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STUDY GROUP I

4th STUDY PERIOD (2006-2010)

QUESTION 7-2/1:

*Regulatory policies
on universal access
to broadband services*



THE STUDY GROUPS OF ITU-D

In accordance with Resolution 2 (Doha, 2006), WTDC-06 maintained two study groups and determined the Questions to be studied by them. The working procedures to be followed by the study groups are defined in Resolution 1 (Doha, 2006) adopted by WTDC-06. For the period 2006-2010, Study Group 1 was entrusted with the study of nine Questions in the field of telecommunication development strategies and policies. Study Group 2 was entrusted with the study of ten Questions in the field of development and management of telecommunication services and networks and ICT applications.

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DISCLAIMER

This report has been prepared by many experts from different administrations and companies. The mention of specific companies or products does not imply any endorsement or recommendation by ITU.

ACKNOWLEDGMENTS

This document is the result of the combined efforts of the distinguished representatives of those countries that made known their interest in ITU-D Study Group 1 Question 7. In order to allow us to gather the information required for its preparation, representatives for the most part spontaneously contributed their experiences regarding broadband in their respective countries.

On behalf of the Rapporteur's Group on regulatory policies on universal access to broadband services, we therefore sincerely thank all those who contributed in any way.

Nor could the work have been completed without the considerable input of the experts and staff of the International Telecommunication Union.

We should like to present our sincere thanks to:

- Ms Audrey Loridan-Baudrier, Chairman of Study Group 1
- Ms Alessandra Pileri, ITU-D study group coordinator
- Ms Youlia Lozanova, BDT focal point for Question 7-2/1.

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QUESTION 7-2/1

Study of the Question

Regulating broadband and all the services it encompasses is a key issue for many regulatory administrations.

As broadband is one of the latest of the new communications technologies, and in view of the importance which most nations attach to ICTs, it is important to be in a position to implement regulatory mechanisms for its accessibility.

This report sets out practices in regard to regulatory policies for universal access to broadband services followed in the countries that have participated in the work of Question 7-2/1. After analysing good practices, the rapporteur group will develop guidelines.

Objectives of the Question

Under its mandate, the rapporteur group decided to work in close collaboration with its members in order to carry out an in-depth analysis, based on the experiences of countries in the group and on all other available resources, within ITU or elsewhere.

The objective is for the rapporteur group, within the ITU-D study period 2006-2010, to:

- identify regulatory policies for broadband technologies and services, summarizing the experience acquired by telecom regulators in implementing universal access to broadband services in their countries;
- highlight the specific universal access aspects with regard to management of access and interconnection agreements and methods of financing universal access;
- pinpoint aspects relating to best practices for identifying sources of funding and devising innovative financing mechanisms in order to accelerate the development of universal access/service in rural communities;
- identify aspects to maintain technological neutrality principles in incorporating broadband access services in the universal service package;
- develop ways and means and solutions for promoting universal access/service in respect of broadband services.

Methods used

The rapporteur group, taking as reference certain reports already published by the International Telecommunication Union, engaged in direct exchanges in the course of the working sessions organized between 2006 and 2008.

In addition, it subsequently based its work on electronic exchanges following up on the country contributions in respect of Question 7-2/1.

Those exchanges consisted in presenting and analysing each country's experiences with regard to regulatory policies on universal access to broadband services.

Several participants contributed to our work. As well as contributions from Member States, direct inputs were provided by operators.

In total, 15 countries actively contributed with their experiences to the work of the group.

Relevant working documents

In the work of the Rapporteur's Group for Question 7-2/1, distinguished representatives of countries provided overviews of broadband regulation in their respective countries. The contributions in question were deemed to be relevant, and have served as a basis for this report.

Abbreviations

ITU:	International Telecommunication Union
ARPTC:	<i>Autorité de Régulation de la Poste et des Télécommunications</i> of the Democratic Republic of the Congo
ATCI:	<i>Autorité des Télécommunications de Côte d'Ivoire</i>
BDT:	Telecommunication Development Bureau
GSM:	Global System for Mobile communication
ADSL:	Asymmetric digital subscriber line
3G:	Third-generation mobile service
Wi-Fi:	Wireless fidelity
WiMAX:	Wireless technology for the provision of fixed wireless communications over a wide range (50 km) at 70 Mbit/s. Can be used as an Internet backbone connection for rural areas.
RLL:	Radio local loop
UMTS:	Universal mobile telecommunications system
IMT-2000:	International Mobile Telecommunications-2000

1 Background

Unlike e-mail, which is a traditional, low bit-rate activity, the exchange of high-capacity data and images, videoconferencing, high-speed downloading and all the other applications now possible with broadband have come to constitute a right for all humanity, presenting countries with the challenge of providing their remote communities with broadband connectivity.

Such connectivity only becomes a realistic prospect, however, when nations set themselves clear objectives with regard to universal access as a means of allowing their communities to enter the knowledge society.

An affordable regulatory framework is required that gives operators an incentive to invest in broadband infrastructure in isolated areas.

Today, the world is addressing connectivity using far more advanced media, producing a quality of service capable of creating an information superhighway for everyone.

This technological development requires just as much political commitment as it does a commitment on the part of all stakeholders in the sector, so that the regulatory framework set up is beneficial for everyone.

We regard this statement as a major, positive point of departure.

Situations differ, with some countries already well advanced in broadband and others still striving to follow suit in their efforts, no matter how small, to cover broadband in their legislation.

Yet both situations offer us an insight into what it really means to establish such legislation, allowing us to then identify its impact on human development in the isolated areas concerned.

Under Question 7-2/1, the rapporteur group will focus on the experiences of countries, in particular with regard to "regulatory policies on universal access to broadband services", analysing them in order to produce a synthesis of the methods introduced by regulators to regulate universal access to broadband services in their respective countries, focusing, *inter alia*, on the following:

- management of interconnection agreements and methods of financing universal access;
- technological neutrality;
- best practices for identifying sources of financing and devising innovative financing mechanisms in order to accelerate the development of universal service and access in rural communities;
- ways and means to promote access to broadband services.

1.1 Definition of broadband and broadband services

Within the meaning of this report, broadband refers to a range of digital, packet-switched network technologies that allow the transport of digital bits at high speeds.

These technologies are both wireless and wireline, and they include both upgrades to existing networks (for example, xDSL or 2.5G networks) and entirely new infrastructure (such as all-fibre networks, WLANs and 3G systems). Generally, networks with bandwidth capacities of 256 kbit/s or more can be termed "broadband", although that threshold may well shift higher as new technologies push the envelope on throughput¹.

Broadband technologies hold promise for all countries seeking to provide access to ICTs and establish the information society.

Broadband offers a wide array of services and its use depends on the user. Online advertising, customer-provider or teacher-student exchanges in real time and videoconference business discussions are just some of the services that broadband offers in business relations.

Any government eager to see its administrative transactions processed quickly can, to a large extent, make documents and forms easily accessible online to those it administers in any town or village of the country.

