_EC_ACP/hipcar/)*



## HIPCAR as part of a global initiative

HIPCAR is just one of three regional projects under a broader global initiative to address policy and regulatory challenges facing the African, Caribbean and Pacific (ACP) group of countries, with the goal of creating an enabling environment for greater investment in ICT infrastructure and ICT-enabled applications. The other two are: "Support for Harmonization of ICT Policies in sub-Saharan Africa" (HIPSSA); and "Capacity Building and ICT Policy, Regulatory and Legislative Frameworks Support for Pacific Island Countries" (ICB4PAC).

In December 2007, ITU and the European Commission agreed to implement jointly this large-scale global initiative known as "Support for the Establishment of Harmonized Policies for the ICT

Market in the ACP", while building human and institutional capacity in the field of policy and regulation in these three regions.

The global initiative also seeks to develop trans-regional synergies in order to promote shared solutions and best practices. To avoid duplication and to increase efficiency, past and current initiatives undertaken by other organizations, such as the European Commission, United Nations agencies and the World Bank, are as far as possible taken into account.

The global initiative has a time-frame from January 2008 to September 2013, and operates with a budget of EUR 8 million funded by the European Commission, plus a complement of USD 500 000 provided by ITU.





*From left to right: Luiz Novaes, Partner with Advisia; Brahim Sanou, Director of ITU's Telecommunication Development Bureau; and Ambassador Ronaldo Sardenberg, President of ANATEL, after signing the contract*

## A snapshot of ITU's assistance to the Americas

Contributed by the ITU Regional Office for the Americas and the Caribbean

### ■ Brazil's ANATEL to develop cost modelling for telecommunication services through a consortium

The Brazilian government takes the view that the rates and prices for interconnection and availability of elements of the telecommunication network should be set on the basis of a long-run cost model. Thus, at the request of the Brazilian Regulatory Agency, *Agência Nacional de Telecomunicações (ANATEL)*, ITU's Telecommunication Development Bureau (BDT) managed a tender process which ended with the selection of a consortium of consulting companies to support ANATEL in the development of cost-modelling for telecommunication services.

On 25 August 2011, BDT Director, Brahim Sanou, was in Brasilia for the signing of a USD 8.22 million contract with the winning company Advisia Management Consulting, which will implement this project in consortium with Analysys Mason and Grant Thornton. Mr Sanou underlined the importance of the work that will be undertaken under the terms of the contract for ANATEL, for the Brazilian market and for Brazil's users of information and communication technologies. "ITU is proud to be

part of this important mission, and of the trust that Brazil has placed in our work," he said.

The consortium will undertake a study to provide ANATEL with the knowledge, models, applications and software needed to determine the cost-based values, as well as benchmark rates, for the interconnection of mobile services; operation of leased lines; and interconnection of fixed services.

Also present at the signing ceremony were: the President of ANATEL, Ronaldo Sardenberg; the Executive Superintendent of ANATEL, Simone Scholze; Partner with Advisia, Luiz Novaes;

and the new Director of ITU's Americas Regional Office, Hector Huerta.

Advisia has two years to complete the work. The contract will be managed and monitored by the ITU Regional Office for Americas and the Caribbean in close coordination with ITU Procurement and BDT's Regulatory and Market Environment Division, which will provide support in the form of ITU cost-modelling specialists. The ITU Information Service Department will also provide support through a specialist in information and technology. ■

## ■ Capacity-building activities through the Centre of Excellence for the Americas region

Initially a regional mechanism for knowledge sharing and a network for capacity building, the Centre of Excellence for the Americas region has consolidated its diversified portfolio and critical mass of training programmes. By the end 2010, it had achieved self-sustainability both in terms of relevance to the ICT sector in the region and from a financial point of view.

In a new project (number 9RLA11009), which started in April 2011 and is expected to end in December 2012, the Centre of

Excellence and its nodes are offering online training, carried out through the ITU Academy. From April to July 2011, the Centre of Excellence delivered online courses in the areas of: negotiation strategies on the telecommunications sector; opportunities and advantages of the new technologies; and e-business. The Centre of Excellence also held the fourth Congress on ICT and Telecommunication, a face-to-face event which attracted 134 participants. ■

## ■ Support to the telecommunications regulatory authority in Peru

ITU has provided assistance to the regulatory authority of Peru, *Organismo Supervisor de Inversión Privada en Telecomunicaciones* (OSIPTEL), under a revised project signed in 2011. In addition, ITU delivered a presentation during a major conference organized by OSIPTEL within the scope of the celebration of the World Telecommunication and Information Society Day, under the theme "Better life in rural communities with information and communication technologies".

The original project (number 9-PER/04/026) was signed by OSIPTEL and ITU in 2004, and mainly aimed at contributing to the professional updating of the staff of OSIPTEL through capacity-building activities organized by international organizations,

along with assisting in the organization and implementation of courses in the field of telecommunications. The project was also expected to promote OSIPTEL's participation in the main relevant international telecommunication events, and to cooperate in the organization of national and international events in the fields of regulation of telecommunication services and market development in a competitive environment.

Because of changes in the Peruvian authorities, and the different priorities set by the regulatory authority, OSIPTEL decided to establish new priorities and implement the project. Following the successful conference, other activities are being discussed. ■

## ■ Training Brazilian telecommunication professionals

In another technical cooperation project, ITU's Telecommunication Development Bureau recently assisted the Brazilian Regulatory Agency (ANATEL) to train some of its staff, as well as staff from the Ministry of Communications and other public institutions.

The training was based on an Advanced Special Programme developed and delivered by the National Institute of Telecommunications (INATEL) in close coordination and under the supervision of ITU. The programme focused on: a historical

perspective of the telecommunications sector in Brazil and in the world; topics relevant to telecommunication regulation; and economic management of telecommunication services, including the protection of consumer rights.

The programme was designed to train 200 students, of which 190 were staff members of ANATEL. Course modules were completed by 196 students and the programme was implemented successfully. ■



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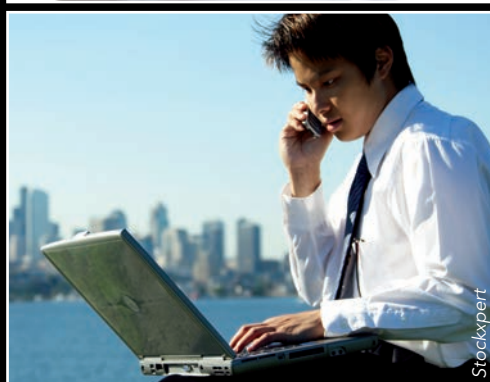
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