International Telecommunication Union

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NATIONAL REPORTS

TELECOMMUNICATION DEVELOPMENT SYMPOSIUM

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TELECOM ITU

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ITU TELECOM ASIA 2002

TELECOMMUNICATION DEVELOPMENT SYMPOSIUM

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Mohammed Gul Kholmi
President of Afghanistan Telecom

Telecommunication Development Country Report for Afghanistan

1 Introduction

As you know Afghanistan's economy, infrastructure and institutions have been totally destroyed.

National unity, reconstruction and economic growth will not be achieved without a proper and affordable communication network throughout the country.

The international community committed and pledged significant amounts for the reconstruction of Afghanistan for the year 2002 and beyond, and this has created a high expectation among Afghan people. But, so far, things have been moving very slowly.

The communication sector in Afghanistan needs a full reform and is in need of urgent support from the ITU Member States. We have already taken some steps but these need to be strengthened and accelerated by the Union's support.

The beginning of a new era in the history of Afghanistan provides a window of opportunity for the Ministry of Communications to introduce radical and modern policies. This new chapter opened with the Bonn Agreement, following worldwide support to assist Afghanistan's return to democracy, peace, security and reconstruction. The potential that communications offer Afghanistan is real: the ability to surpass 23 years of destruction and to recapture lost ground is achievable. The Transitional Government of Afghanistan has a mandate to lay the foundations for a modern communications infrastructure.

Telecommunication services are not just for personal and business users. They represent a national asset in the sense that they deliver all types of information, goods and services to the public, including essential government, social, educational and medical services. Whilst the relationship may be a complex one, telecommunications promote economic development and – significantly for Afghanistan – also promote national, political, economic and cultural cohesion across our provinces.

We have a valuable resource that needs to be carefully nurtured for the benefit of all the people of Afghanistan.

2 Current Situation

Afghanistan has a barely functioning, very limited telecommunication sector. Over and above the use of satellite phones, the infrastructure consists of the following companies:

The Ministry of Communications (MoC) operates a digital service mainly in Kabul, Herat and Mazar-e-sharef where recent national and international satellite links have now been established. Kabul has a recently installed 12,000-fixed line digital switch with 7,000 active lines. Herat includes a 7,500-fixed line digital system, most of which are active, and Mazar-e-sharef has a capacity of 4,000 lines, most of which are also active. The MoC also operates an analogue network (mainly in Kabul) with an estimated 8,000 active lines although the switch does have a capacity of 15,000 lines. The MoC is currently completing the installation of 5 VSAT satellite earth stations in the 5 main cities of Afghanistan. These will give the MoC the backbone transmission to connect its digital lines.

3 Opening the Market

To achieve the objectives of an open, technologically neutral and competitive market will require:

– introducing a new licensing and regulatory regime, and

– changes to the status of the existing licensed operator to ensure a level playing field.

Note that, under the Government's 5-year plan, it is envisaged that a duct will be laid alongside the "circular road" in addition to some of the main roads to border crossings. This will be done during the National Roads Reconstruction Programme. This will provide the country with a ready-made delivery capability for laying fibre-optic cable.

Notwithstanding the above, the following initiatives will be implemented. Note that none of these licences are mutually exclusive. An operator may hold more than one licence. Guidelines will be issued during the licensing process.

3.1 GSM Mobile

The market will have two national licensed operators. The MoC will allow a moratorium of three years before reviewing market conditions for possible new entrants.

Invitations will be issued for two new national mobile licences through a competitive selection procedure. AWCC, as an existing operator, is invited to bypass the tender process and accept one of the licences on the basis that it agrees to the same terms and conditions of the winning bid.

GSM mobile operators will be free to carry their own long-distance traffic.

3.2 Long-Distance Operators

Licences will be granted if requested to any existing licensed operator, i.e. a GSM mobile or Fixed Service Provider.

Any new operators wishing to provide leased transmission capacity to any existing licensed operator for the provision of voice, data and IP services are invited to apply.

3.3 Fixed Service Providers

Invitations will be issued for two new national licences through a competitive selection procedure. To develop public access networks as fast as possible, initial obligations will be divided into two geographic regions, with Kabul being common to both.

Tenders will be issued to invite companies to engage in the provision of voice, data and Internet services. Either operator fulfilling its licence obligations early will be free to enter the other region.

So long as the licence conditions are met, companies are free to present their choice of technology subject to any restrictions in the Invitation to Tender. Fixed Wireless Access spectrum will be assigned and licensed, where appropriate, for both narrow band and broadband usage.

Fixed service providers will be free to carry their own long distance traffic. After five years, if economic conditions allow, the market will be further liberalized to other interested applicants.

3.4 International Gateway

All the above licences will include the right to operate international gateways.

International (facilities) licences will be available for Internet usage – subject to separate VSAT licensing, where appropriate. Such facilities licences do not require gateway capability as ISPs will not be required to handle switched voice and data traffic for which International Point Codes (issued by ITU) are necessary.

4 Licensing

The Commission's authorization regime will be simple, open, non-discriminatory and transparent. There will be two types of licensing requirement:

– General authorizations or class licences for networks and services which do not require access to scarce resources and which carry a limited number of rights or obligations, e.g. private networks and minor services; and

– Individual licences for networks and services which require access to

scarce resources and which have more comprehensive rights and obligations attached to them, e.g. GSM Mobile, Long Distance Operators and Fixed Service Providers.

Note that user terminal equipment is beyond the scope of licensing regulation although it is subject to type approval by an acceptable authority.

Service providers seeking to offer public access services on a resale basis, by means of public pay phones, telecentres, and similar arrangements, will be allowed to enter this market with a minimum of restrictions and regulatory requirements.

Licence awards will be based on a prequalification stage that will review the technical, financial, and operational qualifications of the applicants. Final selection will be based on predetermined objective criteria.

Conditions attached to licences may include but are not restricted to the following:

- Effective and efficient use of scarce resources, in particular spectrum
- Coverage obligations
- Universal access service obligations
- Interconnect obligations
- Lease capacity obligations
- Quality of network and service obligations
- Consumer obligations
- Emergency service obligations
- Fair trading obligations

Where licences are required, the RC (Regulatory Commission) may establish licence fees that are reasonable in relation to the cost of administration and regulation of the licensed services, and to the value of the licence in the market.

5 Competition Policy and Enforcement

A comprehensive framework for ensuring fair competition is critical to effective market development, and the cornerstone of the policy. This will be established through a combination of legal provisions planned in the new Telecommunications Act and in Competition Law, as well as in the licences issued. The goal is to prevent the abuse of monopolistic or dominant positions and other anti-competitive practices.

6 Universal Access Policy

6.1 Universal Access to Inforation and Communications

The Government considers that it is a fundamental right of all citizens to have access to diverse sources of information and means of communication. It needs to reach all locations and people throughout the country, and provide affordable access to the full range of services. Although it has to be acknowledged that this is a very long-term objective, the Government will support all immediate steps to meet its ultimate goal.

The RC (Regulatory Commission) shall develop specific indicators of ICT access, and shall identify targets for moving toward universal access nationwide within an achievable time frame. In particular, the provisions of the following will be implemented.

6.2 Obligations and Responsibilities of Licensed Operators

Every telecommunication operator that obtains a licence from the RC will be obliged to contribute to the achievement of national universal access objectives as a condition of that licence.

The nature and the degree of each operator's obligations may vary, although competing operators in the same market will be subject to similar obligations.

All telecommunication operators will also be obliged to participate in the establishment of a national disaster and emergency service telecommunication system. The RC shall facilitate the planning and implementation of this system, in coordination with disaster mitigation and relief operations and security agencies.

7 Telecommunications Development Fund (TDF)

A Telecommunications Development Fund (TDF) will be established to help support the rapid development of universal access in areas that may be perceived as uneconomic by the market. This Fund will be administered by the RC, and will be separately identified under the Commission's operating budget. The amounts and uses of the fund will be made public and subject to independent audit, taking the current situation of Afghanistan into account. This is essential to link the cities with the rural areas which have also suffered badly from long years of crisis.

The Fund will be governed by the following principles and objectives:

7.1 Contributions to the Fund, or Direct Investments

All licensed operators will be required to contribute to the development of universal access through a financial contribution to the TDF.

The specific options and scope of contributions required from each operator will be defined in its licence.

Contributions to the Fund and support for universal access may be supported by other contributions from within or outside the country.

7.2 Use of Funds

No TDF funds will be utilized to support investments that would otherwise be made by private operators on purely commercial terms, nor shall funds be utilized to the competitive advantage or disadvantage of any operator.

8 Human Resources, Intellectual Capital

Continuous education and training of personnel for the ICT sector are necessary to keep up with rapid technological changes. The new policies must ensure that all citizens are given the maximum opportunity to contribute to and benefit from the ICT revolution. The government shall therefore support the establishment of suitable training facilities and encourage the provision of appropriate courses, including the following:

- A national Institute for Telecommunications and Information Technology (ITIT) will be set up for the training and development of personnel;
- Telecommunication companies shall be encouraged to train personnel and support the ITIT, universities and other institutions; and
- Universities, and other educational and training institutions shall be encouraged to offer courses in telecommunication engineering and management.

9 International Cooperation

International cooperation in the ICT sector is essential for setting up standards of excellence as well as affording the opportunity of exchanging the experiences of other nations in the development of a stable environment that encourages private investment and innovative services.

ITU, its organs and other relevant international bodies provide excellent vehicles for the achievement of these objectives. Bilateral arrangements will, in addition, be explored for the same purpose.

The Ministry shall ensure that Afghanistan meets its international obligations and participates actively in all international activities whose objectives promote ICT development in the country.

10 Telecommunication Commitments

To start development projects that will contribute to our aggressive target teledensity of 2 telephones per 100 inhabitants within 5 years.

Establish a licensing regime with supporting model licences.

To participate in international activities in order to promote ICT development, meet the country's international obligations and

derive maximum benefit from cooperation in these areas.

To establish a spectrum management team with the responsibility for the planning and assignment of the radio spectrum in the interests of efficiency, transparency and accountability.

To set up an independent Regulatory Commission draft and pass a Telecommunications Act that reflects the underlying policies and objectives.

To encourage the development of the underground duct that will circle Afghanistan. Completion dates to follow the National Roads Reconstruction Programme. To issue two new GSM Mobile licences (one for the existing operator and one for the new entrant).

To issue two new Fixed Service Provider licences.

To support the corporatization of the Ministry's operations.

Based on the outcome of the due diligence exercise, to create an efficient and successful corporation within 5 years, ready for eventual privatization.

Bangladesh

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Questions

1

For efficient use of the Internet at the national level, Internet Exchange Point (IXP) is very important. How can it be developed efficiently in a country like Bangladesh and what is the status of IXP in the Asia and Pacific Region?

2

The concept of telecentres is very new to us. How can we introduce telecentres efficiently in Bangladesh?

3

What are the best steps in order to introduce E-governance in Bangladesh where IT literacy and IT infrastructure is very poor?

4

How Telecommunication Regulatory Commission can play an efficient role to develop IT in a country like Bangladesh where public sector and private sector both are working in the field?

Mujibur Rahim
Anisur Rahman

Telecommunication Development Country Report for Bangladesh

1) Nowadays, all over the world trade and commerce, research and education, health, agriculture and different types of socio-economic activities of a country are very much dependent on telecommunication access. That means telecommunications play a vital role for the socio-economic development of a country. But the tele-density of Bangladesh is very poor. Not even one million people have fixed telephones out of the 140 million people of the country. The number of fixed telephones in the country is approximately 0.7 million. That means tele-density for fixed telephones is about 0.5%. At present the number of mobile telephones is about 7 million and tele-density considering both the mobile phones and fixed phones of the country is about 1% only, which is extremely poor to support the huge activities of the socio-economic development of the country in the present world, especially in the age of information technology. The growth of telecommunications, as an ingredient of development inputs, may be seen in the chart below.

2) Bangladesh T&T Board (BTTB) is the only public sector telephone service provider and also the biggest fixed telephone service provider of the country. The switches of BTTB are yet to be fully digitalized. The BTTB has a firm policy to digitalize the complete network as soon as possible. Digitalization started in the year 1983 and over the past few years the installation of digital equipment has increased considerably. Approximately 50% of the total fixed telephones are situated in the multi-exchange area of the capital city Dhaka and the remaining are distributed over the whole country. At present, telephone is playing an important role as an access to data communication systems. All the dial-up access to Internet or other data communication systems is by telephone. So the importance of telephone has increased sharply.

Telecommunication Scenario

Items	June 1990	June 1995	June 2000	June 2002
Fixed telephones	245,824	320,734	580,000	715,000
Cellular mobile telephones	0	3,000	235,000	710,000
International circuits	–	954	2,302	2,767
Digitalization of switching	1.25%	25.12%	68%	90%
Tele-density	0.22	0.27	0.6	1
International traffic (paid minutes)	–	108,693,136	217,210,516	449,838,071
Revenue earning in Taka (billions)	4.15	8.91	14.01	15.83

3) Considering the importance of and pressing demand for telephone, BTTB is increasing its telephone numbers. Installation work for 196,000 new telephone lines is going on under two development projects. By December 2003, installation work will be completed. In addition to this development project, the maintenance unit is installing another 77,000 telephone lines, of which, 43,000 will be used for replacement of analog telephone.

4) In the age of IT, a robust and efficient national transmission system is required to support telecommunications and data communications as well as the IT activities of a country.

5) BTTB is gradually converting its microwave links by high speed and broad band capacity optical fibre network to meet the further demands of telecommunications. Laying of the optical fibre cable from Dhaka to Chittagong, the highest traffic-bearing route of the country, is already completed. The speed of the core link of the network is 2.5 Gbit/s. The 264 km-long network has passed through the south-eastern part of the country.

6) Laying work of optical fibre cable connecting the important cities of the north-western part of the country is continuing under a development project. Speed of the transmission link will be 155 Mbit/s and the technology used is Synchronous Digital Hierarchy (SDH).

7) Other cities apart from the important ones mentioned above are connected with SDH transmission links either with optical fibre cable or with MW under a development project for a telephone network. So by June 2003 all the important cities of the country will be connected by broadband transmission links. Telecommunications and data communications services will be extended up to remote cities as well as this will facilitate the opportunity for rural coverage.

8) BTTB has started providing Internet services. Present capacity of BTTB's Internet services for the whole country is 284 ports, of which 238 ports are in Dhaka, with an international gateway speed of 2.5 Mbit/s. This access capacity will be increased to 500 ports within 2-5 months and gateway speed will be increased to 8 Mbit/s within a year. At present, the services covers around 42 district headquarters using access servers in six cities. Plans are under way to extend these facilities to all 64 district headquarters. In addition, the private sector's participation in the expansion of the Internet in the country is gradually improving.

9) BTTB is going to install submarine optical fibre cable which will provide broadband connectivity to the global information super highway enabling better gateway facilities for data communications as well as voice communications for public and private operators.

10) Though Information Communication Technology (ICT) activities have started in the country, we still have limitations and constrictions. For example, we do not have enough access facilities for data and Internet communications. We do not have a national Internet exchange point (IXP). To overcome these limitations and constrictions, BTTB has begun a development project.

11) Globalization of telecommunications and rapid technological developments have made it imperative to ensure huge investment in this sector for accelerating the growth of telecommunications and an Information Infrastructure. Like many other developing countries, Bangladesh possesses an inadequate telecommunication infrastructure. Moreover, the infrastructure constraints make the access to international networks expensive. To have an adequate infrastructure and to overcome the constraints we need huge local and foreign investment in this sector. In order to have a competitive market in the telecom sector and to encourage huge investment and private operator participation, the Government of Bangladesh has adopted the national Telecom Policy 1998. The objective of the new policy includes:

- Promotion of exchange of information, national integration, universal access and digitalization and access to new technology;
- Creation of a competitive framework and market-oriented regime;
- A liberalized tariff policy;

– Mobilization of public and private sector resources to develop the sector, including encouragement of domestic and foreign private sector investment; and
– Commitment to establish an autonomous Telecommunication Regulatory Commission (TRC) that regulates the telecommunication sector.

12) In accordance with the above commitment, legislative actions had been completed to facilitate the formation of an independent and autonomous TRC. TRC has been working since 31 January 2002. It is expected that this will create a situation where private entrepreneurs, both domestic and multinationals, will be attracted to make significant investment to satisfy the needs. The regulatory commission will ensure essential ingredients like a liberalized environment, pragmatic thinking, cultivation of a flexible approach, practical actions and involvement of all the parties concerned for the greater good of the country and its people. The main functions of TRC will be to issue licences to private operators, control tariffs, regulate technical standards, prepare a national numbering scheme, present international organizations and encourage investment in the sector.

Bhutan

Questions

1

Is broadband Internet access relevant to less developed countries where demands for basic telecommunication services are still unmet?

2

In countries where the literacy rate is low and computer literacy is very much limited, what are the strategies of successfully deploying ICT as a tool for equitable development in terms of education, healthcare, poverty alleviation, etc?

3

What is the justification for using least developed countries as test-beds for unproven access and future technologies?

4

Are least developed countries ready for an ICT era, in terms of policy-making, regulation, and appropriateness of these technologies to those countries' demographic, socio-cultural, and geographical settings?

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Bhutan

Sonam Tobgay and Kezang

IP-based Rural Access Pilot Project: Recent ICT Development Activity in Bhutan

Abstract

A pilot project deploying wireless and Voice over Internet Protocol (VoIP) technologies to deliver communication services to rural areas in Bhutan was completed with encouraging results. The project covered two areas, with different geographical and meteorological settings, serving a total of about 80 customers. Once initial problems with radio interference from other sources were solved, the 802.11b radio network became reliable, then the VoIP equipment could be tuned to accept the more variable nature of a wireless network compared to a wired one. Calls through the PSTN were hampered by a slightly non-standard R2 protocol spoken by the local switch. This underscores the importance of adhering to open standards when many subsystems must work together.

The two areas are being further observed to study any variations in results due to varying climatic conditions in two distinctly different geographically set sites.

1 Introduction

The National Telecommunications Network interconnects all 20 districts and major towns in the country. During the Eighth Plan period (1997-2002), the then Department of Telecom (DoT) was entrusted with the responsibility of providing telecommunication services to all *201 geogs*[1] (specifically, 10 km or 2.5 hours walking distance to telecommunication services from any village) in the country. However, due to lack of funds this objective could not be met.

The 77th Session of the National Assembly enacted the Bhutan Telecommunications Act 1999 (the Act). Pursuant to Part VI of the Act, the Bhutan Telecom Authority (BTA) was established under the Ministry of Communications (MoC) in January 2000 with the mandate to regulate telecommunication services in the country; DoT was transformed into a wholly government-owned corporation, Bhutan Telecom (BT), in July 2000. BT, as the monopoly operator, is still responsible for provision of telecommunication services in the country.

One of the strategies of the Ninth Plan (2002-2007) includes expansion of telecommunication services through establishing at least 10 telephone connections in each *geog*. This will result in 80% of the rural population being covered by telecommunication services. Bhutanese technocrats and policy-makers believe that rural access needs could be met through deploying modern technology developments appropriate to Bhutan's settings.

1 A *geog* is the smallest administrative block in Bhutan. A *geog* may have several villages.

2 Rural Telecommunication Master Plan 2000

BT had prepared a Rural Telecommunication Master Plan 2000 for providing access to remote rural areas of the country. The plan recommended use of Digital Radio Multiple Access Subscriber System (DRMASS) technology; BT has several DRMASS base stations across the country and the skills to install and maintain the systems without external assistance. At the time the plan was prepared, this was the most realistic situation. However, BT was informed that the manufacture and supply of DRMASS equipment would discontinue in the near future.

This scenario change has driven BT to review the Rural Telecommunication Master Plan 2000. BT conducted feasibility studies on deploying IP (Internet Protocol)-based networking technology. This is a fairly new technology and BT did not have the necessary experience. In principle, this technology was the solution. It is IP-based, cost effective, requires less power and has both voice and data capabilities.

DIT[2] has also prepared a draft IT (Information Technology) Master Plan for the country in 2001. It concentrated on building computer networks only, overlooking access requirements. BT, in close coordination with BTA, has implemented a pilot project to evaluate the appropriateness of IP-based technology for promoting Information and Communications Technology (ICT) and meeting the Royal Government's socio-economic development objectives. The new Rural Access Telecommunication Plan hinges on the overall outcome of the IP-based rural access pilot project.