The same applies to farmers seeking, from their villages, to contact customers for their harvests or seeking information on national or regional market rates for seeds.

This technology has the potential to provide everyone with access, bring down financial costs, reduce the time it takes to process government administrative files, enable people to make tax declarations without having to travel to do so, and provide incentive for investment in a given sector on account of the facilities it offers.

The broadband services referred to above are not an exhaustive list, but, just as so many other examples could, they provide a good illustration of how broadband, when supported by the appropriate kind of regulations we see in other countries, can become a lever for human development.

Reflection on regulatory policies on universal access to broadband services was thus entrusted by WTDC-06 to the team of the Rapporteur for Question 7-2/1; the team was to conduct an analysis so as to be able to identify the regulatory best practices for promoting broadband for populations in remote areas.

1.2 Statement of the situation²

The dynamic development in the field of new information and communication technologies (ICTs) tends to give us the impression – given the possibilities they offer – that we have achieved the objective as far as telecommunications are concerned.

When we analyse the situation of neighbouring communities, however, we can but note that there are blank areas where universal access to broadband services remains a myth. Yet technologies today offer us the means to provide remote areas with the coverage required for high-capacity, high-speed information exchange.

¹ ITU: Trends in telecommunication reform, 2006 – Regulating in the broadband world, page 127.

² The statement of the situation should highlight the lack of broadband infrastructure and the inaccessibility of broadband services, when they exist, for isolated populations; it should show the negative impact this implies with regard to access to the global information society, without overlooking the barrier that this state of affairs represents for development.

The contributions received make it clear that there can be no broadband services without certain prerequisites, such as the infrastructure required for transporting data in real time.

Each country, however, according to its means, uses the infrastructure best suited to it to serve its remote areas.

The country contributions reproduced in the paragraphs below will provide the reader with a general inventory of the broadband status.

Many publications present statistical data for broadband Internet and GSM signal coverage in given countries. This only shows, however, that these tools exist, and does not necessarily mean that there is coverage in terms of universal access.

The situation undeniably varies from one country to the next, but it is equally important to note that infrastructure only really comes into its own when founded on a regulatory policy geared to the various different aspects of universal access and service. Without such a policy, it will be hard for universal access to thrive.

The contributions submitted by the distinguished delegates of the Member States show that a policy constitutes a roadmap to guide decision-makers in adhering to their general plan for realizing the objectives of serving remote areas.

Today, broadband is becoming a high-performance tool in telecommunications with the potential to foster intellectual development through the range of services it offers populations. It opens up the most remote communities and constitutes a decisive turning point for countries that have made major investment in broadband infrastructure, in that it allows their populations to enter the information society.

Entry into the knowledge society is possible only if the Internet is made generally available in countries in all areas of activity of national life.

The objective of this report is to study the main lines of the regulatory policies to be implemented, in order to promote universal access to broadband services in countries.

Founded on the experiences of the countries that contributed to the Question, the report is based on the testimonies and written contributions submitted by the country representatives. The list of Member States belonging to the Rapporteur's Group on Question 7-2/1 is annexed to this report.

2 Inventory of infrastructures, policies and projects under way

2.1 Broadband networks and technologies

In order to benefit from broadband services, countries must satisfy several conditions, including the acquisition of a broadband backbone or other infrastructure that will allow the population to benefit from broadband services.

Analysis of the contributions submitted by Member States shows clearly that most developing countries face difficulties in deploying certain broadband equipment, owing to the high cost of the operation. Governments are nevertheless endeavouring to provide a good service in some parts of their territory.

It may therefore be said, in the light of the contributions submitted by Member States, that the question of infrastructure deserves particular attention. Its importance also depends on the priority that each country gives to making this technology available to the population as a whole, and in particular to isolated communities.

We may note, for example, that countries that have decided first to connect their schools and universities often employ means that differ from those employed by countries endeavouring to cover localities much further apart, as acquisition and deployment costs are generally estimated to be high (cost of operating and maintaining equipment, lack of security of equipment, especially in the rural areas of underdeveloped countries, high labour costs, etc.).

In principle, this is a matter to be decided at the highest level of decision-making, as it requires the mobilization of considerable funding.

Case studies

- **Republic of Mali**

In Mali, for example, broadband infrastructure has been identified as a driver of development. Decisions in connection with its deployment have been taken within a context of full sector liberalization, recognizing that NICT remains a motor for opening up isolated areas and for industrial and human development.

In his national strategy, the President, Mr Alpha O. Konaré, within the framework of the Bamako 2000 International Forum, expressed his desire to see the people of Mali trained in ICT, with the primary objective of preparing the population to use the tool in all areas of national life³.

Law 99-043 of 30 September 1990 governing the telecommunication sector established the main lines of the sector's reform. The law reflects the government's political commitment to withdrawing the State from the production sectors subject to competition.

- **Oman**

In Oman, broadband is generally supported by the e-Oman programme with the sole objective of transforming the country by means of a knowledge-based economy and the adoption of ICT tools nationwide.

Broadband services are made available using DSL, ADSL and Wi-Fi technologies, along with other third-generation technologies which the government intends to deploy in rural areas.

2.1.1 National backbone networks

The national Internet backbone is defined as the high-speed, high-capacity lines or series of connections that form a major pathway and carry aggregated traffic within the Internet⁴.

Several contributions indicated the existence of a national backbone with an interconnected system of networks, but other countries employ a mesh-type network wherein each operator has its own point of entry and exit.

2.1.2 Networks/technologies for broadband services access (networks using copper wire, optical fibre, broadband wireless access (BWA)).

As indicated above, the infrastructure model deployed for each country depends on the country's objectives in regard to promoting universal access and serving remote areas.

Case studies

- **Democratic Republic of the Congo**

The inventory shows us that the infrastructure is based on a GSM radio link which presently covers only the main urban and business centres⁵.

In order to promote broadband in rural communities, the country is focusing its efforts first on a satellite link, to be followed by an optical fibre connection (planned).

With no public operator capable of providing universal service or of covering the entire country with a wireline network, the private GSM operators employing broadband technology are obliged to comply with the interconnection and infrastructure-sharing directives issued by the regulatory authority ARPTC, the aim being to allow all subscribers to benefit from the basic service offers.

As to the future, the country, through the ministry and regulatory authority, is preparing itself to pursue deployment of the broadband transmission infrastructure over the national territory in order to facilitate:

- e-government

³ Contribution by Mali, Geneva, 18 July 2008, Document 1/096.

⁴ Hank Intven and McCarthy Tétrault. Telecommunications Regulation Handbook, Appendix C.

⁵ Contribution by ARPTC, Dem. Rep. of the Congo, Geneva, 8-12 September 2009, Document 1/165.

- e-commerce
- e-learning
- e-health, including the connection of main provincial towns with localities and their administrations
- SNEL (*Société Nationale d'Electricité*) optical fibre project
- EASSy submarine cable
- Comtel project, initiated by Comesa, for a regional link
- CAB RCIP project initiated by the World Bank for a regional link
- Muanda-Kinshasa optical fibre connection project
- SAT3/WASC Telkom project
- Project for satellite broadband coverage using Intelsat
- WAFS and ADFC.