3 IP-based Rural Access Pilot Project

BT, as the only operator, is mandated to meet Universal Access Obligations (UAO), which in the case of Bhutan has been equated to the provision of rural services. About 79% of the Bhutanese live in remote rural areas of the country. Only about 90[3] of the *201 geogs* have been connected to the national network. Further expansion has been constrained due to lack of funds. This delay is an opportunity on the one hand, as recent technological developments offer much more cost-effective alternatives for rural connectivity. On the other hand, social welfare gains have been lost in the process.

3.1 Project Objectives

- To test the suitability of wireless IP-based systems for provision of data and voice services to rural areas.
- To evaluate the reliability of equipment available in the market at present, most of which are prototypes for internal factory tests.
- To observe power consumption factors and test reliability of power supplies, as solar power needs to be harnessed at most sites.
- To compare installation and testing methods with the existing DRMASS networks.
- To evaluate the overall usability of the wireless network for VoIP.
- To study and observe reactions of people using this system.

3.2 Expected Outcomes

- To gain experience and understand issues better (by relevant BT staff) in deploying these systems.
- To increase the reliability and usability of the radio network.
- To be able to interconnect VoIP equipment over the radio network and the PSTN.
- To eventually have a usable system that can provide service to pilot sites.
- To facilitate basic access to data and voice services for people at the grassroots.

2 The Division of Information Technology was established in January 2000 to promote IT development in the country.

3 Source: Bhutan Telecom, Thimphu.

– To deploy wireless IP-based systems based on the outcomes of this project.

3.3 Site Selection

Selection of sites for the implementation of the pilot project was based on the following criteria:

– Considered rural areas with no telecommunications services available.
– Identified demand for telephone service of at least 10 potential customers in that area.
– Established presence of telecom-related infrastructure elements: Availability of electricity preferred, but at least one site where electricity is not readily available selected.
– Ascertained the potential to benefit as many people as possible. Population density must be high even though there may be only 10 potential customers.
– Gave preference to the following locations: schools, health units, agriculture and livestock sub-centres, and the *Gup* (*geog* administrator)'s office.
– Chose two pilot sites to provide as much information as possible within the shortest period of time.[4]
– Selected sites with varying geographical characteristics with different climatic conditions.

3.3.1 Project Site Conditions

The sites chosen for the implementation of the Pilot Project are:

1 Limukha Area: It has a school nearby, several villages within a few km of this site, and has line of sight to Toebesa, Wanakha and several other villages.

Limukha is in the middle of Wangdi and Punakha Districts. Winters are very dry and even during summer there is not much rain. It has good line of sight to several villages, BHUs[5] and schools, and is an ideal radio site. Several access points were extended from this location to study congestion problems.

2 Gelephu: Basically for providing access to the outlying areas of the town.

Gelephu (on the border with India) was chosen, as this area is prone to heavy lightning and torrential rains. The effects of rain on the packet radios need to be ascertained.

3.4 Project Duration

Information and communication technologies are changing rapidly and so the pilot project was scheduled for implementation within the shortest possible time-frame. After funds have been made available through ITU, equipment was procured and installed as soon as possible, and other related studies and observations are being done over a period of three months. Data collected from the sites are compiled and a consolidated report is being prepared.

3.5 Technical Plan

Services were extended to sites from the nearest existing telecommunication exchanges. The network configuration and the equipment requirements are discussed below. The network configurations for the two sites are given in the attached Annex.

4 Project Implementation

BT engineers carried out the implementation of this Pilot Project under the guidance of an ITU-funded expert. Implementation was completed within two months. Parts of the installation of equipment were done during the rainy season. The two sites have been tested and cut-over done. Once initial problems with radio interference from other sources were solved, the 802.11b radio network became

[4] The project proposal included four areas. However, implementation could be done for two areas only due to lack of funds.

[5] Basic Health Units.

reliable. The VoIP equipment could then be tuned to accept the more variable nature of a wireless network compared to a wired one. Calls through the PSTN were hampered by a slightly non-standard R2 protocol spoken by the local switch.

Observations will continue till end of September 2002 and subsequent evaluation reports will be prepared.

5 Evaluation

The evaluation of the pilot project will be based on overall observation results. The three-month observation period takes into account varying climatic and weather conditions at the two geographically distinct sites. So far, results have been very good. Users indicate that there is no difference in the quality of service as compared to the circuit-switched network voice telephony.

6 General Comments/ Conclusion

Telecommunication networks provide access to Internet users and transport required for most global data networks. In Bhutan's context there are only three organizations involved with the provision of ICT services. DIT is basically responsible for the development of IT, BT for providing telecommunication services and BTA for regulating telecommunication services, in the country. It is important for these organizations to work closely. Involving DIT in the implementation of this project could have enhanced future cooperation between these entities.

For BT, successful implementation of this project means that IP-based networks can be introduced and rural network constructed using this technology. For DIT, this would have facilitated an alternative method to providing access, thus reducing dependence on BT for access. As a starter, it would also have been possible to provide at least one PC and a connection to the Internet for some of the schools that can be connected through the pilot project, in particular, for schools where electricity is available.

6.1 Vendor Diversity

A diversity of vendors were used for the radio segment in these configurations:

a. Limukha – Tri-M SBC radio and Hyperlink amplifiers

b. Gelephu – Cisco radio and Hyperlink amplifiers

Though Cisco is more expensive, it is very dependable, besides being a leader in this field, and has already been tested locally. Two amplifier vendors were used, Hyperlink being the one that was used in the local tests.

For the customer premise equipment, though a variety of vendors do exist, none – other than e-Tel – offer wireless residential gateways or wireless IP phones, though Cisco plans to start very soon. The mobile IP phones are only manufactured by Spectralink (that were used in the local tests) but we have refrained from specifying this as yet since the protocol used by these mobile IP phones are "Spectralink proprietary".

For the gateway, we investigated three vendors: Franklin, Nuera and Vocaltec. For the moment, Franklin seems to be the cheapest solution.

6.2 Power Considerations

Solar power has been provided at repeaters where electricity is not readily available. The panels and batteries at the repeaters have been designed with 10 days autonomy. Since the customer premise equipment requires power supply as well, villages with no electricity have been provided with one phone. The solar power/batteries at these customer premises have been designed with 7-8 hours stock time.

6.3 Repeater Coverage

Omni repeaters have been assumed to cover 8 km, a combination of omni-parabolic dish repeaters have been assumed to cover 12 km, while 24dBi dish repeaters cover 30 km. In areas where more repeaters were required (in case the initial estimation was inaccurate), provision for a couple of spare repeaters was maintained.

6.4 Backbone Transmission

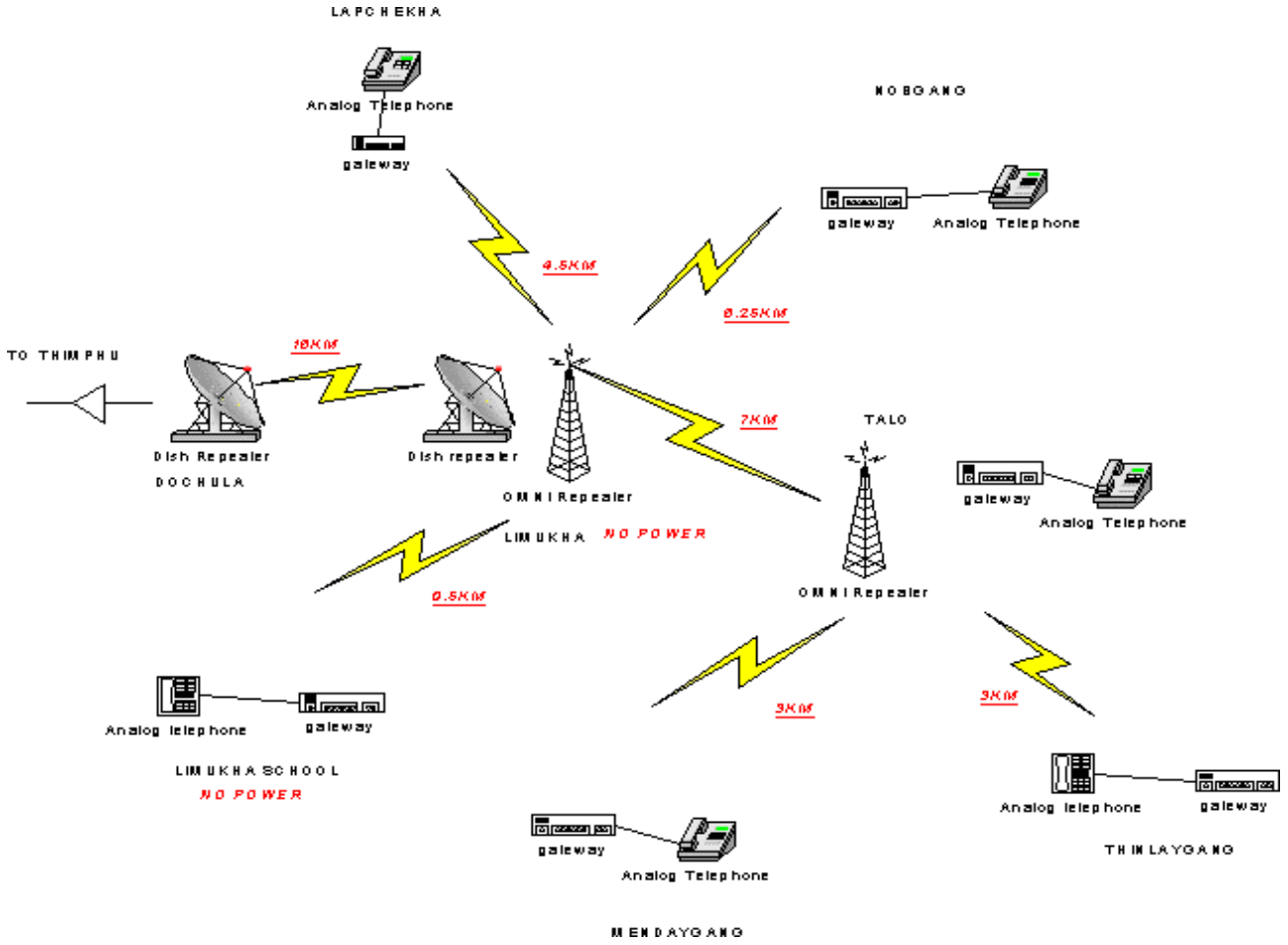
Limukha obtains 2 Mbit/s from the microwave node at Dochula, after which packet radio hops carry it to the customers. Gelephu uses 2 Mbit/s of the existing microwave transmission capacity, which is available. The Gelephu area routes traffic directly back to the gateway at Thimphu which is connected to the Thimphu PSTN.

A backbone to deliver the bandwidth to the clusters of customer sites is required to build a full network. Ideally, you would like this backbone to be much faster than the last-mile delivery system so you can aggregate the bandwidth from many sites onto your backbone and ship it around. Also, because your backbone will be a point-to-point system, you could take advantage of this and design it to be full duplex. This would more than double its capacity, and lessen delayed packets due to collisions. This allows the maximum transit time of packets from one end of the network to the other to be much more predictable, which is a consideration for VoIP and other real-time data. The engineers noted that as the number of calls in progress went up so did the collisions and retries. This is very understandable because a call sends data in both directions, and on a half-duplex link this means the two ends have to take turns sending on their shared frequency. Because 802.11b provides so much more bandwidth than is used for a moderate number of simultaneous calls, the collision rate is acceptable and the voice quality should be unaffected. On a system intended to run at near capacity, you should seriously consider a full duplex high-speed backbone. The most likely candidates seem to be the 5.8 GHz equipment with amplifiers, perhaps on non-overlapping frequencies using horizontal and vertical polarizations for further isolation.

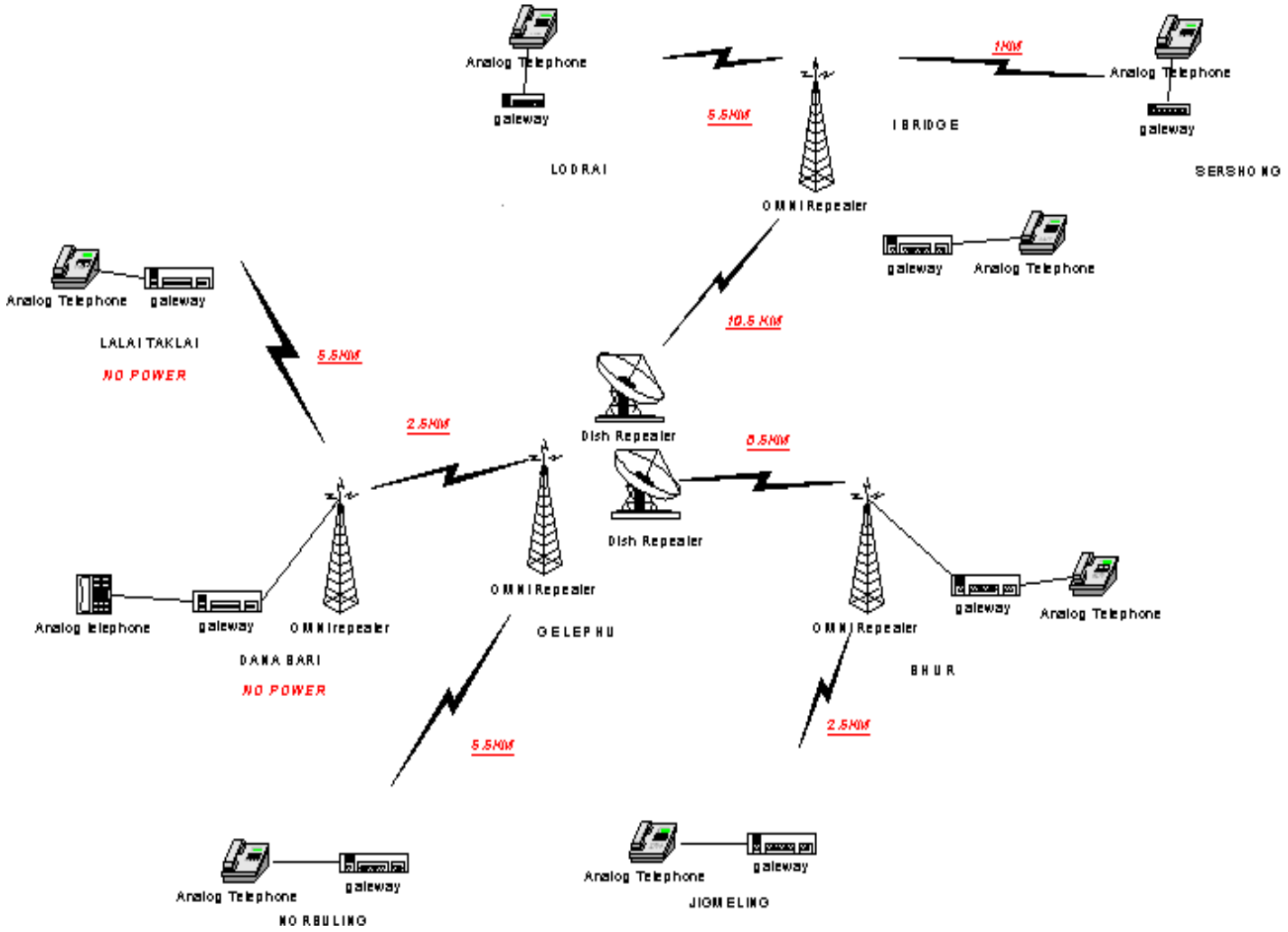
Annex

Network Configuration

1 Limukha Area



2 Gelephu Area

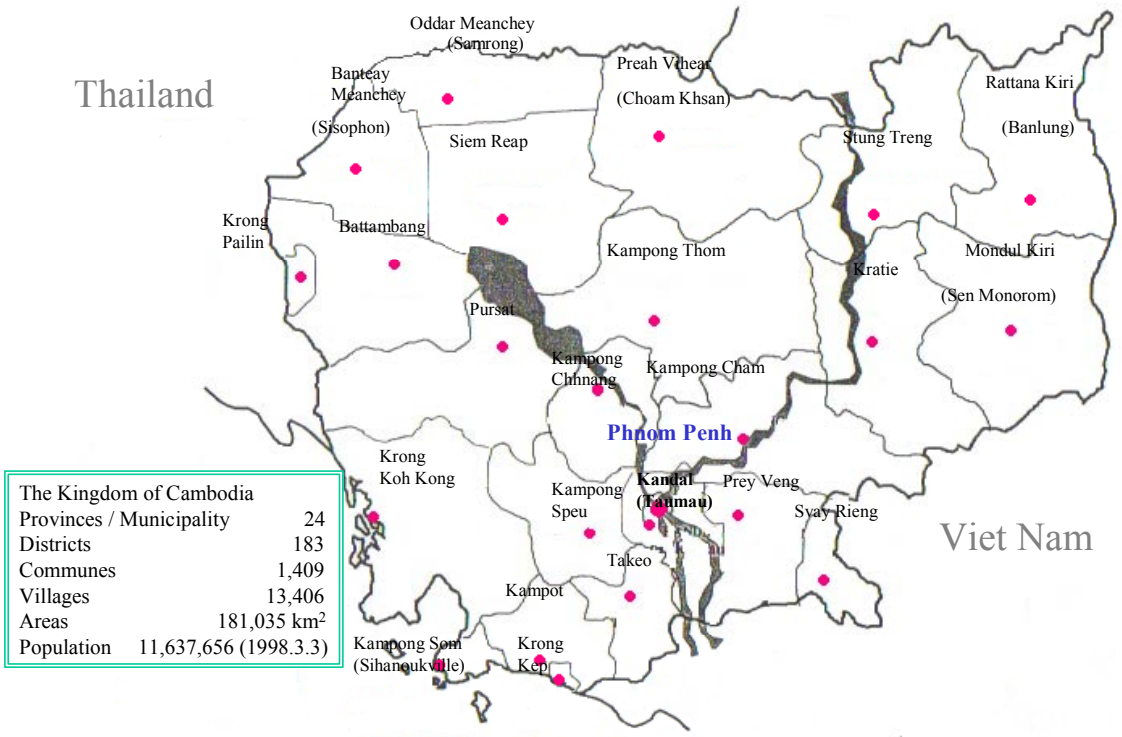


Cambodia

Nong Borang
Riel Barey
Ministry of Posts and
Telecommunications of Cambodia

Telecommunication Development Country Report for Camdodia

Kingdom of Cambodia



The Kingdom of Cambodia	
Provinces / Municipality	24
Districts	183
Communes	1,409
Villages	13,406
Areas	181,035 km^2
Population	11,637,656 (1998.3.3)

A – GEOGRAPHIC FEATURES

NAME OF COUNTRY: **KINGDOM OF CAMBODIA**

CAPITAL: **PHNOM PENH**

PROVINCES: **24 PROVINCES/Municipality**

TERRITORY: **181,035 km²**

LOCATION: **In the southwestern corner of Indochina by Thailand to the West, Laos to the North, Viet Nam to the East and Gulf of Thailand to the South**

CLIMATE: **Part of monsoon Asia and tropical zone, with pronounced wet and dry seasons:**
- dry season from November-April
- rain falls mainly in May-October.

JUNE, 2002

POPULATION: **More than 11 million**

RELIGION: **Buddhism (90% of population) Others are Catholic, Protestant, Islamic.**

LANGUAGE: **Khmer is the national language, French was used as the official language until about 1970. Recently, English prevalent. Other languages: Vietnamese and Chinese are also spoken.**

JUNE, 2002

B – Ministry of Posts and Telecommunications

1. MPTC Staff

There is a total of 1960 staff as of 2002 made up as follows:

–	**Number of employees classified by the Central**	**1309**
	Male	**836**
	Female	**473**
–	**Number of employees classified by the Provinces**	**651**
	Male	**496**
	Female	**155**

Working hours:
Monday-Friday **AM 07:30-11:30 / PM 14:00-17:30**

August, 2002

2. Present Status

TELEPHONE SERVICES

a) TOTAL OF TELEPHONE SETS: 504,798 (May, 2002)

- **FIXED PHONE: 22,200**
- **WIRELESS LOCAL LOOP: 7,710**
- **MOBILE: 275,088**

b) NUMBER OF TELEPHONE SETS PER 100 PEOPLE (December 31, 2001)

For whole country:	**1.96 Lines/100 people (+ Mobile)**
Mobile Phone:	**1.65 Sets/100 people**
Fixed Phone:	**0.31 Lines/100 people**
For Phnom Penh:	**17.76 Sets/100 people (+ Mobile)**
For Provinces:	**0.65 Sets/100 people**

August, 2002

c) TELECOMMUNICATION SECTOR OUTLOOK

The MPTC is the solely responsible and authorized body to supply a telecommunication service and to retain the exclusive right to enter into joint ventures (BOT: Build-Operate-Transfer)

1. OUTLINE OF ADMINISTRATIVE ORGANIZATION

In MPTC, 5 Under-Secretaries of State report through two Secretaries of State to the Minister; each is in charge of international communications, domestic communications, and control of general management including the postal service.

June, 2002

2. CURRENT POLICY AND REGULATIVE ENVIRONMENT

a. The principle telecommunication laws and regulations, the policy concerning privatization, corporatization and competition are still under preparation and planned to be established in the near futur.

b. MPTC has foreign partners: telecom companies which operate with the different services of carriers under the JV form.

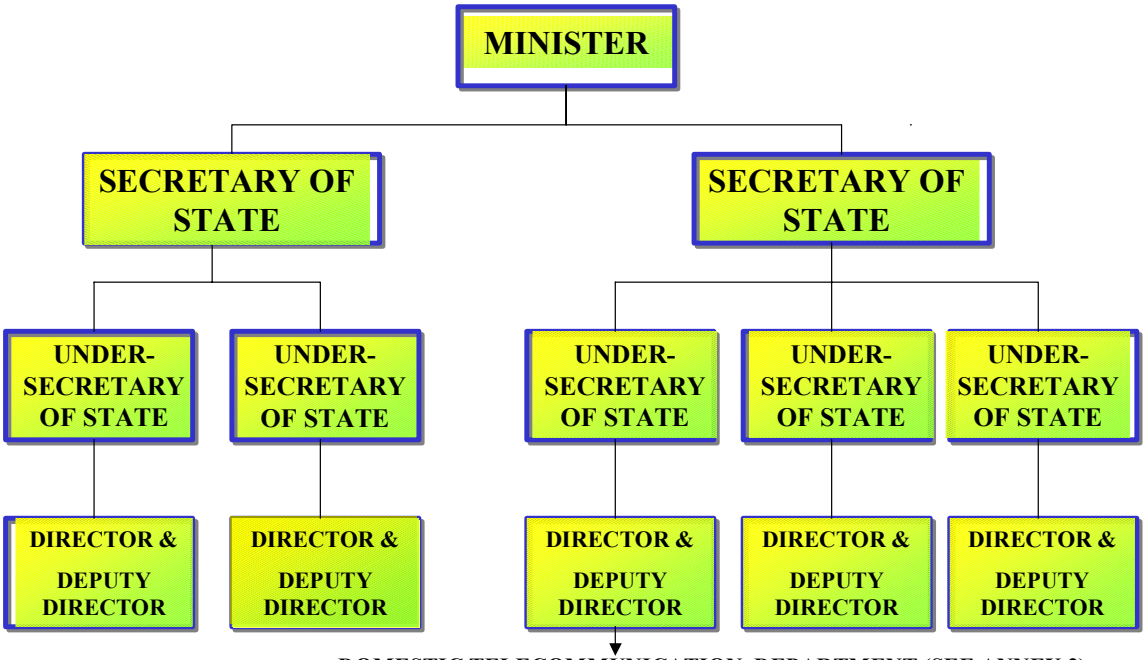
c. In the future, a national policy plan to develop the network information infrastructure.

d. Major problems and difficulties in the telecommunication sector that should be solved: to reform the telecommunication sector, to improve the quality of the services and develop human resources.

The MPTC carries out all post and telecommunication services such as management, supervision and operations with the exception of some cooperative business conducted with foreign communication companies. In the MPTC organization, the operating body in provinces outside Phnom Penh are under the control of the provincial authorities. The present organization of MPTC is shown in the figures given in Annex 1 and Annex 2.

August, 2002

ORGANIZATION CHART OF MPTC (ANNEX 1)



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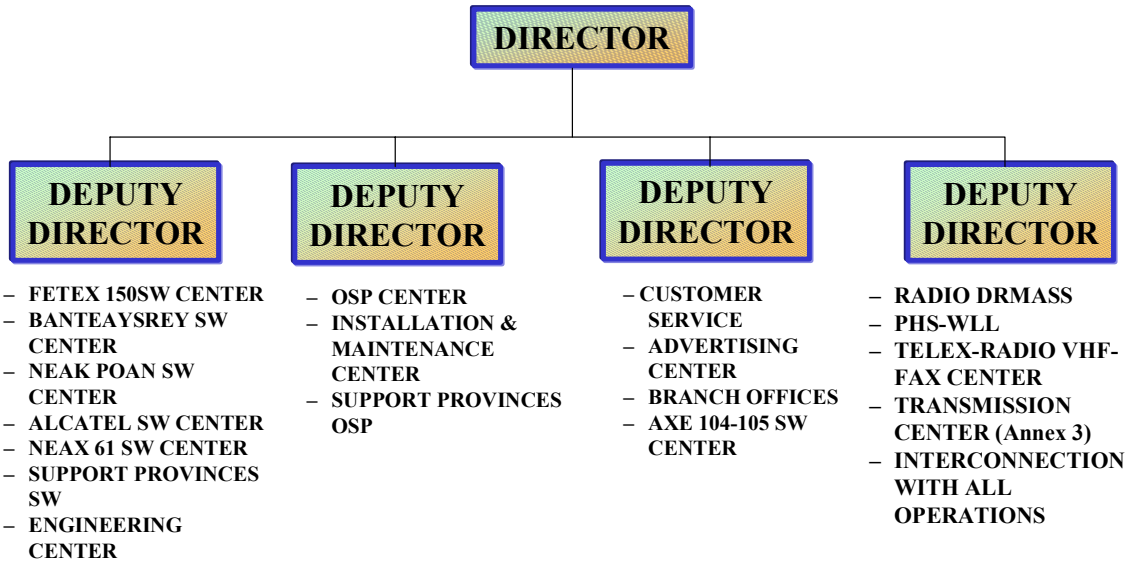
ORGANIZATION CHART OF DOMESTIC TELECOMMUNICATION DEPARTMENT (ANNEX 2)



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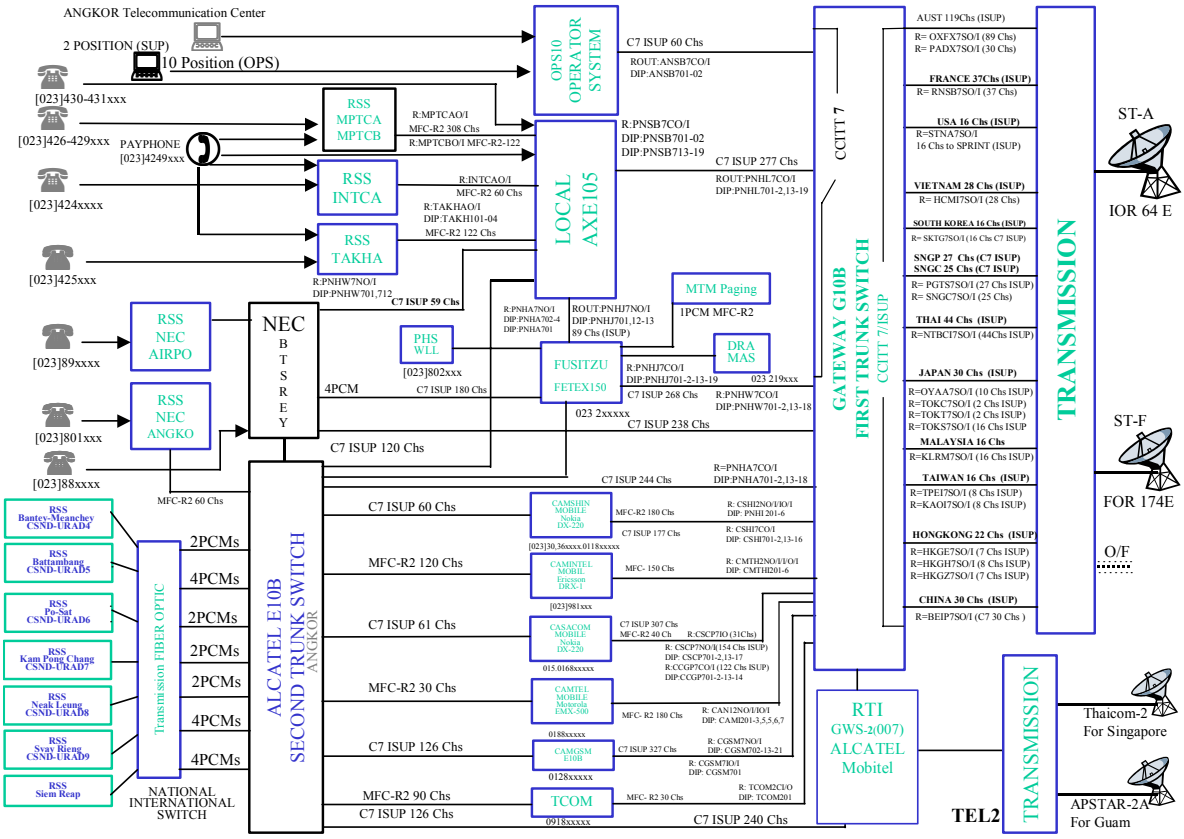
NETWORK CONFIGURATION IN CAMBODIA



C – OTHER SERVICES

1 – ISDN: Not available

2 – PUBLIC PHONE: 312 sets (by May, 2002)
155 sets (MPTC)
157 sets (CAMINTEL Co.)

3 – INTERNET SERVICE: (by December 31, 2001)

Total: 5,567 Customers
Camnet (MPTC): 2,222 Customers
BigPont (TELSTRA): 2,565 Customers
ISP CAM G.S.M.: 780 Customers

August, 2002

4 – MOBILE PHONE SERVICE: (by May, 2002)

CAMTEL:	**2,422 sets**
CASACOM:	**8,958 sets**
CASACOM GSM:	**58,768 sets**
CAMSHIN (WLL):	**6,778 sets**
CAMSHIN GSM:	**53,482 sets**
CAM GSM (MOBITEL):	**146,496 sets**

5 – IT ACTIVITIES:

USED FOR PRIVATE COMPANIES, NGOs, INTERNATIONAL ORGANIZATIONS AND SOME MINISTRIES. BUT NOW WE PREPARE FOR E-GO

6 – LEASED LINE:

USED FOR PRIVATE COMPANIES, EMBASSIES AND NGOs.

August, 2002

7 – FUTURE PROGRAM

A – EXECUTIVE PROJECT

THE FIRST LONG-DISTANCE OPTICAL FIBRE TRANSMISSION OF THE COUNTRY IS TO BE INSTALLED, UNDER SUBTANTIAL FOREIGN AID FROM THE GOVERNMENT OF GERMANY, FROM THE NORTH-WEST TO SOUTH-EAST (ABOUT 620 KM), THAT IS TO SAY FROM POI PET ON THE THAILAND-CAMBODIA BORDER ON THE ROAD TO BANGKOK CITY, TO PHUM BAVET ON THE VIET NAM-CAMBODIA BORDER ON THE ROAD TO HO CHI MINH CITY; A SDH BUS LINK WILL BE INSTALLED WHICH HAS BEEN DESIGNED TO HANDLE THE NATIONAL TRAFFIC AND TRANSIT TRAFFIC USING A 155 Mbit/s STM
INSTALLED OPTIC CABLE FROM SIEM REAP TO BANTEY MEAN CHEY PROVINCE ABOUT 104 KM

MAIN CITIES LOCATED ALONG THE OPTICAL FIBRE CABLE ROUTE.
THE OUTSIDE PLANT FACILITIES WITH CAPACITY OF 6000 LINES WERE ALREADY IN OPERATION.

August, 2002

THE OPS WAS DESIGNED AND CONSTRUCTED BY MPTCS STAFF.

IN THE SIEM REAP PROVICE, THE OUTSIDE PLANT FACILITIES AND SWITCHING WITH 2000 LINES WERE CONSTRUCTED. THIS WORK WAS ALSO DESIGNED AND CONSTRUCTED BY MPTCS STAFF.

B – PLANNING PROJECTS

- **TO ESTABLISH THE OPTICAL FIBRE CABLE TRANSMISSION TRUNK LINE ABOUT 620 KM BETWEEN KAMPONG CHAM-PHNOM PENH –CANDAL-TAKEO-KAMPOT-SIHANUK VILLE UNDER SUBSTANTIAL AID FROM THE GOVERNMENT OF JAPAN (THROUGH JICA).**

- **TO ESTABLISH THE RURAL TELEPHONE ACCESS ALONG THE ABOVE TRUNK LINE.**

August, 2002

8 – TELECOMMUNICATION PROBLEMS AND DIFFICULTIES AWAITING SOLUTIONS IN OUR COUNTRY AT PRESENT:

- **NOT HAVING THE REQUIRED SPARE PARTS AND FUNDS FOR DEVELOPMENT AND MAINTENANCE.**

- **LACK OF SKILLED MANPOWER FOR ATTENDING TO THE MAINTENANCE DEVELOPMENT WORK AND NEW TECHNOLOGY.**

- **LACK OF COORDINATION AMONG DIFFERENT SERVICE-PROVIDING ORGANIZATIONS.**

- **FINANCING PROBLEMS.**

August, 2002

CAMBODIA

THANK YOU SO MUCH
for ITU Cooperation

ITU

THE END

August, 2002

India

ITU TELECOM ASIA 2002 Hong Kong 2-7 December

TELECOM MEET THE FUTURE

Questions

1

Private sector participation in investment for providing bandwidth (infrastructure) for Internet access in rural India has, so far, been very negligible because of low return on investment. As such, investment for such infrastructure is being made by the public sectors only. What kind of methodology with regard to policy/regulations/conditions may be adopted so that private sector participation in such investment is encouraged?

2

From April 2001, the Internet growth rate has declined. What are the kinds of innovative Internet-related policies we should have to further enhance the growth and penetration of Internet services in India?

3

With the increase in global trade via E-commerce/M-commerce, how should one safeguard the various data banks from fraud, particularly in a hostile environment?

Vijoy Kumar

Deputy Director General
Department of Telecommunications

Ministry of Communications and IT
Government of India

India

Benefits to Citizens and Society in India: Internet for Development

1 Introduction

1.1 India being a developing country with an amazing socio-cultural diversity and a huge size, it is most relevant to mention the benefits of the Internet to citizens, for society and its development. Despite certain limiting factors like access, bandwidth, language bias, etc. the Internet has definitely made major changes to the Indian socio-economic landscape.

- Young English-speaking children and adults up to the age group of 30 years have been directly impacted the most.

- The most important benefit has been the generation of employment opportunities for Indians in India and abroad, especially with the rise of new-age businesses in areas of telecom and software services and consulting.

- Internet has provided international exposure. It has caused changes in domestic business environment especially with respect to work culture, dignity of labor, emphasis on sound business practices like productivity, quality consciousness, meritocracy, etc. There has been a marked increased in awareness of international business practices and market conditions even in more traditional businesses including agriculture, which is largely carried out in India using ancient techniques.

- There has also been a tremendous increase in mobility of technical labour due to increased job opportunities as well as increased facilities for communication.

- Geographical limitations on social bonding began dissolving because of e-mail, which increased understanding of different cultures.

1.2 Subsequently, India saw the emergence of Internet-based societies, members of which may have never seen each other and are geographically apart but have common interests. This has resulted in better-informed citizens and strengthening of public opinion which is so vital for the good health of any democracy.

1.3 The Internet is certainly a major phenomenon in India today. Internet kiosks are available in every nook and cranny. In fact, it is being universally recognized that as the Internet proliferates, so will e-commerce and e-governance and e-business.

1.4 Introduction of e-governance by various State governments and the Central Government has helped in achieving greater transparency in government functioning, speed and ease in accessing information on government activities or status of one's file/case, filing government forms, tenders, etc. It has also saved many man-hours, fuel, and so on, and has reduced public harassment, corruption, the load of existing infrastructure, etc. Centralized Internet banking

and computerized banking have also increased productivity and ease of conducting business.

2 Internet Industry – A Snap-shot (as on June 2002)

i)	ISP Licences issued	540
ii)	Operational ISPs	185
iii)	Cities/Towns covered	340
iv)	Internet subscribers	3.3 million
v)	Cyber Cafés/ Public Access Kiosks	12,000
vi)	In-principal approval for setting up int'l gateways	45 ISPs
vii)	Operational int'l gateways	40
viii)	Total estimated investment made by ISPs	Rs. 6,000 crores*
ix)	Estimated investment made on equipment by ISPs	Rs. 2,500 crores*
x)	Estimated employments provided (direct/indirect) by Internet industry	110,000

*crore: 10 million

3 Policy Initiatives by the Government

3.1 The New Telecommunication Policy, 1999, (NTP '99) stipulates targets in terms of establishing a telecom network with a view to achieving tele-density of 7% by the year 2005 and 15% by the year 2010. The NTP '99 also stipulates targets for providing Internet access to all District Headquarters by the year 2002. In addition, the Government has initiated various pro-active measures for the proliferation of the Internet industry in the country. Some of the important initiatives are as follow:

- ISP Licence is one of the most liberal Licences, whereby no Licence Fee has been levied on the ISPs.
- There is no restriction on the number of Service Providers in all the three categories, i.e. "A", "B", "C".
- ISPs have been permitted to set up international gateways by having business arrangements with foreign satellite providers and collaborators.
- ISPs have been permitted to provide last-mile access using radio and fibre optics.
- ISPs have been permitted to provide ISP services through cable TV infra-structure/operators.
- The Government has initiated an ambitious plan to develop National Internet Backbone (NIB) in the country.
- 100% FDI allowed through automatic routes to the ISP (without gateways), 74% in case of ISPs setting up International Gateways.
- ISPs permitted to set up submarine cable landing stations either singly or jointly in collaboration with international undersea bandwidth carriers.
- National long distance services opened to private sector on a non-exclusive basis.
- International long distance services opened up to private sector on a non-exclusive basis w.e.f. April 1, 2002.
- Implementation of IT Act, 2000.

Internet telephony services opened up to ISPs w.e.f. April 1, 2002.

4 Steps taken by the Government for promotion of the Internet

The following steps have been taken by Government for promotion of Internet services in the country for rural, hilly and remote areas:

i) Number of Internet nodes installed in the country – 427

ii) An Internet facility has been made available in all District Headquarters of the country.

iii) An Internet facility has been extended to the customers on a local call charge basis to the nearest node.

iv) An Internet facility has been extended to 5,625 block headquarters of the country:

v) Internet nodes have been set up in remote and hilly areas like Shillong, Agartala, R.K. Pur, Aizwal, Dimapur,

Itanagar, Passighat, Imphal, Kohima, Almora, Pithoragarh, Gopeshwar, Solan Ooty, Namchi, Geyzing, Rangpo, etc.

vi) Internet Dhabas: BSNL, through the scheme of Internet Dhabas, set up through franchises, has provided Internet Dial-up connections to 3,051 Internet Dhabas.

vii) To promote proliferation of the Internet in rural areas, BSNL is offering free Internet access for the Internet Dhabas in the rural block headquarters.

viii) The Internet Dhaba franchises are also eligible for 25% of the Public Switched Telephone Network (PSTN) access charges as commission.

ix) Community Information Centres have been made operational in the 487 blocks of the North-East with V-SAT connectivity.

5 Present Scenario

5.1 Despite the problems of expanding the access base of the Internet, there is an abundance of Internet content generated from India. An independent study has shown that over 100,000 firms in India are currently online, including the majority of newspapers and magazines. The National Informatics Centre provides online information on a number of government departments. In addition, the importance of the Internet as a broadcast medium is being recognizing by firms – online newspapers and magazines are now at the top of the list of advertising locations. The same study concluded that the search engine Khoj indexed over 200,000 India-content websites.

5.2 We are an extremely content-rich country with a very free press climate. News, culture, entertainment, sports, medicine, engineering, tourism, etc., knowledge bases of this country require portals for a content-hungry consumer marketplace. India has a fairly good domestic user base. It can sustain a lot of local infrastructure, content, foreign capital investments and an online market in general.

5.3 Internet users, on average, are estimated to be accessing the Internet for a little over 6 hours a week. As per last estimations, the following have precedence over each other: information, followed by education (as in users educating themselves by reading/subscribing or registering for e-courses), followed by entertainment. As everywhere, people access the Internet mostly to be in touch with other people (via e-mails) and check up on Internal and domestic news on the Web or to source information on products, services or companies. With the rise in the use of credit and debit cards in India, many Indian Internet users have these, and use them quite often to make transactions over the Internet. Many Indian sites are offering services to the Indian community living abroad. Now it is much easier for a relative living abroad to send gifts to dear ones in India using the Internet. Indian companies having a distribution network across India offer such services (viz. HomeIndia.com, indiatimes.com, etc.).