The Democratic Republic of the Congo intends to implement these projects by 2011.

As regulatory supervision is fundamental within the context of deploying a broadband infrastructure, a workshop was organized in Kinshasa in early 2008 under the auspices of the World Bank in order to harmonize the legal framework and regulatory regime. A fair number of recommendations were adopted at the workshop.

- **Côte d'Ivoire**

In Côte d'Ivoire, the government has decided to introduce a common network for all operators. This will comprise telecommunication equipment allowing the deployment of a national backbone usable by all fixed and mobile operators. The backbone will link the departments with rural localities.

The backbone will mean:

- infrastructure sharing between fixed and mobile operators⁶;
- dimensioned to encourage providers to offer the best services in rural areas;
- installation of broadband access networks over the entire country;
- an increase in the tax basis for operators paying into the National Telecommunication Fund, given the diversity of broadband services.

- **Madagascar**

In Madagascar, wireless technology is used more extensively, and its introduction has been funded by the operators themselves.

The sharing of existing infrastructure by operators constitutes one of the measures adopted to tackle the considerable expense of deploying the backbone linking the country's two main towns⁷.

- **Brazil**

In Brazil, the main technologies used to provide broadband access are xDSL (digital subscriber line) and cable modems. Nevertheless, mobile technologies such as 3G systems or GSM systems are used to serve remote areas.

The country has also established a regulatory framework designed to encourage investment in the ICT sector.

The Brazilian regulator is pursuing two main policies for the provision of universal access. The first is deployment of a broadband infrastructure. Established local operators have agreed to connect all the countries' municipalities, primarily using optical fibre. The second is to provide free Internet access to schools in urban areas. Established local operators have to connect over 56 000 educational establishments by 2010.

⁶ Contribution by ATCI, Côte d'Ivoire, Geneva, 8-12 September 2008, Document 1/157.

⁷ Contribution by Madagascar's regulator, OMERT, Geneva, 8-12 September 2008, Document 1/183.

Brazil now intends to cover all remote areas that still have no radio signal, based on the new 3G licences which have just been awarded to the highest bidders. In order to satisfy every Brazilian's right to access to broadband, the regulator ANATEL intends to twin business hubs with less appealing areas.

- **Portugal**

Portugal's experience with universal access to broadband met with the overall approval of participants in the meeting. We might even say that Portugal's contribution represents a model to be followed with regard to regulation and methods implemented to promote broadband services in countries wishing to serve their isolated areas.

Portugal's point of departure was a strategic roadmap along with a schedule. The operation allowed the country to serve several remote areas by linking them up with other institutions within Portugal.

The main objectives set in the programme focused essentially on the following goals:

- provide widespread access to the information and knowledge society;
- reduce the digital divide;
- promote access to broadband Internet.

In order to ensure that the programme is effective, the above objectives will be supported in their operational phases by other, secondary, adjustment programmes under the direct supervision of the Prime Minister.

These will comprise:

1 Cyberopportunity programme

This programme will consist in:

- connecting workers in the professional sector supporting the programme;
- connecting secondary school students with their teachers so as to ensure unbroken tuition even at home;
- providing mobile broadband access by 2011 to 500 000 people for a unit charge of EUR 50 per computer.

The same programme foresees that over 90 per cent of teachers and 50 per cent of students will be brought up to a certified level of competence in ICT.

2 Connecting Portugal

This stage foresees the mobilization of resources in the field of ICT.

The following measures are being taken to this end:

- facilitate the purchase of computers by families with students (in this regard, the representative of Portugal further informed us that his country had decided to grant a 50 per cent reduction between 1 December 2005 and 31 December 2008 on all purchases of a personal computer, software and any other computer equipment);
- sell computers with an Internet connection at a price of between EUR 200 and 250 net of tax.

The above is complemented by:

- Internet connection in all public schools;
- an increase in broadband in universities, polytechnics and research institutes;
- "b-on": libraries online;
- e-U Project: wireless virtual campus for higher education.

During the period under consideration, the number of higher education establishments with a wireless network rose considerably, from 8 to 57 per cent, to which may be added the 57 universities with Wi-Fi coverage.

The same programme foresees the connection of all establishments (around 300 000 students) to broadband by the end of September 2008. Already 85 per cent are connected.

This connectivity has made it possible to create roaming between different establishments, which have now also created a virtual campus.

Over the coming years, the same government programme designed to make broadband Internet widely available in Portugal also foresees:

- an improvement in the quality of services;
- an increase in hospital information on Internet sites;
- an improvement in the accessibility of services online.

These approaches have allowed Portugal to extend not only Internet services but also telecommunications to areas not hitherto covered. Portugal now numbers among those countries that have enabled their inhabitants to enter the information society regardless of where they may live.

- **Serbia**

Serbia elected to draw up an inventory of its broadband infrastructure at national level before undertaking any action.

Accordingly, having noted just how old its infrastructure is, Serbia has drawn up a strategic development plan that incorporates broadband. This priority plan will be operational in the period 2006-2010.

The strategic plan will be complemented by regulations that take account of research conducted by the University of Belgrade.

The regions and municipalities constitute the operational areas in which the university will be involved.

Following the research, a coverage solution should be produced as a basis for serving remote areas.

Document 1/164 presents the range of approaches envisaged. Further details may be obtained from the distinguished delegate of Serbia at the following e-mail address: n.gospic@sf.bg.ac.yu.

- **India**

Indian farmers can use broadband connectivity in their communities in order to obtain information on the market situation in the main towns and thus proceed with the offer of their products.

India has committed itself to making broadband widely available so as to provide its entire population with access to broadband services.

Since 2002, when India commenced its programme to make broadband widely available to its citizens in their everyday lives, over 3 million Indians have subscribed to broadband services, with 60 per cent using ADSL technology⁸.

- **Republic of Korea**

In the Republic of Korea, the government has established a regulatory framework conducive to making high-speed Internet widely available.

The Korean legislator deemed that there can be no development without knowledge and utilization of computer tools, and has therefore enshrined the basic strategies in law.

As of 1989, the government decided to place obligations on portable computer vendors by requiring them to halve their prices, but in spite of this some families remained unable to purchase a portable computer.

The government therefore decided to develop a further strategy:

1 Method for making Internet widely available in Korea⁹

This method consisted in the 1990s in establishing an Internet extension plan over the national territory, in collaboration with all sector players, including Internet access providers, equipment vendors and software

⁸ Contribution by India, Geneva, 9 September 2008.

⁹ Contribution by the Republic of Korea, Geneva, 8 September 2008.

development companies, and in supporting the Korean Information Infrastructure (KII) project over the four-year period from 1999 to 2002.

For its part, the regulator took steps to ensure competition within the sector and promote local loop unbundling so as to allow market entry by any operator wishing to invest in the Internet segment.