5.4 The Indian community living abroad uses another unique service offered by such sites. They simply log on to type a message (letter) to their dear ones in India and leave a mailing address in India with them. The message is downloaded and printed in India to send it over to the Indian address by express post. This has helped many Indian families that do not have Internet connectivity for one reason or the other.

6 Some Interesting Findings by Survey on the Internet*

a) Over 78% of the Internet users are in the age group 18–39 years and 75% of the Internet users are males.

b) The capital cities (New Delhi and other State Capitals) account for 79% of Internet connections of the country.

c) More than 86% of top corporate houses have endorsed that Internet and e-commerce are an integral part of their corporate strategic framework.

d) Over 76% of the Internet users use e-mail services

e) Over 61% of the users access Internet from schools, colleges, places of work and Cyber Cafés while 27% access Internet from homes.

f) Among the career conscious and education-driven middle class, Internet is seen as critical to success in professional life.

g) There are approx. 46 million telephone connections (including mobile) and 7.5 million PC bases in India.

h) There are approx. 45 million cable TV connections out of 90 million TV sets in the country.

**Source:* DoT, NASSCOM, MAIT and Telescope Survey.

7 Internet Telephony

7.1 Since 1995, a number of countries have permitted VoIP as a technology option to the classical PSTN as well as Internet telephony so as to provide a cheaper alternative to classical PSTN calls. In India, the ISPs were allowed to offer Internet telephony services with effect from April 1 2002. With the choice availability of Toll Quality (PSTN) and Non-Toll Quality options, Internet telephony has thrown open long-distance telephony to those sections of society that could not afford the same earlier. Further, Internet telephony is proving to be a key driver for local entrepreneurs to set up Community Information Centres/Cyber-kiosks/Internet Dhabas, etc. even in small towns and villages. In fact, it has made distance learning, tele-medicine and e-governance, etc., a reality in the Indian context.

8 Certain Case Studies

8.1 Electronic Governance

8.1.1 The Center for E-Governance set up at Electronics Niketan showcases the applications running countrywide with the objective of collating and disseminating best practices in the area of e-governance for use by the Central and State Governments. The Center can also offer services like technical consultation, proof of concept and conduct programmes for creating awareness among decision-makers in the Central and State Governments and help in implementing necessary process and policy changes.

8.1.2 Project "Versatile On-line Information for Citizens, Empowerment", showcased at the Center for E-Governance, has been chosen for implementation by NDMC, New Delhi. CMC has been entrusted with the job.

8.1.3 An E-Office package has been developed with the objective of reducing paperwork. This enables online tour approval, leave approval, issue of office orders, meeting papers, generation of various reports, etc. This is under process for testing and deployment.

8.1.4 The following pilot projects have been initiated for e-governance:

- Electronics Governance Model for Indian universitie by Anna University. The objectives of the project are:
  a) Develop EG package for universities;
  b) Computerization of records and their processing;
  c) Networking and movement of information in soft form.
- E-Governance Citizen IT Interface project in the office of DC, Fatehgarh Sahib District, Punjab, through National Informatics Center Services Inc. The objective of the project is to provide a friendly, affordable, speedier and efficient interface between Government and the public. Various application modules have been developed and installation is being completed at the DC Office.
- Project "Operation Sadhbhavana" Augmentation of Information Technology in the Laddakh region was initiated in November, 2001. This project is being implemented through NICSI and is aimed at creating IT awareness and providing computer-based education in schools/colleges situated in far-flung areas.
- Strengthening of NICNET in the States lagging behind in information technology diffusion by providing higher communication bandwidth, and video conferencing facilities at commissionies level.

8.2 Telemedicine

8.2.1 The Health and Biotechnology Division of DIT supports development and application of electronics and IT to the health sector to enhance the performance of health-care services in the country and improve health status of the population.

8.2.2 The Department has supported a number of projects in the area of IT application to health with emphasis on telemedicine. Some of the projects in the area of telemedicine are:

i) Development of telemedicine technology using a high-speed communication network interconnecting three referral hospitals (namely SGPGI Lucknow, PGIMER Chandigarh and AIIMS New Delhi) is under implementation by CDAC and CEDT.

ii) Telemedicine for diagnosis and monitoring of tropical diseases over low-speed WAN. The telemedicine technology for diagnosis and monitoring of skin-related and blood-related tropical diseases has been developed by Webel and IIT, Kharagpur. The system has been installed in the School of Tropical Medicine, Kolkata, and in a district hospital in West Bengal.

iii) Cancer NET for oncology Information, online medical advice and disease surveillance. The objective is to develop a web-based service over the Internet for cancer patients at remote locations by the Regional Cancer Centre, Thiruvananthapuram, specialized in cancer detection, treatment, pain relief and follow-up advice.

iv) Under Jai Vigyan National S&T Mission, a programme has been initiated for Braille literacy in Indian languages with the application of IT. This will enable the blind schools in various parts of the country to share education and training materials for the blind which would make them socially productive persons.

8.3 Distance Education: Vidya Vahini and Gyan Vahini Programmes

8.3.1 There has been a considerable shift in the learning paradigm due to the introduction of technology and newer methods of imparting education. New technologies are being gradually integrated into the learning environment. Networking and Internet are being used as cost-effective tools for improving learning opportunities for students, faculty development, supporting professional development, increasing productivity of members of the learning community and improving the efficiency of schools, district and state administration.

8.3.2 The focus is on strengthening Information Technology (IT) infrastructure for delivery of content and linking classrooms on broadband communication links to deliver integrated voice, data and video to every classroom. Video-conferencing over the Internet is being used as a key technology for students to communicate with each other, with teachers and with the national and international experts. The network technology is being used by the students and the teachers for applications like distance learning, digital library and to access database sharing resources and accessing those people who were previously unavailable to access.

8.3.3 Today, there are more than 1,100,000 schools and over 13,000 higher learning institutions in the country (universities, engineering and medical, dental and degree colleges) catering to more than 250 million students and 7.5 million teachers. Some of these educational institutions are working diligently to speed up the introduction of networking and Internet in their learning environment, so that they can capitalize on the immense benefits of these technologies.

8.4 Vidya Vahini – Salient Features

8.4.1 Out of 1,100,000 schools in the country, there are 60,000 senior secondary schools in the Government sector which have basic infrastructure like science labs and mathematics teachers, electricity, telephone and furniture. It is, therefore, proposed to connect 60,000 Government and Government-funded senior secondary schools on Intranet and

Internet by providing them computer laboratories to facilitate:

- IT education
- Access to the Internet
- Online libraries
- Academic services
- Web broadcasting
- E-learning
- Sharing library resources

8.4.2 The proposal would be implemented in phases. In the first phase, 60,000 Government senior secondary schools across the country would be provided IT infrastructure and connected on the Intranet and Internet. The rest of the schools would be taken up in the second phase.

8.5 Gyan Vahini – Salient Features

8.5.1 There are more than 13,000 Government-aided higher learning institutions in the country, which comprises Central, State, deemed universities, engineering, medical, dental and degree colleges. The program is proposed to be implemented in the following two phases:

Phase-I – To set up Intranet and Internet for 565 Government-funded higher learning institutions (237 universities, 18 deemed universities, 215 engineering colleges and 95 medical colleges).

Phase-II – To set up Intranet and Internet for 11,837 Government-funded higher learning institutions (1,210 polytechnics, 10,600 degree colleges and 27 dental colleges).

9 Emerging Information Society

9.1 Data traffic in India is expected to increase to 30-40% of the voice market, bumping up total revenues from voice and data traffic to Rs 1,000,000 million (USD 21.28 b). India, with its recent initiatives in the telecom sector, is expected to be the fourth largest market in the Internet telephony sector in Asia-Pacific after China, Japan and South Korea.

9.2 Globally Internet traffic is doubling every four months and voice traffic is growing at the rate of 6-9% annually. In line with present trends, the IC (Information and Communication) industry believes that by next year over 90% of all traffic will be carried on Internet Protocol (IP) networks world-wide. India, with the emergence and increased usage of voice-over-IP facility, is expected to drive down the price of voice and data communications to a minimum.

9.3 Our Indian society is emerging as an interconnected society on a par with the developed world. Today we may have a low density of computers in India but our connected society is big. A study by IDC says that the percentage of urban Indians who had used the Internet in one form or the other jumped from 5 to 9% between 1999 and 2000 and is expected to grow manifold. They have predicted that India will have 25 million users in 2005, up from a mere three million in 2000. An independent study by Dataquest has concluded that data accounts for 5% of the entire bandwidth traffic; but with the expected compounded annual growth rate of 67.02% in data traffic, by 2005 it will far exceed voice traffic, accounting for 65% of the total traffic.

9.4 Today many in India rely on "Apps on a Tap" – applications that run on the Net – to help reduce the disparity between organizations. Application Service Providers (ASPs) offer users the opportunity to conduct their business over the Net within a secure work environment. So, a small business needn't invest large amounts of money in the day-to-day IT applications required to run an e-business, as those applications are available on the Net whenever needed. These could range from accounting and transactional software to an industry-focused virtual storefront, where the business can display its products and services. This is usually through a subscription fee in India as it is still in its nascent stage but will move on to the next level of "pay-per-use". This is significantly helping many companies in India, especially the exporters and people on the move.

9.5 India has around 8 million cellular subscribers and has a growth rate of 80%. The wireless society of India believes in "always connected". SMS (Short Message Service) is one of the several services which mobiles can offer or are offering. This feature is one of the biggest drivers to attract customers. We see youths interacting with their friends offline through SMS.

9.6 Personal, localised and simple SMS options are being developed and provided to the customers. With the Multi Applications running on mobile networks, it is easier for subscribers to log on to their bank account, view details as well as carry out transactions irrespective of their location. Different service providers offer such services by having a tie-up with commercial banks. For example, HDFC Bank allows its customers to have the facility to check their account balance, request a cheque-book, request a draft, etc., over the HUTCH network. A similar facility is offered by the ICICI Bank through AIRTEL.

Ary Suryani

Directorate General of Posts and Telecommunications

Ministry of Communications

Indonesia

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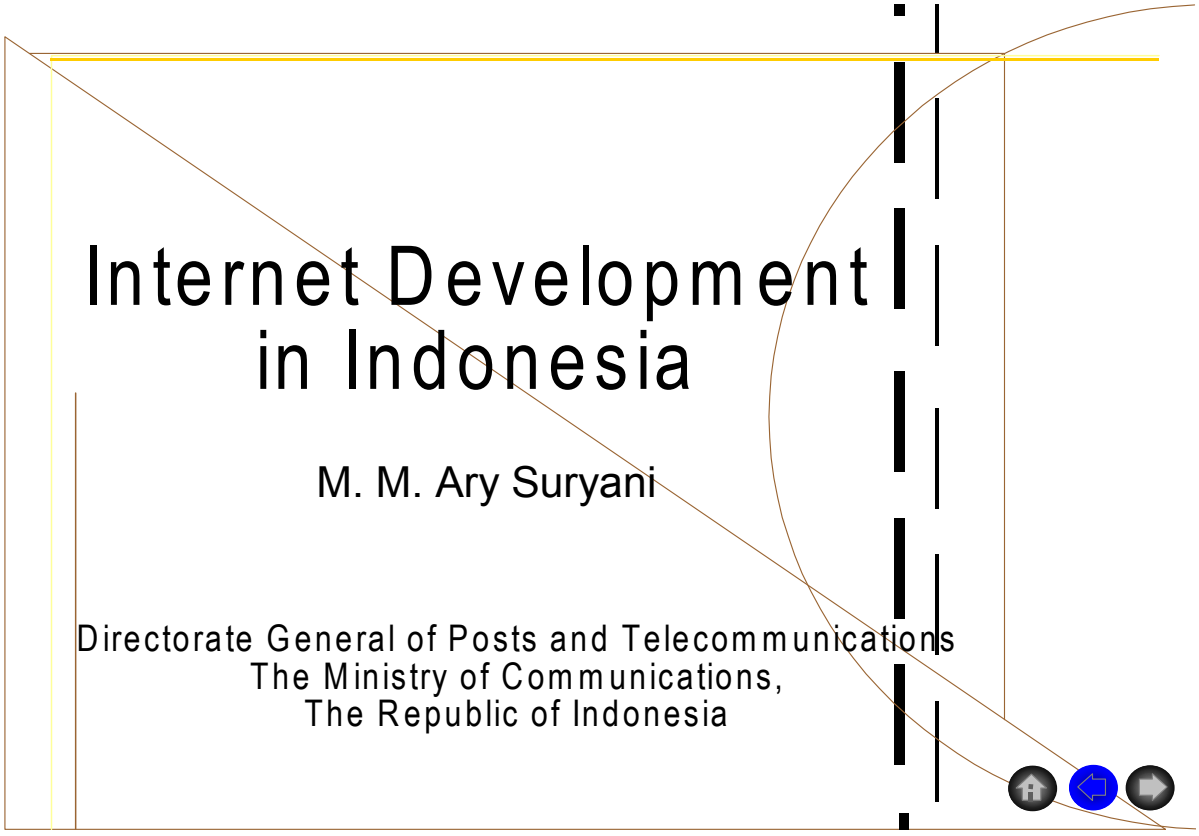


Indonesia status

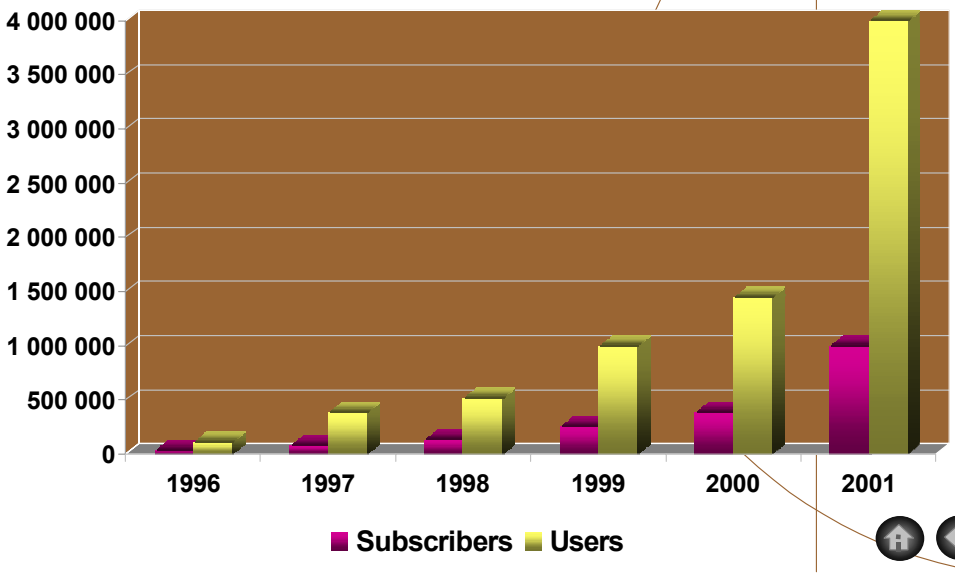
- Lacking in investment to develop telecom infrastructure
- Low density (3% or 3 phone lines per 100 people)
- Most lines are concentrated in cities
- The majority of the population does not have access to telephone and information
- There is a need to invite foreign investors to participate in telecommunication development
- Towards the open market, Government has made some steps to reform the telecommunication sector

Recent status

- Telecom
  - 7.1 million lines (3% density)
  - Cellular: > 6.5 million
- Internet access
  - Users: estimated 4 million
  - Potential users: estimated 61 million
  - High growth in Internet users
- Type of access
  - Dial-up, Cable modem, xDSL, Satellite
  - > 2,000 Internet cafés

Internet users

Source: APJII – Indonesia ISP Association



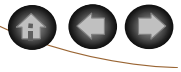
Potential Internet users

Huge potential for Internet users in Indonesia:

• 150,000 telephone/Internet cafés	• ~30 million
• 1,600 universities+	• ~3 million
• 4,000 Specialized high schools (SMK)	• ~4 million
• 10,000 High schools (SMU)	• ~7 million
• 10,000 Pesantren (religious boarding schools)	• ~7 million
• Businesses/offices	• ~10 million
Total potential Internet users	~ 61 million

Information technology

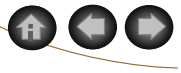
- Internet subscribers (as of end 2001)
  - Dial-up Internet subscribers: 1,000,000
  - Leased-line Internet subscribers: 7,200
- Access
  - public Internet kiosks (43%)
  - offices (41%)
  - residential (12%)
  - campuses (3%)
  - and schools (1%)



Internet bandwidth

- International bandwidth: 670 Mbit/s
  - Outgoing: 170
  - Incoming: 500
- Local bandwidth (Indonesia Internet Exchanges or ***IIX***): 231 Mbit/s peak
- Physical connection in ***IIX***: 2.5 Gbit/s (2,450 Mbit/s)

As of Sept 2001

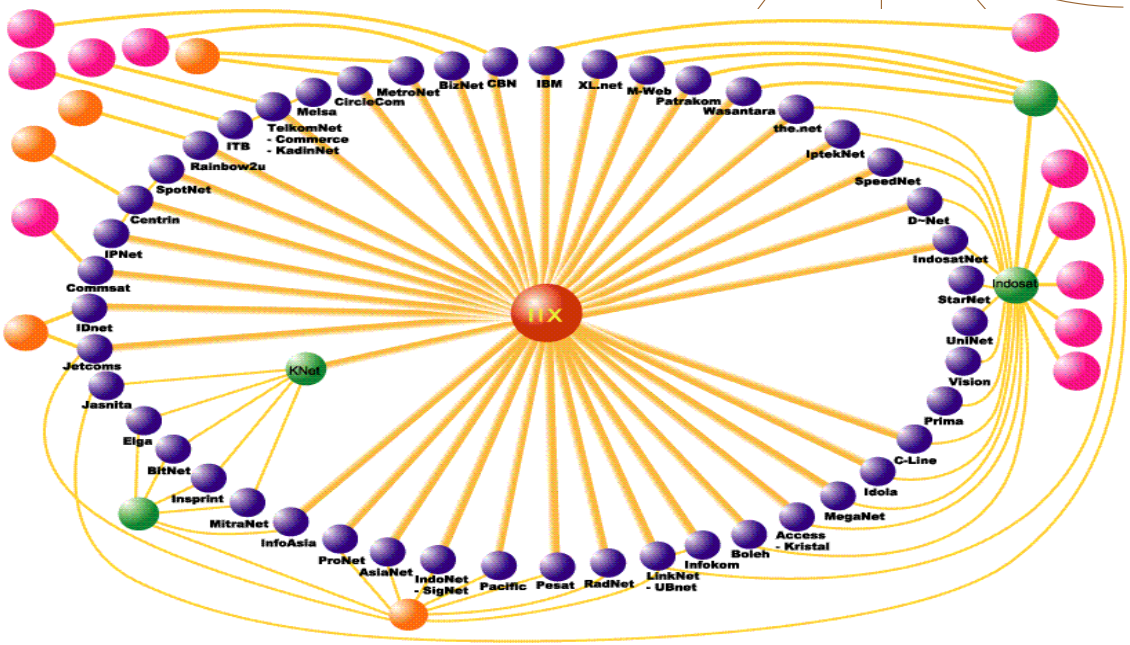


ISP

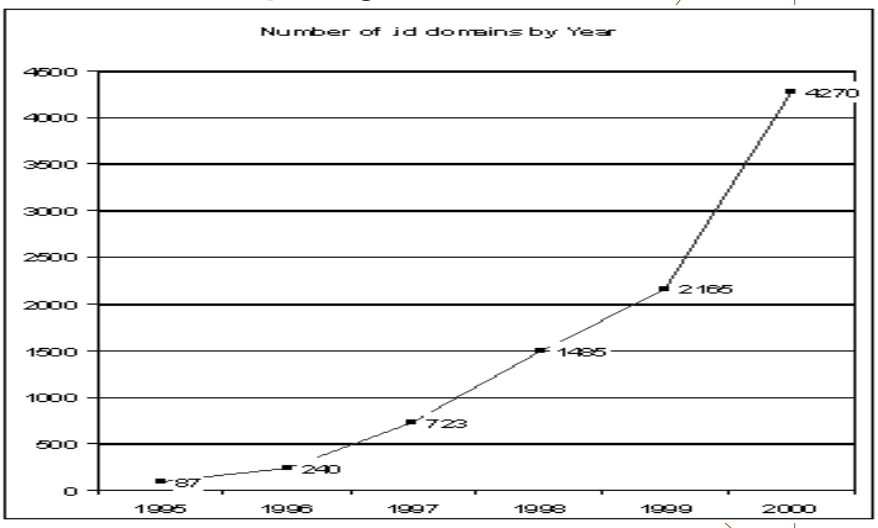
- Licensed: 179
- Operational: 89

Indonesia Internet Exchange (*IIX*)

Source: APJII – Indonesia ISP Association



Domain **.id** progress

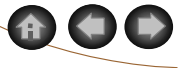


Source: APJII, 2001

Information and Communication Technologies

ICT establishment

- Encouraging Internet access through:
  - ISP, high-speed Internet access, broadband wireless access and satellite
  - Hybrid Fibre Coaxial (HFC): Jakarta, Bogor, Bekasi, and Yogyakarta
  - xDSL (any digital subscriber lines)
- Regulations in preparation:
  - IT Utilization Law (Ministry of Communications)
  - Electronic commerce related laws such as digital signatures law (Ministry of Trade and Industry)
  - Roadmap for E-government (Ministry of Information)
- Implemented through Action Plans

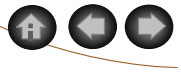


International Bandwidth

- Dealing with international bandwidth, Government endorses that bandwidth (Internet) should be cheaper than before
- Through network access point (NAP) licenses, Government encourages private investments to compete in international bandwidth provisioning in Indonesia

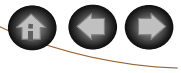
IT development strategy

- Establishing regulations on ICT
- Developing infrastructures and access facilities and CTC
- Developing IT corridors
- Encouraging IT services, with emphasis on:
  - Tele-education
  - Tele-medicine
  - E-government



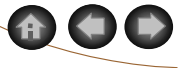
Programme for ICT regulation

- Currently, no limitation on the number of ISPs
- Preparing Information Technology Law to provide jurisdiction and umbrella provisioning for IT implementation in Indonesia. The law will cover all aspects of IT implementation such as:
  - Privacy protection
  - Electronic commerce
  - Competition, Consumer protection, Taxation
  - IPR (Intellectual Property Rights)



Programme for information access

- Endorse information access through villages
- One million telephone access for 971 sub-districts (kecamatan) and about 42,014 villages (desa)
- Infrastructures for community telecentres in rural areas
- Broadband Internet Kiosks/Cafés: remote access area 10 nodes
- Business Information Centre: 320 nodes
- Education:
  - School 2000 programme, accelerating Internet access from schools
  - Establishing a campus network in Indonesia



Programme for IT corridors

- Develop multimedia cities:
  - Kemayoran cities, Jakarta
  - Parahyangan multimedia corridor, West Java
  - Bandung High-Tech valley, West Java
  - Jogjakarta
  - Batam Intelligent Island
- Develop high-speed IP-based backbone: Indonesia rings

Programmes for application developments

- Tele-education
  - Establishing a campus network in Indonesia
  - Developing course contents
  - Promoting on-line education and research in IT
- Tele-medicine
  - Providing access for 7,000 hospitals and health centres
- E-government
  - Applications of E-government for 86 locations
  - Applications of E-government in villages such as information-rich villages (Desa Maju), 95 units

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Ebrahim Hamedi
Mohammad Ali Shamsi
Telecommunication Company of Iran

Telecommunication Development Country Report for Iran

The Telecommunication Company of Iran (TCI), as the executive of the policies of the Islamic Republic of Iran and the respective ministry (PTT) in the field of information and communication technologies, is making every effort to materialize at least two tasks of the third National Development Plan regarding:

1) privatization and liberalization of some of its activities and services, and
2) restructuring based on the contract concluded with ITU, which includes rendering consultation services (establishment of an operational regulatory body, segregation of policy-making duties, regulations operations management, etc.).

It is to be noted that our third National Development Plan (2000-2004) has assigned some groundwork for TCI to participate in global information economics and the global information society, and also for the provision of telecommunication networks and services, a good example of which is the national information infrastructure currently being implemented with the aim of achieving the telecommunication strategic objectives.

Telecommunication restructuring is another vital issue which has to be dealt with by using domestic expertise and via the technical support of foreign sources such as UNDP and ITU.

The Telecommunication Company of Iran, as the main specialized company, acts as the general assembly of the 28 provincial telecommunication companies and supervises the operation and development of the network throughout the country.

This company is planning to add 10 million cellular mobile telephones (5 million by the government and 5 million by private sector) and 10 million fixed telephone lines, parallel with the provision of the national telecommunication infrastructure during the third National Development Plan (2000-2004), aiming at creating an appropriate base for domestic Internet users.

In order to keep pace with global ICT expansion and bearing in mind the role of telecommunications in our national economic, social, political and cultural development, the Iran Telecommunication Research Center (ITRC) is actively pursuing key projects such as tele-education, electronic commerce, electronic banking, and tele-medicine and is hoping to take fundamental steps in extending these services on a nationwide basis.

TCI's approach towards human resources has also changed during recent years, which entails recruitment of well-educated and expert manpower, increasing domestic and foreign training courses, provision of the appropriate recreational services for the personnel, assigning services and non-specialized tasks to the private sector, and in brief, initiating new prospects towards motivation of the personnel.

In a worldwide dimension, TCI participates as an active member in global forums and is striving to develop its technical and political relations in this field through joining the significant international projects.

Telecommunication Company of Iran

Records

Index	Unit	August 2002
Fixed telephones	Number	11 403 534
Mobile telephones	Number	2 153 584
Villages and rural telecom services	Village	33 530
Fixed telephone penetration factor	Number of telephones per 100 persons	17.55
Transmission circuits	Circuit	491 554
Long-distance trunks	Trunk	397 454
Local public telephones	Set	94 609
Long-distance public telephones	Set	15 033
Cities with mobile phones	City	520
Data network expansion	City	160
Data network capacity	Mega bit	6 750

Abbas K. Suhail
Hakim Badir Ali
Iraq Telecommunications and Posts Company

Telecommunication Development Country Report for Iraq

Historically, Iraq has always been in the forefront of telecommunication development in the Middle East area. It was the first country in the Middle East to introduce television service in 1956, the first country to introduce digital exchanges in 1980 and the first country to introduce multi-mode fibre optics inter-exchange and backbone systems in 1981.

So, it is very hard and difficult to be at this rather embarrassing situation where we have to submit a paper that is supposed to reflect on the experiences and the needs of the country in one particular very modern aspect of the telecommunication field, while the whole telecommunication sector in the country is suffering from the effects of a severe embargo imposed on Iraq since 1990.

As is the case with all other telecommunication services in Iraq, Internet access and broadband access services have suffered a lot from the effect of the embargo in the last twelve years.

Iraq attempts to import the necessary equipment for a data communication backbone and Internet access has been rejected in many instances since the mid 1990s. Attempts to get the equipment under the terms of Oil for Food of Resolution 964 of the UN Security Council were thwarted by the refusal of the US and UK representatives in the 661 Sanction Committee.

On all other telecommunication fronts, Iraq is facing an unprecedented decision to stop a country from making any advances in developing its telecommunication sector.

As a living and stark example of the above, suffice it to quote the list of goods that can be imported by Iraq without restriction under the new embargo procedures devised by the UN recently. The list stipulates that the maximum fibre optics link length that can be imported to Iraq is (6) metres only! (Please note: Metres, not Kilometres.)

While realizing that this forum is not a political forum to discuss the issue of the UN embargo on Iraq, we are submitting this paper as an information paper to let telecommunication quarters in the world realize the great obstacles and injustices faced by the country in its effort to develop its telecommunication sector.

Going back to the subject, Iraq has only one small ISP at present with no more than 1,500 subscribers and an access bandwidth of about 2 Mbit/s to the Internet. Most subscribers are connected by modems with some by narrow band wireless access. There are also some wide band DSL modems in use but these are fewer than the real need, as for everything else.

The Iraqi Telecommunications and Posts Company, which is the main governmental telecommunication entity in the country, has devised many plans for important projects to develop the telecommunication sector and it is attempting hard to convince the 661 Sanction Committee to allow it to go ahead with these projects.

One such important project is a data communication project which includes the setting up of an all-IP backbone with

MPLS along with a multitude of access band modem access to DSL and broadband wireless and fibre access. The project covers the whole country and will rely heavily on the implementation of the digital microwave backbone project which is already contracted with many suppliers and which is supposed to connect all important cities and large population centres in the country.

If this project and all other important and relevant projects are allowed to go ahead by the UN Sanction Committee soon, then technologies ranging from normal narrow Iraq will have a chance to try to catch up in the next few years on its loss in development of telecommunication.

Conclusion

There is an urgent need for reconsideration of the requests of Iraq to be allowed to modernize its telecommunication infrastructure for the benefit of its people and global telecommunication progress in general.

Osamah Abutaleb
Nizam Ahmad Nofal

Telecommunication Development Country Report for Jordan

Executive Summary

At the onset of the twenty-first century, the Hashemite Kingdom of Jordan is poised to make a dramatic leap into the networked world. With a young, literate and well-educated workforce already providing manpower and technical expertise throughout the Arab region, Jordan is uniquely well-placed to play an increased role both regionally and globally. In accordance with its new responsibilities under Law No. 13 for 1995 as amended by Law No. 8 for Year 2002, the Ministry of Information and Communications Technology (**MoICT**), lays out its plans to ensure that the country takes maximum advantage of the opportunities presented by the Information Age.

Information, broadly defined, has become a source of wealth in its own right. The industries associated with the manipulation, transmission, storage and retrieval of information, or ICTs, have become the drivers of significant change in countries able to harness their potential. In order to maximize the role of the ICT sector in the country's economic development, the Government of Jordan has combined the disciplines of ICTs under the umbrella of a single ministry, the MoICT. The restructured Ministry has added IT to its traditional responsibilities for telecommunications and post to establish a policy framework in which all can jointly grow. The MoICT is committed to creating the environment within which the citizens of Jordan have the widest possible access to the best telecommunications, post and IT services at the lowest possible price. It will also serve as a single point of contact for governments, investors, and other stakeholders interested in the ICT sector in Jordan.

There are three broad areas of responsibility inherent in the above framework: for **policy**, where the intentions of the Government of Jordan are made explicit; for **regulation**, where procedures are put in place, where appropriate, to ensure a healthy competitive environment and protect the rights of consumers; and for **operation**, where maximum scope is given to the private sector – within the constraints of the policy and regulatory framework – to bring about the expected economic activity. A draft **Policy Consultation Paper** has already been published by the MoICT and important stakeholders have responded with their comments. The MoICT is also aggressively looking for quality staff to discharge its responsibilities, and has already hired talented Jordanians to fill full-time positions.

Even in an environment of private sector involvement and competition, there is a role for government to foster and nurture the growth of ICTs. In the area of **regulation**, the hand of government will be light. However, where competition is not present – or where the interests of consumers cannot be otherwise protected – it will play a carefully structured role. Under the new law, the Telecommunications Regulatory Commission (**TRC**) has become a five-member, full-time Commission, more independent from the Government. The Government will ensure that the Commission is equipped with the legal and technical resources necessary to fully discharge its duties. Specification of a revised interconnection framework including service level agreements, a new

national numbering plan, and procedures for dealing expeditiously with critical regulatory issues are efforts that are already under way. But the main focus of the reform effort will be to ensure that the TRC has the resources and the leadership necessary to take the enforcement actions that must underlie any successful regulatory regime.

Telecommunications and Post have traditionally been considered public utilities, along with Universal Service obligations, and regulation of these sectors will follow traditional models. Given the complexity of the technical and legal issues in IT, other laws and regulations must ensure competitiveness, technical standards, privacy, data integrity, security, and the safeguarding of intellectual property. The MoICT will take steps to prepare the laws that are necessary in an electronic environment. The first of these, an Electronic Transactions Act, has already been passed. Others must follow to ensure a fully-enabled environment.

Regarding **telecommunications**, the Government has committed itself to a range of measures in keeping with its obligations under the World Trade Agreement (WTO), including liberalization of the mobile service in 2004 and the fixed-line service in 2005. A study to specify the specific policies of the Government in the mobile sector has already been awarded to an international consultant with wide experience of wireless liberalization. The study is due to be completed before the end of August, 2002. A similar study for the fixed-line service will follow. Both studies will lead to specific policy decisions that will allow new entrants to build infrastructure in time to offer the latest services and technologies immediately upon the expiry of the duopoly and monopoly. Competition in the provision of mobile GSM services has already produced significant benefits to Jordanian consumers and we believe that further competition will only increase those benefits.

The radio-frequency spectrum is a national resource. With the rapid development of wireless technologies, the value of this resource has increased, at the same time that investors demand clear policies with regard to its use. The amended Telecom Law provides a framework within which the value of this resource will be optimized, including coordinated management by the agencies concerned and the possibility of spectrum auctions. Taking into consideration the needs of national security, the MoICT, the TRC, the Armed Forces, and the security agencies will work together to put in place the procedures that bring clarity and transparency to the spectrum management process. In this way, investors will be assured that their investments can be made on a rational and predictable basis.

Jordan Telecom will remain a key player in our plans to connect Jordanians. However, we firmly believe that a competitive environment will benefit the company as well. The pie will have grown larger and all participants will benefit from increased opportunities. An initial public offering (IPO) in Jordan Telecom will be made in 2002 and we believe that a well-regulated sector, a strong and respected regulator, and a clear path to liberalization, will only increase the share value of the company. After liberalization in 2005, experience elsewhere has shown that everyone – the sector, the companies, and the subscribing public – will be the winners.

In **data communications services**, the market is already liberalized with a wide range of Internet service providers (ISPs). We will work to increase Internet penetration by requiring Jordan Telecom and the ISPs to execute service level agreements. At the same time, the government will continue its efforts to reduce the cost of Internet access to service providers and consumers. In addition, developments in technology mean that services and delivery methods – such as voice and data, television and the Internet – originally thought to be separate are now converging. We will work to ensure that the opportunities presented as a result of convergence are not missed and that the Jordanian consumer is the beneficiary of those opportunities.

REACH, an industry-specific strategy, had identified the main challenges and opportunities within the IT industry. The Government of Jordan is fully committed to the success of this strategy. It is also concerned with the sustainability of this

initiative. To achieve a continuous input and feedback mechanism into the strategy, a public-private sector council has been established.

The Government of Jordan committed to creating a conducive IT legislative framework that is clearly understood by its employees, a streamlined IT-friendly taxation regime, access to global markets, "always on" infrastructure, e-governance and a corporate environment attractive to local and global investors. In addition, the Government will ensure that local IT firms have the widest possible opportunity to participate in joint ventures with industry leaders.

To build Jordan's competitive advantage in information technology, the Government of Jordan will enable the environment not only for the IT firms to grow but for the whole array of its supporting and related industries. This will better position Jordan to tap into the global e-opportunities. We believe that the positive approach of the Government to the development of the IT cluster will ensure the availability of world-class e-services.

Realizing the importance of human intellect in this industry, the Government shall seek and promote all options to further enhance research and development capabilities, whether in public universities, public research institutes or public-private endeavours.

Government is also committed to proliferating the use of IT into other economic sectors to boost e-commerce for example. By placing its procurement online, the Government will serve as a role model for many private sector firms to follow.

Government action in this sector will be minimal. We will avoid unnecessary regulation in this sector and will encourage effective self-regulation through codes of conduct, model contracts and enforcement mechanisms developed by the private sector.

Connecting Jordanians is an initiative dedicated to ensuring that all Jordanians have access to the knowledge economy. Through this initiative, the MoICT is taking the lead to bring high-speed, broadband connectivity to all the nation's schools and public access points by the end of 2004. Experience elsewhere has shown that market forces are not always responsive to national goals, and government leadership and investment may be necessary to fill the void. All public resources, physical, financial, and managerial, will be marshalled to build a private network initially dedicated to education. However, the private sector will not be excluded, and requests for expressions of interest by local, regional and international providers will be solicited to partner with the Government in the effort. On expiration of Jordan Telecom's exclusivity, it is the intent of Government that the network be made available for commercial use.

The nation's future lies with its children. A new pedagogical approach that makes use of IT, not merely as a tool but as the basis of a new educational paradigm, must accompany the improvements in connectivity. This has already begun under the leadership of the Ministry of Education. Many countries have articulated educational reform as a belief, but Jordan is doing something about it. With adequate connectivity, schools will be able to create an entirely new and more effective means of teaching our children. The costs are affordable, and will more than pay for themselves in the medium term. When Jordan has achieved this level of connectivity, it will have moved into the realm of the top five, most connected countries in the world. Connectivity is not a luxury, even for a developing country like Jordan. It is a necessity, and we intend to see that every Jordanian has every opportunity to realize his or her potential.

Kazakhstan

Abilkhan Baimuratov
Yelena Novosselova

The development process in telecommunications in Kazakhstan

Development of the telecommunication field, and constant technological and technical improvement of the field imply correction of the regulating mechanisms. The key role of reforming the telecommunication field was given to governmental bodies and structures. Nowadays, a strong willingness to improve the telecommunication field reduces governmental regulation of this sphere. That is a main prerequisite for changing the methods of legal telecommunication regulation. Therefore, there are some main principles which determine this "volte-face" in regulating telecommunications in Kazakhstan.

Combination of governmental regulation and self-regulation

It should be borne in mind that telecommunications develop dynamically and in various ways. That's why old-style normative structures do not work effectively. They don't support telecommunication development and most of all yield to normative lawful regulating models which combine government regulating of very important aspects of this field (limited resources, universal service, interface connections, network control and so on) and self-regulating activity developed by communication operators and their customers. On the one hand, it dismisses regulating bodies and state budget from being unable to solve tasks and on the other hand, it lets operators feel free to develop their net and systems of network in a determined framework.

Limitation of governmental intervention in the area of activity in the telecommunication market

Based on this principle, the Government plays the role of independent arbiter, a powerful structure which is authorized not only to establish normative legal documents but also to clinch arguments. While, the governmental role consists of establishing common rules and strengthening responsibility for infringements in the telecommunication field, the rest of it is reduced.

Universalizing the principle of regulatory methods

In an increasingly developed telecommunication market, there is research for new ways of regulation.

Taking into account national and world experience of telecommunication regulating

The Government has to develop creative, effective mechanisms of regulation by using world-known experience in the domain. At this time, the Government has to take into account real problems of regulating both in Kazakhstan and abroad and use this knowledge for creating new mechanisms of regulating.

Universal service

This principle (also called universal access) is the main point of changing governmental telecommunication policy. The aim of choosing this principle as a main one is to provide the population maximum access to telecommunication and informatization services. This is a good foundation for accessing Kazakhstan to world information society.

Main directions of governmental policy in telecommunication regulating

1 Making corrections to the construction and interconnections of the network

A law currently in force, "About network", governs an interconnected network which consists of the public and departmental network, also allocated network of juridical professionals and individual people. This classification has a double meaning. On the one hand, this is an interconnected and allocated network. That means a special order of management of interconnected network and also special procedures of network connection. On the other hand, that is a division of nets by organizing on a functional principle: nets for public, corporative and departmental networks. As soon as liberalization covers telecommunications, a new way of building network infrastructure will be created. Requirements to support joint functioning of all nets not only deleted but also quite the contrary, it emphasizes the importance of it.

There are therefore several categories which are classified by organizing functional principles: networks for public use, corporate and institutional networks and also networks for special purposes (the need for this is the requirement to protect national security, defence, law and order).

2 Licensing of communications

In liberalizing the telecommunication market, there is a new way of licensing telecommunication activity. The present law concerning licensing has become old. Those licensing rules hamper operators' activities since, in developing new kinds of activities, they need to get new licences/ permission. That stops their activity. Licensing is one of the most powerful measures in governmental regulations. It is useful in cases where anything else doesn't work. According to this, we plan to create varied ways of controlling the various aspects of telecommunication markets but to cut down licensing completely is not possible. A well-known aspect of licensing is limited resources (radio frequencies and number of resources). This concerns the guarantee of network infrastructure functioning.

Taking all the above into account, we think we have to reduce the licensing sphere and leave only 3 positions: radio-frequency activities, limited numbering activity and universal service activity. The rest we can control through the registration procedure and maintenance of certificated equipment usage rules, as well as by maintenance of the requirement to provide high quality telecommunication services. All these kinds of control must be provided through more dynamic work by the Ministry of Transport and Communication, as well as the Agency of natural Monopoly Regulation and Protection of Business Undertakings which has the right to use strong administrative sanctions for infringements.

3 Interaction of operators

There will be law mechanisms and methods of competition protection. That is the key sphere of telecommunications. The principle of interaction of operators is the main condition of developed telecommunications. Modern law of all well developed countries consists of traditional standard rules of interconnection, rules of certification and other similar mechanisms.