During the same period, the government prepared legislation creating a climate conducive to investment in broadband.

2 *Cyber Korea 21*

This method consisted in connecting schools, promoting competition in industry and achieving widespread electronic handling of the documents of Korean administrations. These initiatives were crowned with unprecedented success in the history of the Internet in Korea, making the country a strong telecommunication and Internet market.

Regulation in Korea

Still within the framework of initiatives to make Internet widely available within the country, the Korean government maintained strong collaboration with players in the telecommunication sector, and notably with Internet access providers and equipment vendors. The purpose of this was to maintain the interoperability of decisions taken by the central government and the success of projects implemented to achieve the widespread use of Internet within the country.

It having been noted that during the period from 1997 to 2000 the price of a PC was still too high, regulations were developed to bring prices down so as to make the connectivity of communities feasible.

As part of this campaign, the government requested the manufacture of 380 000 portable computers with Internet connection in 2000; the results of the campaign were as follows:

Computer penetration in Korea

No.	Year	Rate
1	1998	44.5%
2	2000	66%
3	2002	79%

Source: Document 1/201.

Taking account of rural communities when ensuring the widespread availability of the Internet

In its programme to make the Internet widely available, the Korean government has not overlooked isolated areas.

The government introduced methods to reduce the digital divide between towns and isolated communities. Since peasants are among those dwelling in isolated areas, exercising agricultural or fishing activities, a website was set up to provide information on the commercial aspects of the sale of agricultural and fishing products.

These operations were backed up by a law to make ADSL (broadband Internet) widely available in the rural community, encouraging the use of computers, with a view to developing e-commerce in this domain.

The results of the programme were as follows:

- in 2001: 20 villages selected
- in 2002: over 70 villages selected
- in 2002: over 104 agricultural villages connected to the Internet.

With a growth exceeding 100 per cent per annum, this operation was an unprecedented success for Korea, adding to that of the establishment of community access centres.

After 2003, further regulations were introduced for rural communities with the following objectives:

- creation of a website;
- increase in ADSL infrastructures;
- increase in the number of community access centres;
- increased distribution of portable computers to peasants.

All these operations come under the budgetary management and supervision of the local entities reporting to the central administration, which in turn evaluates the results.

• **China**

China is one of the countries with the greatest number of telecommunication service subscribers, particularly for fixed and mobile telephony.

The efforts made by the Chinese government are also reflected in its commitment to developing universal service with regard to the Internet.

There is nevertheless an imbalance between penetration in urban areas compared with rural communities. The Chinese government has therefore taken steps to deploy infrastructure in rural communities. With the added support of Internet access providers, China has set itself the objective, with its project "Internet Access to Every Village" by 2020, of providing full coverage over its entire territory.

This programme will make it possible to reduce the disparity between the eastern and western extremities of the Republic of China and improve the low rate of utilization of computer tools.

The government has actively improved its policies on universal access. Over the past years, it has developed long-term mechanisms to gather universal service funds.

We should welcome the efforts furnished by the Chinese operators, in particular China Telecom and Netcom, which have brought enormous resources to bear in promoting broadband over the national territory.

• **Cameroon**

Cameroon has seized the opportunity offered by the Chad-Cameroon pipeline to equip the national territory with an optical fibre network.

Today, this project is driving several national initiatives, in particular:

- the national backbone project, for the roll-out of a broadband infrastructure based on IP/MPLS technology. This project aims to reduce connection costs, improve national access and introduce the Cameroonian people to the information society.

Other projects are in the study phase, such as the Central Africa Backbone (CAB), to be financed by the World Bank.

2.2 Regulatory policies and practices¹⁰ for universal access to broadband services

2.2.1 Broadband infrastructure deployment policies

Strategies for introducing broadband services vary from one country to the next. In this report, we shall look specifically at situations in countries which have already established an NICT strategy.

¹⁰ The practices are referred to here are those found in the inventory, it being assumed that practices may exist outside the scope of well-defined policies.

2.2.1.1 Incentives to investment in broadband access and infrastructure for rural areas or underprivileged populations

The development of universal access to broadband services depends to a large extent on the policy developed for the purpose, with such a policy often hinging upon the material resources required to promote basic broadband services for people in remote areas.

Thus it can be seen, for example, how some countries have adopted one method rather than another in order to deploy broadband technology nationally. Depending on the objective they are pursuing, decision-makers are required to establish an appropriate policy, taking account of realities in the field.

Some countries found it useful to lower their customs duties, so as to encourage investment in ICT. For its part, the Sultanate of Oman, as part of its broadband development programme, requested the regulator to lower the annual fees paid by operators planning to deploy infrastructure and offer a broadband service, particularly for voice and data in rural areas, and to lower the taxes levied on ICT equipment entering the country¹¹.

In Denmark, on the other hand, broadband legislation clearly sets forth the practices designed to promote deployment within the framework of universal access, but certain price reduction measures are foreseen in favour of operators providing broadband services at advantageous prices¹².

Like all other countries, China too has set about establishing a policy for the deployment of broadband technology.

As part of its government programme, it has introduced tax measures to encourage operators to invest in rural communities and provide for the effective establishment of the universal service fund.

Over the past years, such use of tax incentives has had positive effects, whereas the imposition of government taxes such as spectrum utilization fees or customs duties is liable to produce the opposite effect by financially penalizing operators and their customers. China has also envisaged establishing a system whereby low-interest loans or microcredits are granted in order to promote the development of networks in rural areas¹³.

Even though measures required for deployment in rural areas may have more appeal, all segments of the population must be catered for. People with disabilities offer a case in point.

Several regulatory measures have been put in place by Brazil to make ICT tools accessible to physically disadvantaged people¹⁴:

- The requirement to put a tactile identifier on the "5" key of computers accessible to people with disabilities
- Adaptation of public telephone booths by equipping them with teleprint telephones for the deaf or hearing-impaired, with installations at a reasonable height for disabled people in wheelchairs
- Requirement for fixed-line service providers to ensure that at least 2 per cent of their public telephone booths are accessible to people with disabilities
- Use of the universal service fund to provide services to people with disabilities.

We find the same kind of thing in Portugal's Resolution 155/2007, according to which operators should allow people with disabilities requiring specific treatment to also be able to consult the government's Internet site and other sites, and to receive assistance. The site in question provides this target group with information on how to effect commercial transactions, tax declarations, vehicle registrations and numerous other tasks just like any other Portuguese citizen.

¹¹ Contribution by Oman, Geneva, 5 September 2006, Document 1/051.

¹² Contribution by Denmark, Geneva, 26 June 2007, Document 1/069.

¹³ ITU-D Study Group 1: Report on innovative solutions for the management and financing of universal service and universal access policies (2002-2006).

¹⁴ Contribution by Brazil, Geneva, 11 September 2008, Document 1/166.

a) Liberalization of the broadband market

Today, liberalization of the market is a major driver of telecommunication sector development.