There is a need to modernize the way of protecting interconnection networks – **first of all, standards concerned with the rules of interconnection of networks.** Also there is a need to improve our status through attaching main guarantees regarding the market subject's interests in this case. **Secondly, it is necessary to modernize the rules of interconnection.** The obligation of the PSTN operator (the operator owning the most significant part of the market) to

interconnect the networks of alternative operators to its network must be recognized as a common rule. The interconnection rules must be applied on an universal base, i.e. to any type of network and service. It is necessary to work out a model agreement that will provide all the main positions having principal importance for interconnecting operators and state reliability control of network interconnections. According to the existing interconnection rules, the PSTN operator has advantages when concluding an agreement. New rules regulating the interconnection will provide equity for operators. The model agreement is subject to examination for the purpose of observance of competition by the interconnecting operator, on communication and other legislation, as well as publication in the regions, where this operator has its infrastructure suitable for interconnection.

4 Universal access provision aspects

At present, even the ordinary telephony service is not available to the majority of Kazakhstani people. In this situation, the most necessary public services must be considered, and universal service is not vital. The provision of customers with basic telecom services will be difficult to carry out. But this is one of the conditions of the successful development of Kazakhstan's economy in the present world of "network structure society", the information society. In other words, the provision of the Kazakhstani society with the minimum of access services is the necessary first stage towards domestic economy development. Moreover, it is obvious that the saturation of Kazakhstan's market with access services will entail the demand for information services, additional communication services, net and online tools. The size of this market depends on the amount of finance including investments, quantity of customers, variety and latitude of possible services.

a) State motivation of universal services provision

Probably the standards that foresee the rules of licensing for provision of universal services must be included in legislation. During discussions of the universal services realization variants, the possibility of financing at the expense of the most capable PSTN operators on the regional communication services markets was considered without the use of budget funds. In this connection, it is necessary to provide for a number of legal mechanisms for stimulating operators to take up the universal servicing obligations, while minimizing possible damage to operators, population and the communication services market in general. In particular, **licensing and licensing control will be introduced for customers' protection. A thorough preliminary analysis of local services markets, and the financial and technical state of communication operators by the regulatory body is envisaged in order to entrust with obligations those of the operators that, on the one hand, are capable of providing universal services in the necessary volume and, on the other, will endure minimum relative damage.**

At the same time, it is necessary to note that **in case of correctly elaborated by operator economic strategy on local market, companies will gain from universal services provision.** Universal services mean a number of basic access services. Having ensured these services, the operator could develop on this base a wide infrastructure of additional tools. But it will not be available to its competitors on the local markets on equal terms. The attraction of universal services market depends on infrastructure development in the region, incomes of local operators and other conditions that cannot be foreseen. Taking into consideration this situation, the opportunity of tender on universal services provision is provided. In cases where negative conditions dominating on the local market will not enable operators to benefit from universal services licence, the mechanisms of state stimulate universal services provision. In this connection it is necessary to provide legally special mechanisms of state support for operators providing universal services.

b) Tariff policy regarding universal services

The main principle of tariff policy on the national market is the parity of tariffs for the same services of identical quality, without difference between customers. It is anticipated to design tariff rebalancing and a structural-change plan. The tariffs for local communication service will grow because they will reflect the real costs of their provision and the tariff for national and international long distance communication services will reduce significantly as the necessity of unprofitable services cross-financing is not essential. The consulting company Andersen Management International, together with OJSC Kazakhtelecom, implemented the work on telecommunication services real-cost determination, created special economic models and elaborated a tariff rebalancing programme. These results will be used for a reasonable tariff policy. However, the realization of planned projects and models will take an extensive period of time. The rebalancing process is supposed to be carried out step-by-step and is strongly bound to the implementation of local calls time-rate system.

The second key principle is measurability of each service. The necessary condition here is the implementation of local calls time-rate systems without failure. The clauses on tariffs for universal services are to be emphasized in legislation separately on the score of popularity of local telephone communication and necessity of implementation of a local calls time-rate system. After discussions over the last several years, it was decided to set the alternative in financial relations between operator and customer regarding the choice of payment variant. Meantime it is necessary to note that the tariffs size (and not the availability of alternative) guarantees the universality of this communication service. Tariffs for services may be alternative but are equally high. Local telephone call service is reckoned among the universal and in this connection is regulated by government in accordance with price accessibility; the alternate is not significant. Nevertheless, there is a necessity to maintain additional state access guarantee of local telephone call services for the population.

Reasons for creation of international and long-distance communication

At present, the exclusive right of OJSC Kazakhtelecom for outgoing and incoming international and long-distance communications ensures the financial possibility to provide publicly available services within Kazakhstan.

That is why before liberalizating this market, the alternative of an organizing and financing mechanism of universal access is to be created.

Another important problem of the liberalization of international communication is the regulation of rates by operators for incoming international calls.

The process of an international and long-distance communication clearing market will pass through the following stages:

First stage: Partial telecommunication market liberalization. This will be possible after realization of the programme of local telephone communication market liberalization, including new numbering plan implementation, local calls time-rate system, new licensing rules and telecommunication networks conjunction.

The licensed operator that owned the network as a part of PSTN will have the possibility to provide international and long-distance communications only for customers of its network.

It is necessary to introduce a regulation mechanism through the authorized body in the field of communication covering a single level of rates for international operators in Kazakhstan and which does not allow them to lower rates and a mechanism of dividing incoming traffic revenues between them as well.

The preparation for the first stage is to finish in 2004 with the following results:

- creation of a competitive environment in the local communication market;
- appearance of competitors in the international and long-distance communication market among Kazakhstani operators;
- high investment attraction in the telecom market.

Second stage: Full liberalization of telecom market. This will be possible after finishing the national super highway construction and the appearance of alternatives on use of international and long-distance terrestrial digital main communication circuits. The subscriber of any local network can choose among licensed operators providing the services of international and long-distance communication and the operator does not have the right to limit the choice of subscriber.

The preparation for the second stage is foreseen to finish in 2006.

At present, the Ministry of Transport and Communications of the Republic of Kazakhstan is drawing up the draft Programme of telecommunication development for the 2003-2005 period, taking into account the proposals of operators and relevant ministries and departments.

Kyrgyz Republic

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Questions

1

What kind of technology from the DSL family is practical for use on existing subscribers' copper telephone lines?

2

What ISDN or DSL technology is more economical for use in developing countries?

3

What are the possibilities of using an electronic signature and of ensuring safety in practice by developed states?

4

What projects on the use of the Internet are the most necessary for developing countries, based on the practices of developed countries?

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Kyrgyz Republic

Zamirbek Mambetaliev
Kubatbek Talypov

Internet for development

The Kyrgyz Republic, as for the whole world community, has established a purpose of gradually entering into the Global Information Infrastructure (GII).

The main purpose of establishing the Global Information Infrastructure is to ensure the possibility of providing a full range of telecommunication and information services to any potential user at any place – on land, on water, on air.

The telecommunication network of the Kyrgyz Republic is a component part of its economic and social infrastructure and functioning on its territory as an interrelational production and economic set-up. It is intended to satisfy requirements of the population, organs of State authorities and control, defence, safety and law and order, as well as managing subjects and other juridical persons in telecommunication services.

The modern information and communication technologies (ICTs) greatly change not only ways of product manufacturing and types of services, as well as leisure, children's training, realization of civil rights. ICTs have significant and decisive influence on the changes occurring in the social structure of society, economy, democratic institutions of development. At present, the Kyrgyz Republic's presidential decrees and governmental resolutions on the development of information and communication technologies in the Kyrgyz Republic are being adopted.

The main attention of the State is drawn to using the Internet services in the field of education, health care, social spheres, transport and communication sectors, energy, industry, agrarian sector and State management.

In particular:

- In the field of education – using the Internet for distance training of students in high education establishments, for distance retraining and qualification promotion of secondary-school teachers, creation of electronic libraries and study-methodical supplies in electronic form, having access to the Internet.
- In the field of State management – development of State management information system, electronic government (a system of interactive interrelations between State and citizens by means of the Internet), and electronic business undertakings.

At present, ten Internet services providers are functioning in the Republic, and practically each of them has its own variant of symmetrical or asymmetrical connections to the Internet. One group of suppliers has its own symmetrical international channels, another group handles asymmetrical connections, some operators have hybrid forms of connection, and the third group works locally.

One of the development factors of the Internet is an increase of the total channel output to the Internet. So, if in 1998 a general channel of providers was valued at 768 Kbit/s, then by the end of the year 2000 the total capacity of channels increased to 5 and has reached more than 5 Mbit/s.

Below are shown the main features of the data transfer market.

Feature	Year 2000
Amount of Internet providers	10
Total output channel to Internet	About 5 Mbit/s
Aggregate modem pool of providers	More than 800
Amount of subscribers	6000

Significant resources on data transfer in Kyrgyzstan are held by JSC "Kyrgyz Telecom", which provides the "Frame Relay" services since 1998 within the Republic and at the beginning of the year 2001 has executed a connection to the Internet in all regions of the country. At present, the Frame Relay network of JSC "Kyrgyz Telecom" combines all the regional centres of the Republic. However, the majority of the clients require more distributional infrastructure of the network, including out to rural areas. Up to now the restraining factor was absence of good connecting lines in many regions of the Republic. Realization of telecommunication projects allows large and average size enterprises, organizations and private persons, having presence in different regions of the Kyrgyz Republic, to deploy full-scale corporative networks with access to the Internet. At present, building data transfer networks, the TDM-networks are used as transport. Installed network of package switching (Frame Relay, X.25, Transparent, etc.) has a variety of advantages of a qualitative nature, which was demonstrated to first users of the public data transfer network (hereinafter PDTN). Quality of work is ensured, first of all, by a reliable digital transport platform. The Frame Relay network architecture includes 6 nodes of access Eripax 230, installed in regional centres, 6 nodes of access Eripax 660, distributed within Chuy region and in the city of Bishkek city, universal switching centre AXD 311 in the head office of JSC "Kyrgyz Telecom". In addition to this, JSC "Kyrgyz Telecom", in case of necessity, may extend the existing network by installing additional devices of switching packages. The Republic's network and a network of nodes of access in the Chuy region have a star-type topology, and a base network in Bishkek has a full node topology.

The main difficulties which communication operators have are absence of qualitative high-speed transmission channels on the whole territory of the Republic and international large capacity channels, which are required by increasing traffic of Internet exchange.

To ensure an access to the Internet in all regions of the Republic, the use of PDTN forseen, as well as organization of a node of exchange of Internet graphics (IXP) between all Internet service providers (ISP). PDTN, practically, is the "Frame Relay" network, covering all the regional and area administrations of the Republic. At present, eight Internet providers from ten providers, working in the Kyrgyz Republic, are connected to IXP. From the beginning of the year 2000 and up to nowadays, JSC "Kyrgyz Telecom" has been a connected on constant basis to its resources of six large Internet service providers (ISP). The quality and comparatively high capacities of connection attract all the providers of Kyrgyzstan. For providing a high quality of service, JSC "Kyrgyz Telecom" plans to have connections, at the very least, with two Internet international main relay operators. Moreover, satellite as well as fibre-optic connections will be used there.

The growing demands of users are frequently unpredictable and puzzle communication operators. Telecommunication operators should satisfy not only users' needs, operating by the technical possibilities of the existing infrastructure, but should as well as plan their networks for the future users' needs. Already today there appears a need in network infrastructure to provide greater velocities, and guaranteed quality of services in a cost-effective and technically efficient way.

xDSL technologies may be noted as the forecasted direction of development in the Kyrgyz Republic for organizations with narrow-band access facilities to integrated networks. Existing network resources should be used maximally at each given stage, offering on its basis increasingly wider spectrum services. Thus, it is

possible to use xDSL technology with velocities of 512 Kbit/s to 58 Mbit/s for organizing high-speed digital communication on existing copper lines.

At present, fibre-optic technology by means of network architecture, such as "Fibre technology to house/building" (FTTH/B), "Fibre technology to cupboard" (FTTC) and "Fibre technology to a Cable road" (FTTCab), offers mechanisms for ensuring the necessary network velocities for the delivery of new services and applications. In general, the optical section of a local access network may have an architecture "point-point", "ring" or passive networks "point-suspension points" (PON). There is particular interest in an architecture of passive "point-suspension points" networks.

Conclusion

Development of informatization processes is an important task of the State. The economic potential of the country, national safety, quality of the population's life are greatly dependent on the informatization level. A programme of information and telecommunication technologies development for a long-term period should be an integral part, accepted at present by the country leaders, of the strategies of the authorities and of the economy's modernization.

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Maldives

Implementation: ICT Regulation in the 21st Century in the Maldives

1 Introduction

The Maldives is an archipelago of about 1,190 islands. These islands are grouped into natural coral atolls. The population of Maldives is about 270,000 spread among 199 inhabited islands. Another 83 islands are developed exclusively as tourist resort hotels. A quarter of the population live on the island capital Malé. There is an inward migration trend from the other inhabited islands to Malé as people seek employment and better education. Those living outside Malé depend mainly on fishing, agriculture, and other primary industry-related activities for their livelihood. The decentralisation of economic activities away from Malé is hampered by lack of basic infrastructure and a poorly developed inter-island transportation system. With these geographical and economic characteristics, Maldives has a huge potential to take full advantage of ICTs.

As a country with limited natural resources, info-communication technology can be the tool in developing the skills for obtaining knowledge and information, increasing productivity and for promoting our products and businesses in the global market. In addition, Maldives needs to create a local environment that is conducive to foreign investors.

2 Telecommunication background

The restructuring of the Maldivian telecommunication sector, which began in 1988 with the incorporation of the Maldivian Telecommunication Company, is considered to be a success story.

Prior to 1995, telephone service was available only to a few islands. However, by the year 2000, all inhabited islands had access to basic telecommunications. GSM mobile service is now available to 8 atolls, including the Capital Malé. Internet access is also available throughout the country. Considerable improvement is seen in terms of service penetration. Services are now becoming cheaper and more affordable to a wider population, making Maldives telecommunication services comparable to other more developed countries in the region.

The provision of telephone access to all inhabited islands by the year 2000 is the result of the Government's firm policy on telecommunications. Similarly, Government has set sectoral goals and objectives for the next 5 years, and has formulated a telecom policy for years 2001 to 2005.

3 Telecommunication Policy 2001 – 2005

The government recognizes the potential of ICTs and has issued the first comprehensive telecommunication policy of the Maldives. The "Maldives Telecommunication Policy 2001-2005" focuses on ICT development.

The Telecommunications Policy creates an enabling framework for the development of ICTs in the Maldives and would help to link our dispersed communities and

reduce the impact of the geographical isolation and physical separation that exists between our island communities.

Key policy issues covered in the Maldives Telecommunication Policy 2001-2005 are as follows:

1) Reducing telecommunication charges.
2) Expanding telecommunication services and improving the equitability of service provision between Malé (the capital) and the other outlying islands.
3) Strengthening the Regulator and improving the necessary legislative framework.
4) Open the Maldives telecommunication market for competition.
5) Making Maldives an extensive user of info-communication technology and improving accessibility to ICTs.

The Policy encourages private sector participation in telecom development and therefore calls for liberalization of the sector starting from the Internet in 2002 and followed by mobile before 2004.

Even though Maldives is a small market, the experience of the existing service provider shows it is a profitable market. There is sufficient demand to sustain more than one operator. Competition in markets even smaller than Maldives is surviving with benefits to the consumers. Although the Maldives population is dispersed, within an island it is quite compact. This provides many advantages (e.g. short distribution network in those islands, possibility for wideband wireless networks, etc.), which are unavailable in rural areas of other countries with more dispersed population.

The government's policy on telecommunication is an important guide for the stakeholders of the sector, including the service providers, investors, regulator and the users, to understand developmental objectives and to align their efforts in achieving their respective goals.

The aim of this Telecom Policy is to shape the telecommunication sector so as to contribute positively to the development of the country and thereby improve the quality of life of the people.

4 Achievements

The impact of the telecommunication policy of the sector has been very positive. Telecommunication charges have been significantly lowered during the last year. International call charges have been reduced by as much as 50%. Internet services are more accessible, with lower charges and different usage packages moving closer to the needs of the consumers.

Service coverage has improved with mobile accessibility now approaching 42% of the population. The number of mobile customers has surpassed the fixed telephones to have a penetration of over 11%. A nation-wide coverage is expected by end 2004.

Competition will be introduced in the Internet market first, and plans are under way to liberalize mobile market.

All these changes have improved the perception of the telecommunication industry in the Maldives. However, to achieve all the objectives of the Telecom Policy, significant work has to be done to strengthen the regulatory structure and legal framework.

5 Strengthening the Regulatory Structure

The Telecom Policy identifies the following policies, objectives and actions in respect of strengthening the Regulator.

Policy – *Provide the necessary means and powers to the Regulator through an appropriate legislative framework to strengthen the telecommunication sector.*

Objective 1 – Strengthen the legislative framework of the telecommunications sector.

There is a need for a legislative framework that defines the rights and the obligations of consumers and the service providers and one that protects their rights. The Regulator should be empowered to execute and enforce the laws and regulations enacted under this framework.

Action – *Formulate a telecommunication legislative framework.*

This legislative framework should define the powers and responsibilities of the Regulator. It should also cover the rights and obligations of the consumers and the service providers as well as procedures for licensing, controlling and determining tariffs.

Objective 2 – Distance the Regulator from the management of the telecommunication company.

The Regulator shall not be associated with a telecommunication company through ownership or management or in any other capacity that may give rise to conflict of interest.

Should the Government be a shareholder in a telecommunication company, the Government should not be represented either by the Regulator or the Ministry responsible for telecommunication policy.

Action – *Government shareholding in a telecommunication company should be represented by an organization other than the Regulator or the Ministry responsible for telecommunication policy.*

No members of the Regulator or the Ministry responsible for telecommunication policy shall be on the Board of Directors of any telecommunication company.

Objective 3 – Enhance and strengthen the Regulator.

With limited resources and capacity, the Regulator will not be able to meet the challenges in regulating commercial telecommunication operators. Hence, the Regulator should be further enhanced and strengthened.

Action – *Provide Regulator the freedom to discharge its regulatory functions.*

This would facilitate the implementation of international best practices in regulating the sector.

Enhance skills and resources of the Regulator in order to be effective in a competitive business environment.

6 Conclusions

The Maldives experience shows that, even in very small markets with many physical and geographical constraints, the telecommunication sector could be successful if properly managed and a suitable environment could be created for the investors. Many of the problems of slow penetration are not entirely due to the lack of funds, but to the level of efficiency of the operation, and how much access the operator has to its own funds that have been generated.

In developing the telecommunication sector, Regulator's role is significant. Especially in a country where the market size and unique geography pose significant challenges to the existing operator and new entrants to the market, the regulatory role will be more significant to strike a balance between the needs of the people, the requirements of the operators and the resources available to sustain the development.

Mongolia

ITU TELECOM ASIA 2002 Hong Kong 2-7 December
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Questions

1

What is the major principles of the universal service fund's collection and disbursement mechanisms in the least developed countries?

2

In how many least developed countries established a regulatory body?

3

Internet telephone is a voice service over the data communication. How is the licensing of VoIP service in Asian countries? What is the national regulation for VoIP?

4

What is difference between voice accounting rates and the tariffs for VoIP service in Asian countries?

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Mongolia

ICT Regulation in Mongolia

1 Introduction

Mongolia is in the process of transition towards the market economy. The Government has been closely following sound macro-economic policies, supported by the international donor community. As a result, inflation dropped from 53.1% at the end of 1995 to 8.1% at the end of 2000. The unemployment rate became lower from 7.7% in 1997 to 4.6% in 2000.

It is essential for the country's economic growth as well as for human development factors that efficient and effective telecomunications should help overcome geographic disadvantages and support all activities of the population.

Since 1991, the Government has been addressing the reform of institutions, management and service delivery that have constrained structures for telecomunications' contribution to growth.

The basic policy was set forth in the Teleommunications Sector Policy Statement of 1994 (as revised in 1998 and 2001) which defined the policy and investment actions required for the medium term, improving services, structural and institutional reform, based on competition, increased foreign investment and improved regulatory systems.

In 1997, the telecommunication sector occupied 2.5% of GDP and the share of value-added services occupied 1.1% of GDP. During the period of 1994-2000, USD 78 million was invested through the Post and Telecommunication Authority (PTA) of Mongolia.

The Master Plan for Mongolia Telecommunications, prepared in 1994 with the assistance of the International Telecommunication Union, has laid the foundations for the program of development of the sector and led to a structured program for liberalization of the Mongolian telecommunication sector.

The law on communications (November, 1995) was part of the package and provided for policy, investment and regulation of the sector. It established a telecommunications regulator, the Communications Regulatory Commission.

In December 1997, the government established an advisory commission on Information Technology, consisting of representatives and experts from research institutes, ministries and agencies. The commission has the task of studying international trends in the introduction of e-commerce and the wider development of the Internet, and of using this information to support the development of efficient and fair competition in a regulated environment.

In December 1998, the Minister's Council approved – and the Ministry of Infrastructure Development subsequently adopted – the Mongolian Telecommunications Sector Policy Statement (1998-2010). The main purpose of this policy statement was to set out objectives for improving the quality of service, and increasing the types and coverage of infotelecommunication services.

Revision of the Communication Act of Mongolia was placed under the responsibility of Parliament in March 2001 and the revision of the Communication Act was passed by Parliament on 18 October 2001. The corresponding Telecommunications Sector Policy Statement was promulgated on 28 December 2001 (Annex 1) as per order of the Minister for Infrastructure of Mongolia.

2 Establishment of the Communications Regulatory Committee in Mongolia

The adoption of a modern, clear and predictable regulatory framework in the area of ICTs, and the establishment of institutions that will have the power and the means to implement it, constitute a condition *sine qua non* for the attraction of private investment and the overall development of the sector in Mongolia. In October 1995, a Regulatory Body, the Communications Regulatory Commission (CRC), was established in Mongolia. At the time, this Regulatory authority had only limited power and staff. Five years later, in October 2001, the Law of Mongolia on Communications was adopted.

Amongst others, it defines the functions of the Communications Regulatory Commission with enlarged powers and competencies. The Charter of the CRC, which was adopted by the Government on 25 January 2002, specified the structure of the CRC. It defines the main tasks and organizational structure of the CRC. Based on this charter, an organizational chart and staffing estimation was elaborated by the Ministry of Infrastructure.

As part of the task of determining an appropriate organizational structure for the Mongolian Regulatory Authority, organizational charts of regulatory bodies and their staffing in other countries have been examined.

The CRC is an organization responsible for the establishment of an efficient and fair competitive environment among the citizens and entities of all types of property categories in the field of the communications market, issuance of licences, elaboration of professional reviews and recommendations and decision-making. The daily operations of the CRC are conducted by the Departments for "Radio-frequency regulation", "Regulation", "Market and tariffs", and "Law, information and administration", under the direct management of the Chairman of the CRC.

3 The implementation of Universality policies in Mongolia

Liberalization and tariff-rebalancing mechanisms towards cost-oriented tariffs that are under way do no longer allow the former incumbent, Mongolia Telecom, to support rural access through its internal cross-subsidization mechanisms.

Article 11 of the Law of Mongolia on Communications does legally fix the implementation of a universality fund following a trend in universality policies in many developing and transitional-economy countries.

In Mongolia, universal service obligation means a state policy provision of basic telecommunication services to populations or remote areas and areas without service access at real cost, within the framework of the government policy (Article 3 of the Law of Mongolia on Communications).

Related to internationally accepted best practices, collecting and disbursing resources that will be used to meet this universality obligation will be enabled through a universality fund referred to as "Obligation Fund" or "Fund".

According to the Law of Mongolia on Communications, the Fund shall be implemented in order to:

- construct new network elements;
- support the rehabilitation and renovations of existing network elements;
- provide telecommunications service to remote areas and those parts of the populations without service access.

Although no universal service or access strategy has been implemented yet, the Law of Mongolia on Communications

formulates mid-term targets of infrastructure and service roll-out as follows:

- Creation of technical conditions to increase the number of subscribers per 100 persons to 15 in Ulaanbaatar and 10-12 in Aimag Centres.
- Facilitations of automatic telephone connection from all Sum Centres to long-distance and international networks.
- Connection of more than 50% of the population to the Internet by the year 2010, especially establishing (in all Sum Centres) communication centres, which are able to provide multiple services including telephone and Internet-related services.

This part of the Law refers to the financial sources from which the Fund shall be generated, i.e. donations, grants and aid funds and other resources.

The Law of Mongolia on Communications defines the responsibilities related to the implementation, establishment and administration of the Fund as follows (Annex 4):

- The Government of Mongolia establishes the Fund and approves the procedures of its disbursement
- The Cabinet Members that have communication matters as a part of their portfolio elaborate the policy on universal service obligation, organize the establishment of the Universality Fund and monitor its implementation.
- The Regulatory Committee (CRC) ensures the implementation of universal service obligation.
- The Post and Telecommunication Authority (PTA) disburses the resources that are collected by the Universal Service Fund in accordance with the disbursement plan and reports to the Cabinet Members on the status of performance and implementation.

4 Mongolian legislation on licensing and deregulation

The following legislation and licences have an effect up on the licensing regime in Mongolia.

Primary legislation: The Law of Mongolia on Communications:

- The Law of Mongolia on communications of 18 October 2001.
- The licence law of January 2002 (Annex 2).

Secondary legislation:

- Medium-term policy statement for the Telecommunication Sector of 28 December 2001 (Annex 2).
- Order No. 168 Regulation on licensing the telecommunication operations, maintenance and services in Mongolia of the Minister for Infrastructure Development, dated 25 June 1999.

Licences (Annex 3):

- The company Mongolian Telecommunications (MT) licence granted 31 August 1995.
- Cellular telephone licence for Skytel consortium granted 25 March 1999.
- Cellular telephony licences for Mobicom consortium granted 18 September 1994.

The Law on Communications stipulated that the Regulatory Committee shall exercise the power "to grant licences, suspend and revoke licence, monitor implementation of licence conditions and requirements within the framework of the State policy for communications, and conclude contracts".

Further on in the article on licensing: "The CRC shall grant a licence to a legal person and citizen planning to conduct the following activities on the territory of Mongolia: provide a public communications service and Article 14 "Issuance of licence and refusal of licence application".

The Chairman of the CRC validates licences with his signature.

Mongolia's concrete deregulation and liberalization policy is set out in the Medium-Term Policy Statement for the telecommunication sector (see Annex 1).

Medium-term policy statement states that: "The monopoly of the international telephony service shall be revoked and a number of international gateways shall be allowed starting from 01 January 2001. Hereby, competition in the provision of international telephone service is allowed.

Today in Mongolia, we have four gateways. Also, competition has been allowed for fixed local and domestic long-distance communication services as from 1 January 1999.

5 Conclusion

The Telecommunication Sector Policy Statement decided policies for the telecommunication sector in Mongolia in 1994, 1998 and 2001, and the organizations of regulatory body and operators have been changed according to the policies. The government policies are summarized as follows:

- Establishment of a telecommunication development strategy.
- Development of sector structure and management (Policy-making body, Regulatory body, Operators).
- Privatization of fair competition.
- Sector legislation (Telecommunication Act).
- Mobilization of financial resources.
- Development of human resource.

Based on the above policies, privatization and deregulation for the telecommunication sector in Mongolia has been promoted and telecommunication networks and services have been developed.

Annex 1

Mongolian ICT Sector Policy Statement of 2001

Mongolian Telecommunication Sector Policy statement (as amended on 28 December 2001) is targeted to implement the liberalization of the communication sector as well as the principle of non-discrimination in the telecommunication sector by creating an efficient regulatory system. It stipulates the sector's management/governance and structural organization, general strategy for the telecommunication sector's development, competition and regulation in the telecommunication market, privatization and investment support of the telecommunication sector, universal service obligations, financial resources, and human resources.

The objective of the general strategy for developing the telecommunication sector with the target year of 2010 is to introduce more fruitful investment along with the latest high-tech and technology innovations Mongolia, and it shall be implemented by:

- Continuing the reform, expansion and digitalization of the telecommunication network in combination with technologies of fibre optic, microwave, space and mobile communications.
- Introducing the fibre optic technology into the backbone network, connecting centres of all *Aimags* and towns with high-speed broadband width information transmission networks and developing the integrated information network.
- Digitalizing the radio and TV broadcasting and receiving stations, broadening the receipt coverage of radio and TV broadcasting from a satellite, increasing channel numbers, improving the quality of broadcasting, step by step.
- Speeding up the penetration of optic cables into urban area telephone network lines, and the copper, optic cables and wireless technologies into sub-lines and increasing the coverage extent.
- Introducing the space mobile communications system into rural communications.
- Improving the telecommunication service supplies so that, by 2010, telephone density in urban areas achieve shall 15 phones per 100 inhabitants in Ulaanbaatar, and 10-12 in Aimag centres, while international and domestic calls from all Sum Centres shall be performed automatically and ensure no less than 50 per cent of the population with technical opportunities to be connected to the Internet.

The telecommunication sector regulations are targeted at developing the free entrance into the market of providers with the possibilities of enhancing the fruits of the sector in terms of broadening service coverage range by promoting competition and private investment, lowering tariffs, improving quality.

- Privatization
  - In the privatization of the telecommunication network Mongolian Telecommunications (MT), which provides telecommunication services throughout the whole territory of Mongolia by implementing the universal service obligations, shall be encouraged to enhance its competitive capability.
  - Transferring particular parts of the State-owned network property to a company to be privatized together with the credits for its construction/renovation and debt payment obligation, the privatization program seeking strategic investors shall take place through tendering. The revaluation of the network property has to be carried out for the purpose of determining the price of shares to be offered.
    - Under the basic direction of privatizing State property for the years 2001-2004, leaving international and domestic long-distance network and international switching facilities under State control, other assets shall be transferred to MT and the particular parts of the State-controlled shares shall be sold to the strategic investors.

  - After the above-stated period, the privatization programme shall be intensified and the percentage of the State ownership shall be decreased.
  - National radio and TV broadcasting transmission stations shall not be privatized.

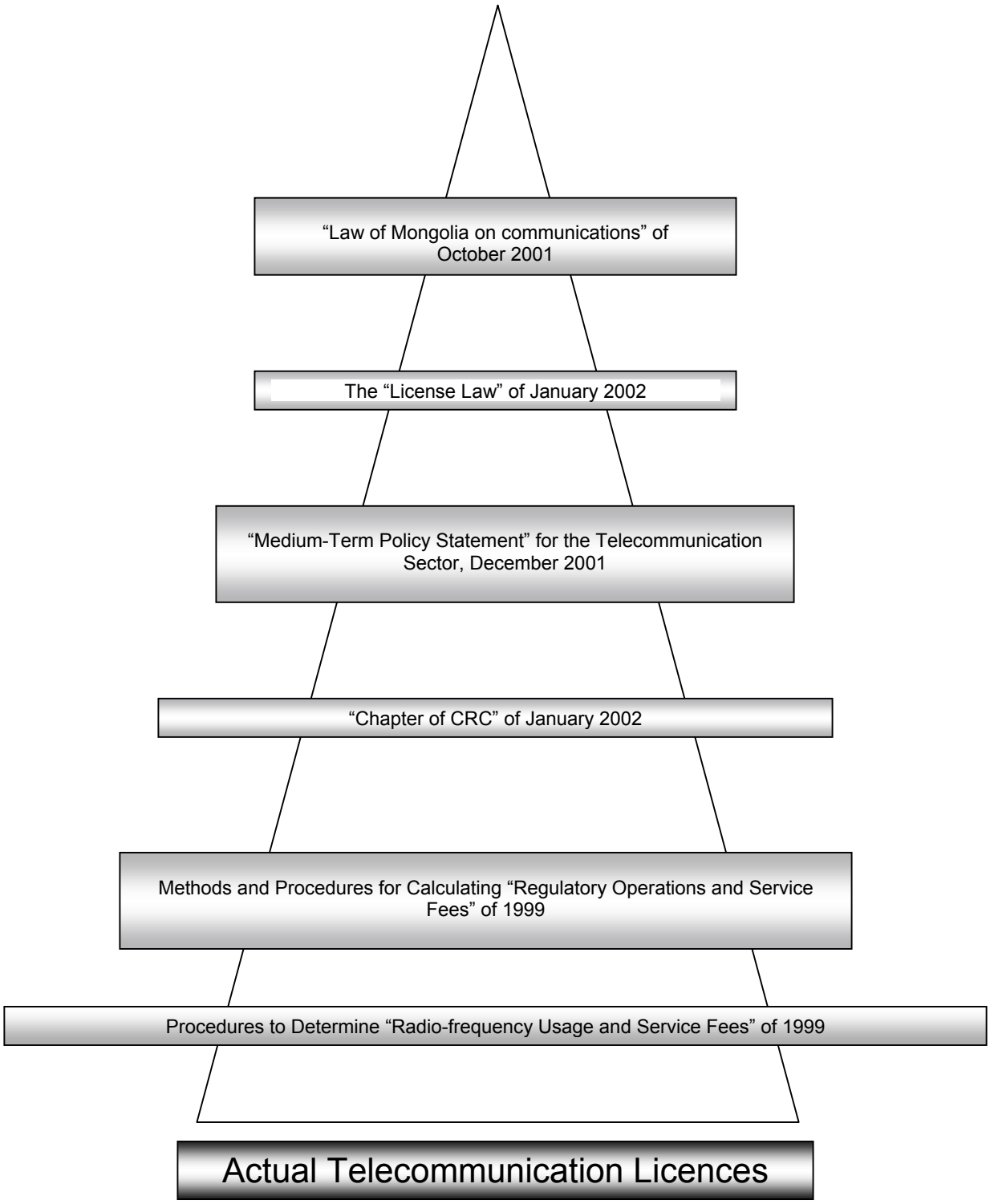
- Universal Service Obligations
  - In areas with high demand and supplies, the private sector shall be supported to carry out telecommunication services under common commercial conditions. Running services in the remote and sparsely populated regions of the Mongolian territory is cost-expensive, thus a mechanism shall be created for attracting providers there. The mechanism can be established properly utilising the Universal Service Obligations Fund that is raised from providers in the telecommunication market. The telecommunication services to the remote and sparsely populated regions shall be financed on the basis of tendering. It shall be aimed that telecommunications centres be established providing services of telephone and the Internet within each Sum. This objective shall be implemented by utilizing terrestrial and space mobile communication technologies.

- Financial resources
  - The financial resources necessary for expansion/renovation of facilities to ensure meeting the telecommunication market demands shall be created under the sector's specific investment and finance policy.
  - Investment will come from foreign, domestic and private sources. Directives to increase investment by ensuring transparency in regulatory activities shall be maintained.
  - Loans, aids, donations and budget funding shall be used for projects with social purposes. From the above resources, investments shall be selected consistent with the criteria of the sector's tasks, financing institution and type of financing.

- Human resources
  - It is essential that qualified personnel (technical, management, financial, marketing, accounting) be recruited, developed and retained. Directives shall be promoted to extend domestic training systems as well as to utilize foreign and international organizations' assistance efficiently.
  - Establishing sufficient resources for management personnel and improving their knowledge and skills, teaching computer skills, Internet and foreign languages, especially English, to technical staff and management, should receive immediate attention.
  - All necessary conditions will be created in order to ensure compliance with technological standards and to make the services provided by all the personnel, especially the service-related personnel and their management staff, more customer-oriented and efficient.

Annex 2

Overview of Licensing Legislation in Mongolia



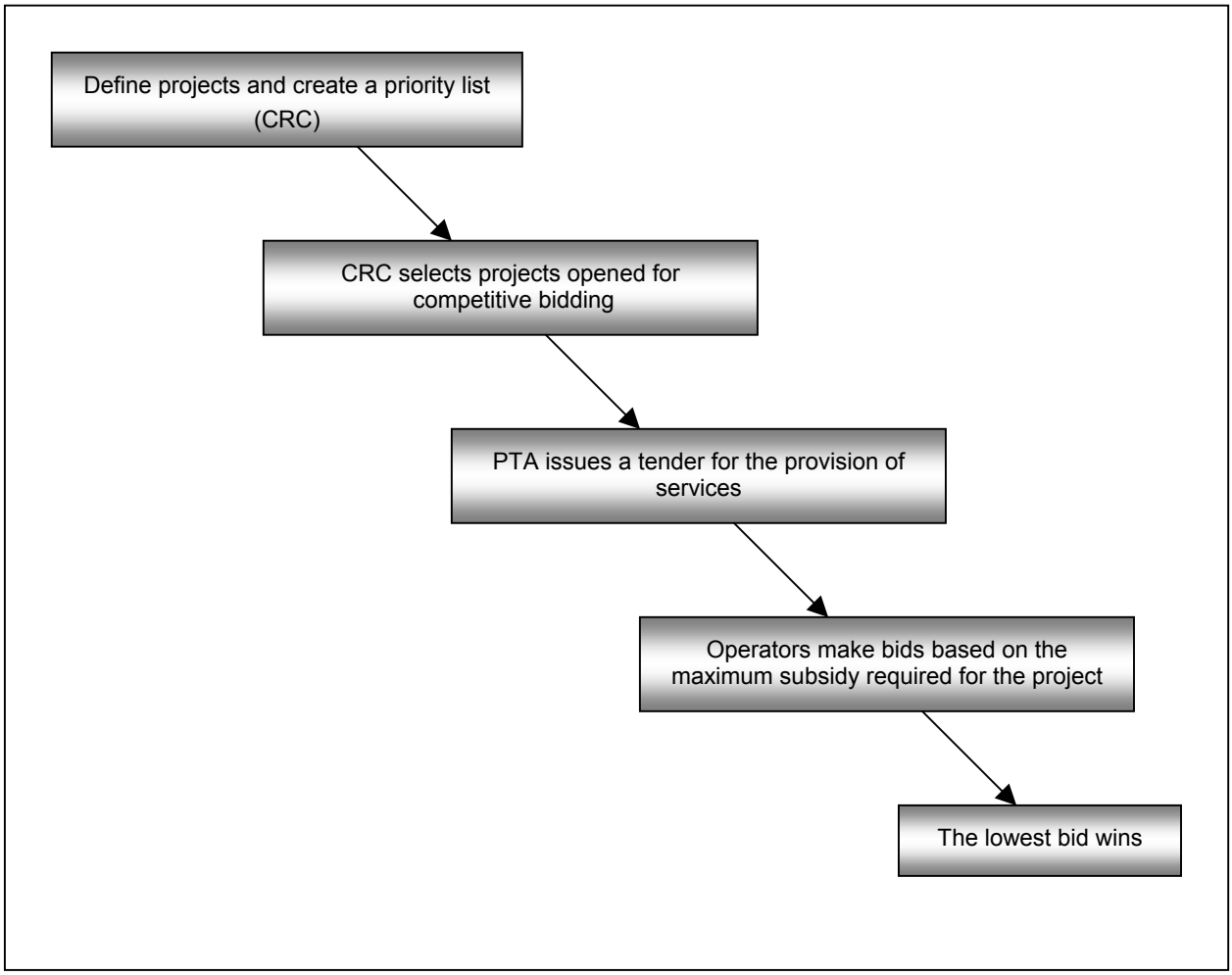
Annex 3

List of Licensees in the ICT Sector in Mongolia

Number of licensees	License type	Licensees
4	Basic telecommunications service operators	Mongolia Telecommunications Corp.; Railway Authority; Civil Aviation Authority; Info commet
2	Cellular operators	Mobicom; Skytel
16	Communication technical operations and services	Montel; DH telecom; Newcom; MC Electronic; RF Link; Tergel teck; Yo-SB; CLCom; GTTO; RF; Elcom; Sorgog; Key Tich; Monham; CTV; Datanet
7	Postal services operators	Tuushin; Selenge Group; Baganat; Mongolian Air trans; DHL express post; Japanese & Mongolian Economic Corporation Supporting Center; Mongol Post
19	Cable TV operators	Sansar cable TV; Khiimori cable TV; Gun Nariin; Nomin suvd; Lkha cable TV; Mon Electronic; Nisleg trade; Medeelel cable TV; Buyan Nalaikh; Chandmani Altai; Ereen Tsav; Khaan Altai; Uranbaigal trade; Darkhan Shirenkhentsig
22	Radio transmission	Dorvon-uul Radio; Badruun; AE&JAAG; Noyon; Bilegsanaa; Erdenet press office; Informal distance training project; Seruuleg; newspaper; Radio & Television Technical Center; Sandard M; Chugu; Monkh-Orgil; Idesh Linch; MT; Ecsodus international; CTB; Information Technical University; Eriin tsav; Ombo; Lkha; Goviin dolgion; Orgon Selenge; Buyan Nalaikh
10	Television transmission	AE&JAAG; MBC; Ulaanbaatar TV;Radio & Television Technical Center; Monkh-Orgil; Idesh Linch; Monplus; RJB; Noyon; Lkha; MT
33	Communications Cable Line Assembling	Tsagaan Eej kholboo; Kharaatiin teel; Mon cable; Nospan; Tel cable; Odod teecom; N&B telecom; Khas cable; Mandmaal; P&B; B&N; FBI; MTTelco; Takhomfarm; Badral; kholiin solongo; Timecommu-nications; Telcom; Bestcom; Gandirs ord; Chigmal; Delgerekh naran; Cabletel; A&S; Boss; Arvis; Buir nuur damba; NBO; Monnis group; Aront; Cititel; Khanbuural; Chuulgat
12	Internet services	Datacom; Erdemnet; Bodocomputer; Status; Micom; Newcom; Mobicom; Telcable; Skytel; International economic business high school; MCS; Globalnet; Ulaanbaatar city; Erdenet factory; Bayangol hotel; Chingis hotel; Hasabe International; Ulaanbaatar hotel
5	Technological internal communications services	Mobicom
1	Inmarsat services	MT; BS Capital; Skytel
3	Card telephony service	MT; BS Capital; Skytel
3	Directory services via special numbers	MBC international; Mongol news; Togsuchrakhui
5	Other services	Monsuljee; Montel; SITA; Air service; ATE
1	WLL	Mobicom
3	Wireless cable TV	Khiimori cable TV; Naran trade; Sanburd

Annex 4

Schematic Overview of the Project Selection and Bidding Process



Myanmar

Questions

1

If e-Security is top priority, how can it be made to develop in the use of the Internet?