Liberalization has prompted a boom in the ICT sector, consequently leading to the establishment of regulatory bodies, and has boosted the market through free competition in the sector. Several countries have liberalized their telecommunication sectors, while others have not yet done so; however, in most countries where the wind of liberalization has not yet blown, this state of affairs has constituted a handicap compounding the problems long since faced by these countries in trying to catch up. This is the case of the developing countries.

Privatization is also one of the means of promoting universal service, for several reasons. First, network expansion targets are often laid down in contracts and licences under the privatization process. However, that is not the sole reason. Private operator investors have shown that they strive to achieve or even surpass the implementation targets, not only in order to meet legal obligations but also as part of their strategy to maximize profits. Privatization also fosters universal service for other reasons, including:

- availability of private capital to fund network expansion;
- commercial incentives to supply service to meet demand;
- improved management;
- reduced political and bureaucratic constraints on extending service¹⁵.

Case studies• **Switzerland**

Liberalization of the telecommunication sector in Switzerland, effective as of 1 January 1998, was a wager. The country's authorities had decided to submit the telecommunication sector to competition in order to meet the requirements of all Swiss consumers.

Ten years later, Switzerland's wager has paid off: 100 per cent of the population is covered and most of Switzerland is covered by GSM and UMTS services.

Broadband is gaining considerable ground. Universal service ensures that all segments of the population are served appropriately.

• **Democratic Republic of the Congo**

The telecommunication market is governed by a single framework Law 013/2002 of 16 October 2002 in the Democratic Republic of the Congo.

This law does not apply only to broadband, but to all new telecommunication technologies operating within the country.

The Democratic Republic of the Congo now has over 25 Internet access providers, including operators providing broadband Internet access using satellite given that there is no high-speed optical fibre backbone.

The regulator currently issues authorizations to operators for WiMAX or Wi-Fi technology, and other operators provide private customers and businesses with access using eBURST methods.

It should be noted that the law contains no specific provisions for broadband.

• **Cameroon**

As part of its infrastructure deployment and expansion plan for the country, the government had instituted a regulatory framework encouraging investment in ICTs, offering tax relief on all equipment in the ICT sector nationwide. However, this measure was cancelled at the behest of donors.

b) Fiscal policies and measures

Incentives designed to foster broadband development are one of the main avenues being pursued by national regulators.

¹⁵ Infodev: Hank Intven, Telecommunications Regulation Handbook, Module 6, § 6.3.3, page 15.

However, broadband development policies differ considerably between the developed and developing countries. Most of the emerging countries have barely entered the ICT national policy elaboration phase, in which they wish to include broadband aspects, whereas the developed countries are already in the most advanced phase of implementation, with the resulting development of their broadband services. Such is the case of the Republic of Korea and China, where charges on ICT tools have been reduced, from importation right through to their provision to households and student circles.

2.2.1.2 Measures to promote competition in the introduction of broadband networks

a) Interconnection of national networks¹⁶

The concept of interconnection implies the confluence of numerous other contracting networks focused on the provision of either services or capacities, although new operators often prefer to make do with selling services rather than building their own networks. This practice is covered by most regulations, which make interconnection a duty that facilitates opening up to competition.

G. Dang Nguyen and D. Phan nevertheless consider that operators in dense areas would find it more advantageous to deploy their own networks in order to reduce their interconnection costs and offer broadband access¹⁷.

Even though this is a consumer right, the law in some countries is silent on the subject, despite its crucial importance for developing access to broadband in rural communities.

- **Democratic Republic of the Congo**

Law 013 on telecommunications in the Dem. Rep. of the Congo does not develop the concepts of universal access to broadband services, but the country recognizes the potential of interconnection and makes it an obligation for telecommunication network operators under the surveillance of the regulatory organ, ARPTC.

- **Brazil**

Brazil has established a committee specifically responsible for number portability, so as to allow all users access to all services using their own number¹⁸.

- **Switzerland**

Switzerland's legislation contains provisions governing network interconnection. Any dominant operator in the telecommunication sector is now obliged to allow interconnection and local loop unbundling.

- **Denmark**

In Denmark, the regulations on interconnection governing all telecommunication players, and thus all operators, provide that all Danish consumers must have access to broadband services. It is further recommended that operators with any market power make the local loop available to alternative operators.

In practice, interconnection as traditionally understood is reserved to the public or historical operator; this is often reflected in telecommunication sector legislation, but the historical operator's infrastructure is in fact proving to be obsolete. This is very often taken advantage of by private operators entering the scene with their own infrastructures and building a meshed network under bilateral contracts.

This practice is acting as a brake to the rapid deployment of infrastructure in remote areas, owing to the conflicts that arise between operators regarding capacity exchange, to the detriment of coverage of unprofitable areas.

b) Local loop unbundling

Local loop unbundling is the obligation to offer permanent as opposed to sporadic access at the (physical) ends of the copper wire local loop. The main advantage of permanent access is that it allows competitors to

¹⁶ It is important to remember that the question of interconnection can be addressed specifically within the framework of universal access to broadband, as otherwise there would be duplication of work with other study group Questions.

¹⁷ Isabel Crocq. Régulation et réglementation dans les télécommunications, Ed. Economica, January 2004, page 142.

¹⁸ Report of the meeting of the Rapporteur's Group on Question 18-1/1, Geneva, 16 October 2008, [Document 1/REP/028\(Rev.1\)](#).

install their own equipment at both ends of the link, in order to improve the services over the copper pair, in a manner which is both technically feasible and financially viable. Installation of such equipment would not be viable if they were only used temporarily or sporadically for calls.

Several reasons justify the obligation to unbundle the local loop:

- 1) allows competition and innovation;
- 2) speeds up the rate of deployment of broadband services;
- 3) helps to avoid inefficient investment (if tariffs are set at the right level, local loop unbundling encourages use of the existing infrastructure to provide broadband services rather than installing entirely new networks which would duplicate the existing ones);
- 4) also stimulates the development of competing networks with direct access to users.

Access to a broader bandwidth is of crucial importance for the development of new services within the information society.

Technologies such as DSL, cable modems, third-generation mobile, broadband fixed radio and digital TV will enable services such as always-on unmetered high-speed Internet access, interactive audiovisual services and video-on-demand to be accessible to a wide audience¹⁹.

The concept of local loop unbundling, be it for radio, ADSL or any other technology, represents a solution for the development of universal access in remote areas in that it allows customers linked to the loop to have access to the services offered and to all network externalities. The contributions by country representatives show that local loop unbundling acts as a major stimulus to the development of broadband services and is now essential in so far as it is conducive to competition. Some developed countries (Denmark, Switzerland) have liberalized the local loop. Other, developing countries are endeavouring to do so.

c) Infrastructure sharing and open access

China has made considerable progress in infrastructure sharing in the field of broadband as a result of the consolidated efforts of the historical and other broadband operators in China.

Thus, China Netcom has developed the following three models designed to provide the entire population with access to broadband applications²⁰.

1 *Cooperation model 1*

In the light of the market situation and service capabilities, China Netcom has developed the already consolidated software, modem and other products from user-end equipment suppliers in order to provide a better quality of service to broadband access users.

In conjunction with well-established computer and terminal vendors, China Netcom has started to develop simple network access terminals to lower the access threshold for users. As a result, China Netcom and its partners have introduced co-branded computers with embedded broadband access capabilities, bundling the sales of terminal equipment with that of broadband services.

2 *Cooperation model 2*

China Netcom cooperates extensively with the outside world and gives full consideration to user needs in its development, upgrading and management of content channels.

3 *Cooperation model 3*

By creating an industrial chain, China Netcom and the provincial communications companies will jointly build a centralized network service platform to provide access, authentication and billing services to other enterprises, and to promote bundled sales of terminals and broadband services in cooperation with ICPs/ISPs and terminal manufacturers.

¹⁹ OECD; Access pricing in telecommunications, page 132.

²⁰ ITU-D Study Group 2: Report on broadband access technologies, § III.3.2, pages 92-95.

d) Innovative spectrum management practices

Account should be taken of the point of view of the representative of Thales (France), who highlighted frequency allocation aspects.

He informed us that GSM frequency allocation practices in bands allocated to broadcasting currently cause some African countries problems with regard to interconnection.

At the 2007 World Radiocommunication Conference (WRC-07), however, the ITU Member States approved a schedule for changeover from analogue to digital broadcasting by 2015. This transition may well resolve the issue of mobile interconnection, and indeed that of other technologies.

The spectrum management framework must make provision for ways of facilitating the deployment of innovative broadband technologies. Striking a strategic balance between the use of licensed and unlicensed frequencies is becoming a fundamental component of good regulation.

Progressive convergence of regional policies on fees has been encouraged, in particular the kind of measures adopted by the European Commission²¹.

2.2.1.3 Mechanisms for financing broadband universal access initiatives

Today, as most countries have an independent telecommunication sector regulator, we find several different development strategies for the sector.

In view of the desire of countries to promote broadband services in rural areas, and on the basis of the testimonies of the participants in the work of Question 7-2/1, it appears that most decision-makers have opted to adopt a universal service policy in their countries.

To ensure the success of this approach will require enormous resources to cover areas that private operators regard as less profitable. Legislators have therefore deemed it necessary to support this approach through the adoption of legal provision establishing a universal service fund.

In general, the universal service fund is fed by a percentage of operators' annual income, in accordance with the law establishing it.

It may be managed by a management board, usually comprising all the stakeholders in the sector, as appropriate.

Other countries have indicated, with regard to means of regulation and universal access, that they find it difficult to get themselves mobilized with respect to universal service, making it even more difficult in those countries to assign resources to universal service.

Although set up on 1998, the universal service fund only really became operational in 2007.

This is the case in the **Democratic Republic of the Congo**, whose universal service fund was created by Law 014 of 16 October 2002, but has since been paid into the public treasury and allocated for other purposes.

With the coverage rate at only 20 per cent for a country of over 60 million inhabitants, rural communities are left entirely at the mercy and discretion of private operators, who freely choose the most profitable areas.

a) Universal service fund

As indicated above, universal access is a priority today for countries wishing to narrow the digital divide in universal access priority areas, but the fund required to make universal access to broadband services effective is a thorn in the side of regulators.

Country experiences

As stated above, the contribution to the universal service fund in the **Democratic Republic of the Congo** is 2 per cent of operators' turnover. With the help of the World Bank and the French consultancy firm ICEA,

²¹ ITU: Trends in telecommunication reform, 2006: Regulating in the broadband world, § 1.7, page 16.

the national regulator initiated a series of studies for the establishment of pilot projects in isolated areas in order to reduce the digital divide, but these have not been brought into operation.

In **Côte d'Ivoire**, the National Telecommunication Fund (FNT) is fed mainly by the fees charged for the purpose of opening up isolated areas, payable by telecommunication operators in the amount of 2 per cent of their turnover, although it also receives funds from other sources such as loans contracted for the purpose by the State.

The FNT can be used to pursue rural coverage objectives, or to finance the construction of a suitable infrastructure allowing the operator responsible for deployment of the local loop to connect rural localities in accordance with the schedule concluded in agreement with FNT²².

b) Authorization charge

Sustained, incentive-based legal instruments are an integral component of telecommunication sector development. Today, several countries are combining their efforts in the interests of having proper sector regulation and securing investment in this sphere, which is a sensitive one in the current era of new technologies.

Such instruments stipulate the obligations and duties of the parties (authorities and licensees). Within the framework of our work, the rapporteur group has insisted on the introduction of incentive-based measures for the sector that are apolitical and whose sole main objective is to secure the development of broadband services.

Convergence poses a number of problems where authorizations are concerned. Unified licences are beginning to appear in certain countries such as Kenya and India, whereby the licensee is entitled to use any resource platform, such as the limited radio-frequency spectrum. Consequently, while individual licences are likely to remain, they should not include the conclusion of agreements liable to favour, for example, integration between fixed and mobile services. The restrictions affecting operators holding an authorization or the inequitable treatment of such operators – for example, when cable television operators are authorized to enter the voice and data markets while telecommunication operators are barred from the video market – can put a brake on convergence. Existing authorizations should therefore be reviewed in the light of the policy of competition.

Convinced as it is that such an approach would be conducive to the sector's development, the rapporteur group recommended that countries should be in a position to issue authorizations while having due regard for **convergence**.

2.2.2 Policies for accessible and affordable broadband services

2.2.2.1 Policies, regulations, practices and programmes to promote and increase broadband access in schools, universities, hospitals, local administrations, community centres (telecentres), post offices and other public infrastructures

Universal access for institutions in most countries depends on the government's objectives in terms of the regulation adopted.

It may clearly be stated that the measures are not identical in all countries, since they depend on each country's definition of universal access to broadband services. The table below gives an overview of models used in some countries:

²² Contribution by Côte d'Ivoire, Geneva, September 2008, Document 1/155.

Country	Universal access policy	Obligation for the operator
Kenya	Telephone within reasonable walking distance	Quality of service and expansion
Dem. Rep. of the Congo	Public telephone within a maximum radius of five kilometres	Quality of service
Moldova	At least one public telephones for 500 inhabitants	Geographical coverage
Zambia	Public telephones in public places (schools, dispensaries, etc.) throughout the country	No obligations
Switzerland	Real-time speech or AF transmission and data transmission, direct dialling and primary entry in telephone directory; supplementary services such as call transfer, privacy, itemized billing and call barring; emergency services; public telephone directory services, text services; operator assistance	Quality of service
Denmark	Telephone network and associated telephone service, ISDN network and associated ISDN services; leased lines (except for broadband lines)	Quality of service

These definitions will provide decision-makers with a clear framework for developing a plan for access to services which they consider beneficial for each area.

2.2.2.2 Legislative or regulatory measures to provide broadband services at advantageous or subsidized rates to certain categories of underprivileged subscribers

Regulation is a universal service tool. Strong regulation with equally strong regulatory instruments will serve to foster the development of broadband universal service.

The case of Europe is extremely eloquent, where fibre-to-home (FTH) is now in place. This is adequate proof that strong regulation is contributing to the growth of broadband in some countries of Europe.

This approach is possible for countries with highly developed wireline networks, but in countries where the networks are based entirely on mobile technology, like the developing countries, the same will have to be done with radio systems.

The case of Uganda is considered as a model to be followed in terms of the methods for developing universal service: approaches based on neutrality, transparency, equity, sustainability and independence, which are the watchwords that have underpinned the strengthening of universal service in this country. Today, over 54 Ugandan districts enjoy telephone coverage and the regulator is making the USF very proactive.

The same approach of promoting the USF will also be valid for equipping all administrative entities, schools and hospitals with broadband.

- Portugal has used public-private partnership (PPP) to provide widespread universal service in schools, hospitals and administrations.
- Participation of mobile operators in financing the programme developed by the State.
- Training has also helped to spread universal service by creating a desire among consumers and enabling them to make use of ICT tools.

- Mobile broadband is also considered as the best solution for countries without an extensive fixed network. This is the case of the Democratic Republic of the Congo, most of the territory of which is today covered only by the wireless network.
- Provision of spectrum for sole use of broadband, as is the case with the 50 MHz reserved primarily for Internet service providers (ISPs) in India.
- To give greater importance to broadband, the Dominican Republic has published a decree on the four universal access models: public-private partnership (PPP), public-public partnership, private-private partnership and the universal service model. With the support of the State, this has contributed to the development of broadband as well as to knowledge transfer.

2.2.2.3 Tariff practices

In other countries, reducing prices has been used as a lever for spreading broadband. The table below gives us a general idea for a selection of countries:

Portugal	Serbia	India
<ul style="list-style-type: none"> – Reduction in price of a 30 GHz laptop to USD 200, in order to ensure wider coverage – 3G licence renegotiated – Operators involved in the programme 	<ul style="list-style-type: none"> – 3.5 GHz opened up for school and university access – Planning for coming years – Tax relief 	<ul style="list-style-type: none"> – Reduction in fees in rural areas – Broadband as backup service

3 Regulatory best practices

3.1 For broadband network development

a) Best practices for promoting investment

The deployment of broadband imposes several preconditions. In the past, this task came within the sole remit of the government, but today several countries have achieved their objectives by opening up the market to the private sector.

These operations nevertheless require regulatory measures to provide the private sector with the incentive to risk its capital.

In order to encourage investment in broadband, **India** has freed some frequency bands (50 MHz per town set aside for Internet access provider (ISP) operators).

A service supporting the development of broadband in rural areas has been created. It supports investment by lowering taxes and fees in the area of broadband in rural areas.

Portugal, in addition to lowering the price of portable computers, intends to sustain the use of broadband in rural communities by creating a public-private partnership strategy.

The same approach has been used in the **Dominican Republic**, where private initiative is supported by the State. In order to ensure the success of the approach to encourage investment in broadband, the State subsequently introduced the following models:

- public-private partnership (PPP) model

– private-private partnership model.

The government's considerable commitment in implementing these methods has satisfied the needs of the inhabitants of isolated areas and resulted in implementation of the SONIA programme, making it possible for this country to now boast a rate of one computer per three inhabitants compared with one computer per 30 inhabitants a few years ago.

By dint of cooperation between the country's operators, **China** has succeeded in reducing the digital divide between its remote areas and urban centres. This approach forms part of a massive infrastructure deployment which has significant advantages and would facilitate rapid broadband coverage nationwide.

It should also be remembered that the Chinese central government has taken a series of national measures, ranging from tax breaks to encourage operators to invest in rural areas, and government guarantees provided by both the central government and the provincial governments for financing obtained abroad, to the establishment of special universal service funds administered by the central government.

It has since been considering establishing a system for granting low-interest loans and microcredits to promote the development of networks in rural areas²³.

b) Best practices for promoting competition and technological neutrality

Scarce resources, specifically the frequency spectrum, remain a key concern for operators and regulators.

These resources, which are of enormous importance for the economy, need to be properly allocated to maximize their benefit. In view of their scarcity and rapid technological development, however, regulators need to make licensing arrangements that ensure technological neutrality.

Following through with technology-neutral liberalization and regulation could help many developing countries still pondering liberalization and could create a more favourable response in capital markets²⁴.

Conclusion

Universal access to broadband is a core concern for many countries. Its importance for ensuring universal service in remote areas is such that suitable regulation is required to facilitate the inclusion of rural communities in the information and communication society.

The rapid pace of development in broadband technology and its knock-on effects are liable to exacerbate the digital divide in many countries if significant regulatory measures are not taken.

Thus, the regulator must assume its responsibilities and create an environment that is conducive to investment in infrastructure in rural areas.

In pursuit of this objective, the rapporteur group has sought to conduct an analysis and propose guidelines on broadband universal access policies on the basis of contributions from participating countries. This analysis reveals that decision-makers see a pressing need to improve the regulatory framework.

Although situations are different from country to country, the common objective remains that they all need to extend universal access to broadband services in all communities, which calls, however, for an enabling regulatory framework.

In view of the magnitude of the task, it requires significant involvement of senior decision-makers in the development of regulatory actions, so that these actions may at last have a major impact on operations in the sector, giving operators the necessary confidence.

It is also important, as regards broadband, to encourage direct public-private partnerships to promote universal service in remote areas. PPPs bring a fresh injection of capital, provide consumers with ICT equipment and rapidly reduce the digital divide.

²³ ITU-D Report on innovative solutions for the management and financing of universal and access policies, § 3.5.1, page 12.

²⁴ ITU: Trends in telecommunication reform, 2003, § 3.6.1, page 60.

To achieve this, clearly established and structured actions that take account of the principles of universal service and access are highly recommended, for decision-makers to be able to achieve the best possible result (reducing customs duty on broadband ICT equipment and subsidizing operators wishing to invest in broadband infrastructure in communities is one of the strategies that can be implemented in order to push broadband out to remote regions).

A strong and independent regulator will be able to enforce the guidelines with a view to achieving a balance and perfect competition.

Annex I

Guidelines

In line with its objectives, and having analysed the features of all the different situations prevailing in the countries contributing to the work of Question 7-2/1, the rapporteur group proposes the following guidelines for regulation of universal access policy for broadband services.

These guidelines are not the only means of achieving universal access to broadband, and account needs to be taken of the specific situation of each country in terms of the objectives set under their ICT sector reform process.

States should:

I Create an enabling regulatory environment

This stage is a starting point to make investment attractive. Countries whose ICT sector policy fails to be attractive have no way of convincing people to invest in the sector. Therefore:

1.1 Countries must have strong advocates at the highest decision-making level capable of making people aware of the importance of enhancing the regulatory framework for broadband.

1.2 It is recommended that countries establish a value-chain pyramid for management and capacity-building with a view to disseminating and promoting broadband ICT tools.

1.3 Countries should draw up transparent guidelines for telecommunication regulation, capable of promoting the development of new information and communication technologies and making broadband affordable and accessible.

1.4 Countries should establish independent regulatory bodies equipped to play their role and issue guidelines that will stimulate competition.

1.4.1 The regulatory body should be given the capacity to draw up guidelines that will make broadband affordable and accessible for each and every consumer.

1.5 Countries need to adopt a national ICT policy incorporating clear objectives in respect of universal access to broadband.

1.5.1 This national ICT policy shall constitute a roadmap setting out the national plan for broadband access, based on international standards but tailored to local conditions.

II Design a universal access policy

2.1 Countries should develop a regulatory policy designed to encourage investment in infrastructure, in order to promote universal access to broadband.

2.1.1 Reducing import duty on broadband ICT equipment.

2.1.2 Decision-makers must draw up guidelines on sharing of broadband infrastructure in the country.

2.2 It is recommended that countries formulate specific national policies for broadband, which should foster infrastructure deployment and facilitate the promotion of broadband through local content in the education and health sectors and areas of public interest.

2.3 Broadband access policy should highlight tax relief aspects, thereby facilitating affordable broadband access.

2.4 In formulating universal service and access policy for broadband, policy-makers must take into account deployment of the backbone to cover underserved isolated areas.

2.5 Decision-makers and regulators should intervene effectively to ensure coverage of areas which they consider necessary for universal service.

2.6 Countries should have a targeted connectivity programme authorizing the deployment of broadband service and applications. Coverage requirements should be determined through a realistic study for the

medium term, taking into account accessibility, distance, population density and the time needed to access communication media.

III Regulatory processes

3.1 Countries should conduct periodic public consultations of service providers and other stakeholders, in order to keep them informed, and ensure that operators and access providers participate in the development of regulations which will thus be geared to market trends.

3.2 Decision-makers and regulators should draw up laws and specific decisions within the missions assigned to them.

3.3 Policy and regulatory bodies should collaborate closely, with the sole objective of developing access to services and universal access to broadband.

3.4 In taking decisions, policy-makers and the regulator must consider other stakeholders.

3.5 Decision-makers must cooperate with decentralized bodies in order to facilitate coverage in underserved areas.

3.6 Decision-makers and the private sector must work in close collaboration in order to assess entities' service and access needs.

3.7 Other means should also be explored for deployment of the IP network in areas which are not served.

3.8 Guidelines regulating universal service and laws on broadband should incorporate other development aspects relating to other sectors (e-education, e-government, e-health, etc).

IV Regulating broadband

4.1 *In the area of licensing, countries should strive to:*

4.1.1 Promote technological neutrality so as to enable operators to select the most cost-effective technology for providing a better service to end users.

4.1.2 Simplify the licensing process by adopting the first come/first served approach so as to stimulate competition in broadband.

4.1.3 Design a competitive bidding process.

4.1.4 Consider subsidies for operators working in less profitable areas.

4.2 *In the area of interconnection, regulators should:*

4.2.1 Develop a transparent and non-discriminatory regulatory framework, in which rates are linked to costs.

4.2.2 Liberalize the international gateway in order to reduce the cost of Internet and voice connectivity.

4.2.3 Require service providers to publish reference interconnection offers (RIO).

4.3 *In the area of spectrum management, regulators and decision-makers should:*

4.3.1 Release adequate spectrum for IMT-2000 and wireless service so that users do not have to wait for fixed lines.

4.3.2 Design non-discriminatory and transparent spectrum award procedures.

4.3.3 Institute incentives for voice and Internet service operators in rural areas, in order to promote universal access.

4.3.4 Eliminate entry barriers for new operators in rural areas.

4.3.5 Encourage infrastructure sharing among operators.

4.3.6 Implement the results of WTDC in relation to each country's specific situation.

4.4 *In the area of regulation of competition, regulators should:*

- 4.4.1 Ensure effective liberalization of the market.
- 4.4.2 Ensure that broadband is supplied on a competitive basis.
- 4.4.3 Ensure technological neutrality in the marketplace.
- 4.4.4 Enable the establishment of local and regional Internet exchange points (IXPs) for connectivity.
- 4.4.5 Encourage cybersecurity nationwide to secure national and regional traffic.
- 4.4.6 Eliminate entry barriers for new entrants in the broadband market.
- 4.4.7 Encourage build-out of the backbone infrastructure above and beyond the existing infrastructure.
- 4.4.8 Draw up guidelines for the settlement of disputes between broadband operators.
- 4.5 *In the area of taxation, the government and regulators should:*
 - 4.5.1 Adopt a system of tax/fiscal incentives for operators investing in broadband infrastructure in such a way that costs are not passed on to the end user.
 - 4.5.2 Income tax levied on operators for the universal service contribution should not exceed 24 per cent of turnover.
- 4.6 *In the area of cost and quality of service:*
 - 4.6.1 In addition to the existing model, operators should introduce innovative service offerings.
 - 4.6.2 Operators must allow users free access to emergency services.
 - 4.6.3 Operators should develop local content geared to local consumer needs.
 - 4.6.4 Operators should provide a quality of service that is acceptable to all users, in a transparent and non-discriminatory manner.
 - 4.6.5 Regulators should ensure continuity, quality and affordability of service offered to users as part of universal service and access in rural areas.
- V Stimulate access to broadband-enabled services and applications
 - 5.1 We recommend that countries should adopt laws on broadband according to their own market structure.
 - 5.2 We also recommend that countries take account of cultural aspects and the country's socio-economic interests.
 - 5.3 The government and regulators should show their determination to connect administrative entities, education centres, schools, social centres and libraries, by subsidizing rental of capacities, drawing up a viable public access programme, establishing community telecentres, etc.
 - 5.4 The government should organize training programmes for broadband users, in order to enable them to exploit the new ICT tools at their disposal.
 - 5.5 Promote local ICT manufacturing industries, in order to combat customs duties.
- VI Financing mechanism and management of universal access policies
 - 6.1 National broadband policy should regulate deployment costs, stimulate value-added services, and encourage the deployment of access providers.
 - 6.2 Subsidies must be geared to a target market.
 - 6.3 Possibilities for financing broadband infrastructure to expand the market may include:
 - 6.3.1 Direct financing through public-private partnerships (PPP).
 - 6.3.2 Universal service fund (USF) to finance broadband infrastructure.
 - 6.3.3 State allocation to finance the broadband network.

Annex II

Composition of the Rapporteur's Group for Question 7-2/1

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List of member countries of Question 7-2/1

Algeria	Kenya
Andorra	Liberia
Bangladesh	Madagascar
Benin	Mali
Brazil	Mexico
Burkina Faso	Morocco
Cameroon	Nepal
Côte d'Ivoire	Oman
China	Portugal
Democratic Republic of the Congo	Republic of Korea
Denmark	Senegal
Djibouti	Serbia
Dominican Republic	Spain
France	Switzerland
Gabon	Tanzania
Guinea	Togo
India	Venezuela

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