2

What are the inputs that can be used to convince people that using the Internet is not harmful and will benefit citizens and society?

3

What are the driving forces to ensure more transparency and more flexibility in 21st century regulation?

4

What are the essential needs for acquiring broadband Internet access in the least developed countries?

Myanmar

Tin Tun
Naing Lin

Information and Communication Technologies in Myanmar

1 Brief about Myanmar

The Union of Myanmar is situated in South East Asia, sharing a border of 5,858 kilometres with Bangladesh and India on the north-west, China on the north-east, Lao on the east and Thailand on the south-east. It has a total coastal line of 2,832 kilometres from east to west. In Myanmar, the population and land ratio is favourable and the country is rich in natural resources as well as human resources. The current population density is low at only 76 persons per square kilometre. The Union of Myanmar has good prospects for the establishment of a national economy based on the agricultural sector according to the geographical and weather conditions, water and land resources. The agriculture sector plays an important role in the national economy. It also serves as the livelihood of the majority of the population and it improves the economic and social standards of the people. The agricultural sector is still dominant in GDP as well as export composition. About 80% of the population live in rural areas and are occupied in the agriculture sector. Myanmar is blessed with an abundance of rice, minerals, teak and hardwood forest, onshore and offshore oil fields, precious stones such as giant jade stones and pearls of the highest quality.

2 ICT Policy

As Myanmar signed the e-ASEAN Framework Agreement in November, together with all the other members of ASEAN, it has committed to implement the necessary steps according to the agreement. The e-National Task Force was formed to monitor the implementation of the e-ASEAN Framework Agreement.

This Agreement explains the main objectives of ICT policy which are to:

a) promote cooperation to develop, strengthen and enhance the competitiveness of the ICT Sector in ASEAN;

b) promote cooperation to reduce the digital divide within individual ASEAN member states and amongst ASEAN member states;

c) promote cooperation between the public and private sector in realizing e-ASEAN; and

d) promote the liberalization of trade in ICT products, ICT services and investments to support the e-ASEAN initiative.

In accordance with the main objectives of ICT policy, the following measures are to be taken such as those to:

a) ensure widespread application of IT in state management with the intention of providing better services to the public, improving efficiency and reducing costs;

b) ensure widespread application of IT in business organizations to improve productivity and rendering better services;

c) use IT as an infrastructure for the smooth operation of socio-economic organizations;

d) develop IT industry to become one of the main economic sectors;

e) ensure widespread application of IT to improve the educational level of the whole population;
f) use IT as a vehicle for business organizations penetrating into the international market;
g) develop human resources so that sufficient IT professionals are available for both IT industry and IT applications;
h) create an IT intelligent society;
i) facilitate the growth of e-commerce at national, regional and international levels; and
j) reduce the digital divide.

Above e-ASEAN objectives are also the guidelines of Myanmar's future informatization. Myanmar will go along with targets set by the agreements and its informatization will certainly meet with a new scenario of its own development.

3 Regulation

Regarding a law for authentication of online transactions, a legal arrangement for the protection of private information and for the safeguard of the security of network, Myanmar is now in the process of making orders to put into practice and to regulate ICT to have a good legal framework, drafting the comprehensive Cyber Law, e-Commerce Law, Digital Signature Act, CA (Certification Authority) Regulations, IPR (Internet Protocol Regulation), etc. These will be applied through a new comprehensive law, which should be solid, substantial and strong to stand the test of time and circumstances. Efforts are already being made in studies of domestic laws of other countries, international treaty obligations and the adaptability to the Myanmar legal system.

4 Initiatives for ICT

Myanmar initiatives for applications of ICT include the short- and long-term plan.

The Current Initiatives for Applications are:

a) E-Government,
b) E-Commerce,
c) National Portal,
d) Online Banking,
e) E-education,
f) Telemedicine,
g) The Digital Library.

a) E-Government

Myanmar has started initiatives on e-Government projects such as Yangon City Land Registration System, Electricity Billing and Collection System, Import/ Export Licensing System, Smart Card System and Online Visa Application System.

b) E-Commerce

E-Commerce initiatives started only one year ago after the emergence of Bagan Cybertech. The operations are e-Banking, e-Shopping, e-Reservation, e-Media and e-Entertainment.

c) National Portal

The ICT Application Committee under the e-National Task Force have made maximum efforts to create the Myanmar National Portal by establishing e-application.net.mm. All the ministries' websites and e-Commerce sites have begun hosting and more local contents are invited to become part of the comprehensive Myanmar National Portal.

d) Online Banking

All the private Banks in Myanmar are computerized and very recently an online Banking system was introduced by five private banks. Bagan Cybertech provides the VSAT networks for all over the country, and banks' head offices and all the branches are connected online via satellite.

e) E-Education

The Ministry of Education has introduced Data Broadcasting for Distance Education in collaboration with the Ministry of Information by sharing the channel of the satellite. Over 200 learning centres all over the country can get online training via satellite. The Ministry of Education is also preparing an e-learning system among all the universities and colleges by using VSAT network.

f) Telemedicine

The Ministry of Health is trying to combine medicine and communication by taking advantage of the Bagan Cybertech VSAT network.

g) The Digital Library

Myanmar is also transforming traditional libraries into digital libraries. After the digital library project had been adopted, most of the libraries from universities and colleges were upgraded to the digital library system. Myanmar is preparing an ICT Master Plan for year 2010. It includes an info-communication plan and strategy. They are:

a) Info-communication in the public sector,

b) Government info-communication,

c) Business info-communication,

d) Promoting e-Commerce,

e) Consummating the network infra-structure.

a) Info-communication in the public sector

It drives various public sectors including population management, environment protection, science, technology and education, medical care and social security, bringing improvement of the quality and living standards of the people.

b) Government info-communication

Info-communication of the government ministries and departments is the major aim of the ICT Master Plan. It brings improvement of the ability of instant response from government to the people.

c) Business info-communication

It will be the foundation for deployment of e-commerce and to improve the efficiency and standard of business.

d) Promoting e-commerce

It is the main driving force to the development of Myanmar info-communication e-commerce as business-to-business-to-consumers is steadily developed.

e) Consummating the network infra-structure

Establishment of new microwave routes, introduction of wireless mobile telephone system and installation of domestic satellite communication earth station are all part of the continuous efforts of Myanma Posts and Telecommunications (MPT) to cater for the increasing numbers of telephones. MPT has established a new standard (A) satellite earth station and a new international gateway switch in addition to the standard (B) earth station. Bagan Cybertech (100% government-owned company), the new service provider for data communication, is ready with infrastructure, such as VSAT and wireless networks for Intranet and Internet connection.

5 Conclusion

In conclusion, IC Technology is not only developing rapidly in the world, but also contributing to the globalization process. As IT solutions have been listed as the top priorities on companies' investment agenda, they are fast becoming strategic business tools for enterprise development in Asia.

In the process of technological advances and globalization, the Technology Gap (the so-called Digital Divide) has widered the gap of technology and development among the nations of the world. Consequently, inequalities are on the increase among the nations of the world.

The ICT revolution may also tend to widen the Digital Divide. Only where information flows can knowledge, capital and commodities be involved. Reversing this trend will require meaningful global cooperation.

While the rich are moving into the better quality services of ICT, efforts should be concentrated on eliminating the widening disparities between the developed and the developing world. It is necessary to make endeavours to acquire advanced technology from developed nations, so that all the nations of the world might work hard to develop communication technology, which plays such a vital role in all the changes today, and put it to use in promoting national interests.

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Pakistan

Investment opportunities and current situation of IT in Pakistan

Pakistan is an ideal country to play a vital role in providing goods and services to the world community because of its location. In the distant past, this part of the world had been a centre for exchange of culture and commerce of South, South East, West and Central Asia.

The importance of information technology cannot be over-emphasized. It is important for the nation to build a sophisticated IT infrastructure to face the challenges of information technology in the 21st century, having the capability to serve as network of networks. Towards this aim, we are endeavouring to build an IT network infrastructure network throughout the nation by using state-of-the-art technologies so as to create a strong, permanent and reliable IT superhighway system (Indus Information Superhighway – IIS). To encourage the use of the superhighway network by all users, various information services such as data communications, videoconferencing, voice information, fax and other services both in the public and private sectors are liberally being promoted.

The Government of Pakistan is endeavouring to achieve the following with respect to IT:

a) Make the Government a facilitator and an enabler to give a maximum opportunity for the private sector to lead the thrust in development of IT in Pakistan;

b) Develop an extensive pool of trained IT manpower to meet local and export requirements;

c) Provide business incentives for both local and foreign investors to ensure the development of Pakistan's IT sector (including the software, hardware and service industries and the use of its products);

d) Develop an encouraging legislative and regulatory framework for IT related issues;

e) Rekindle, emphasize, and support the country's dormant manufacturing and research and development (R&D) potential;

f) Establish an efficient and cost-effective infrastructure that provides equitable access to national and international networks and markets;

g) Set up national databases that are reliable, secure, and easily accessible;

h) Promote the widespread use of IT applications in government organizations and departments for efficiency improvement in functioning and service provision, and to organize and facilitate access to public information;

i) Promote extensive use of IT applications in trade, industry, agriculture, education, health, and other sectors;

j) Encourage and promote the development of quality software that can capture export markets;

k) Develop a tradition of electronic commerce for both national and international transactions.

There are three very critical elements in the information technology business and these are:

1 Telecommunication Infrastructure

2 The Availability of Qualified IT Manpower

3 Regulatory Support

In the following paragraphs, three of the issues have been comprehensively discussed.

1 Pakistan Telecommunication Environment/ Infrastructure

The Pakistan Telecommunication Sector is competing in a multi-level market, namely the Asia-Pacific and South East Asia regions. The state of development and the expected growth of services and infrastructure with the introduction of new and emerging technologies defined the development outlook in policy-making. The global trend in telecommunication is towards a free market approach and deregulation of services. The global infrastructure of telecommunication is being driven by convergence of technologies allowing an increasing number of applications to be offered from the same technology platform. Pakistan cannot be considered as an isolated entity and is strongly affected by the regional and global changes. The World Trade Organization (WTO), of which Pakistan is now a full member, has chalked out recommendations for the opening up of the telecommunication sectors of member countries. It has become imperative for Pakistan to devise a policy for addressing the changes in the international trade environment as well as carve out a unique position for itself within the region to not only assert its sovereignty but also to reap the commercial benefits of a more liberal trade environment.

The strengths of the Pakistan telecommunication market are its ability to offer a high growth potential with a population of 135 million people and a current telephone-lines penetration of only 2.5%, as well as its geographic location as the gateway to the Central Independent States (CIS) in the North East, and Gulf markets to the West. The opportunities of the Pakistan telecommunication market is to emerge as the regional hub in South Asia by deregulation and sector liberalization guided by a sound telecommunication policy and regulatory framework, and thereby increase its share of foreign investment in the region. The deregulation of services in Pakistan is thus the main thrust of the proposed actions.

The telecommunication sector is expanding rapidly with the introduction of new products, services and technologies. This development has become a catalyst for the growth of the nation's commercial and industrial sectors. The integration of the telecommunications and computer industries has also resulted in the rapid growth of sophisticated technology, which ushers in a new Information Technology led society. In addition, the telecommunication sector, as an industry in its own right, has gone through rapid growth, and has contributed much to the nation's economic development. The formulation of the policy is important because it provides guidelines for the development of the telecommunication sector in Pakistan as it faces future challenges and supports the attainment of the objectives of vision 2010.

Pakistan Telecommunication Company Limited (PTCL)

PTCL provides telephone access to over 200 countries, with about 5,203 international circuits. There are 4 INTELSAT Standard "A" Earth Stations. About 50 major countries of the world are linked directly through these Earth Stations via the INTELSAT satellite network. Access to other 160 countries is available through direct and indirect links. A 1200 channel submarine cable is operating between Pakistan-United Arab Emirats with 800 circuits to handle international traffic to the UK and USA. An 1800 channel coaxial cable operates between Lahore-Amritsar to handle traffic with India. A microwave link connects Pakistan with Iran and Turkey through 116 channels. Another, a 72-channel UHF link, handles traffic between Pakistan and Afghanistan.

The Government of Pakistan owns about 88% of the shares of PTCL and the public owns about 12%. The Government plans to sell up to 26% of the shares (1,326 million shares) along with management control to a strategic investor by the end of this year.

At present, PTCL has about 4.2 million access lines installed [ALI] and about 3.4 million access lines in services [ALIS], 2,447 telephone exchanges, 1,650 NWD stations, around 11,000 public call offices, and 444 telegraph offices. PTCL also has stakes in Telephone Industries of Pakistan, and Carrier Telephone Industries. The number of telephones for every 100 persons increased from 0.95 in June 1991 to 2.55 in 2002. Besides the growing number of customers who make use of telephone facility, other services such as mobile telecommunication radio, paging, fax as well as data services have been established. A few value-added services have also been introduced on limited scale. The Pakistan Telecommunications Authority (PTA) has given clearance to PTCL to provide the following services: Wireless Local Loop, Videoconferencing, Store-and-Forward Fax Services.

Other Supporting Infrastructure

A total of 227 private companies have been licensed to provide certain telecommunication services such as mobile cellular telephones, Internet pagers, trunk radio, data communication, payphones and few value-added services. The Ministry of Science and Technology (MOST) advises the Government of Pakistan on the telecommunication plans and policies and is responsible for their formulation. The MOST relies on the Pakistan Telecommunications Authority (PTA) for advice and support to carry out the said functions. PTA is responsible for amend granting, and enforcing the operating licenses and ensuring that service providers adhere to licence requirements; they regulate tariffs and ensure quality of service. The PTA also monitors compliance to the licensing conditions pertaining to rates for other service operators; enforces interconnection to enable the development of competing new services; resolve customer complaints and disputes, and establish and enforce technical standards. The Frequency Allocation Board (FAB) is in charge of the management and monitoring of the radio spectrum and responsible for policy advice in that connection.

STATISICS OF LICENSEES

S. No.	Name of service	No. of licences granted	No. of users/ subscribers
1	Audio tex	6	2 are operational
2	Card pay phone	36	25 376
3	Cellular mobile phones	4	0.8 million
4	Data communication	32	6 471
5	Digital paging	4	9 920
6	Electronic information e-mail + (4) data communication licensees providing Internet service	118	134 312
7			
8			
9	Satellite	3	5
10	Telephone	2	2 792 115
11	Trunk radio	11	197
12	Voice mail	9	167
13	Vehicle tracking	1	62
14	Voice paging	1	0
TOTAL		**227**	**3 216 332**

Internet Service Providers (ISP) and Data Communication Operators

Internet Service Providers and Data Communication Operators are encouraged to provide following services:

a) Internet Access
b) Web Hosting
c) Web Content Development
d) Tele Housing
e) Virtual Private Network
f) Domestic VSAT Connectivity
g) Backbone Reselling
h) Voice over IP (VoIP)

PTAs Vision for a Robust IT and Telecommunication Infrastructure

1) Encouraging the Development of Open Telecommunication Infrastructure

The development of an open, interactive and robust telecommunication infrastructure/system, including both wire/fibre and wireless systems, by reducing unnecessary barriers to private enterprise, consistent with other national policies, shall be encouraged.

2) Competition and Regulation

The open competition [except where otherwise provided] is the most effective way of ensuring adequate service to the public and shall be generally encouraged. However, where appropriate, PTA shall regulate telecommunication infrastructure and systems, where necessary, as a remedy to limitations in the marketplace, e.g. to promote the widest availability possible to telecommunication services. In promoting competition, PTA shall attempt to provide a level playing field among telecommunication providers, e.g. by attempting to ensure that providers are subject to similar taxes and fees within the provisions of the Pakistan Telecommunication Act.

3) Encouraging Public/Private Partnerships and Networking

The establishment of public/private partnerships and networks to promote its telecommunication goals and to generate synergy among local knowledge-based businesses shall be encouraged.

4) Removing the Barriers to Market Entry

Every effort shall be made to remove the barriers to telecommunication markets according to the provisions of the Act, while preserving the regulatory powers of the authority, without causing any adverse effect to national assets, and national interests to achieve the stated policy objectives.

5) Elimination of Barriers to Competition

As a general principle, the Authority shall promote competition (except, to the extent and within the provisions of the Telecommunication Act 1996 for PTCL monopoly on basic telephony). Any policies that bar competition in the provision of local telephone, mobile, data services, cable and other telecom services shall be eliminated as warranted by the provisions of the Act. However, the number of players, permissible coverage, extent of service offering, interconnection arrangements, service overlap with regards to the basic telephony shall be decided in the broader national interests.

6) Forbearance – Reduction of the Burden of Regulation

As a general principle, the Authority shall rely upon markets and consumers, not regulation, to determine prices and services. The role and scope of the Authority shall therefore be a promoter, a facilitator and an elder, a planner to achieve the provisions of this policy. Competitive markets, including those for competitive local and long-distance services and value-added services should not be regulated beyond the reasonable need. As soon as the market forces ensure the provision of quality services at reasonable costs, the Authority shall forebear from regulating.

7) Elimination of Protectionism

The free participation from overseas investors, in the shape of direct investment, will be allowed. In view of the national self-reliance and national sovereignty, local participation in the shape of joint ventures and for technology transfer shall be preferred and encouraged.

8) Elimination of Telecommunication Subsidies

As a general principle, the cross-subsidies shall be discouraged, except when warranted to achieve the universal service objectives and the stated policy objectives. If not eliminated, any subsidies should be limited in scope, targeted to those in need.

9) Frequency Allocation

Frequencies shall be allocated and assigned based on market forces, allowing new technologies to develop and consumer preferences to be better served. Licensees should be allowed to use frequencies for any purpose, as long as users of the spectrum stay within the licensed provisions.

10) Human Resources Development

Development of Human Resource base in the telecommunication sector by both private and public sector institutions or in public private partnership will be encouraged. The allocation of education and training budget for the manpower development shall be mandated in the service licenses.

11) Acquiring Space Segment for the Next Fifty Years

An effort will be initiated immediately to work out the future requirements of telecommunication of the country for the next 50 years and applications shall be filed with appropriate authorities for the allocation of space segment. This is essential because the allocation of space segment is becoming limited and the queue is growing. We have to wait for many years if the action is not taken now.

12) Acquiring the "Second-Hand Satellite" for Use in Already Acquired Space Segment or Leasing the Space Segment Already Allocated to Interested Buyers

We are told by some knowledgeable sources that we may be able to buy a small- to medium- range satellite for a relatively low price, which may be shifted to the space segment allocated to Pakistan. We can use it not only for speeding up the service provision but also rent the transponder capacity to other operators. Alternately, we may lease the space segment to some international operators in an open auction and earn handsome revenues until we are able to use the segment with our own satellite.

13) Encouragement for the Development of Telecommunication Policies and Plans

All the major institutions in the country, including the federal government, provincial governments, city governments, banks, airlines, universities and large businesses, will be encouraged to develop their telecommunication policies. (The organizations of a certain size may be mandated to develop plans by 2005.)

14) First Right of Local Entrepreneurs to Build, Own and Operate the Telecommunication Networks on a Regional Basis

PTCL will be privatized by the year 2002. This is a extremely lucrative yet sensitive business. The controlling share of this business shall remain within the country. The privatization plan of PTCL may be worked out in such a way that maximum participation of the local businesses is ensured. The building of new telecom facilities, expansion of the prevailing infrastructure and operation of the telecom markets by local business people in collaboration with overseas partners shall be preferred.

15) Reducing Traffic and Economizing Resources

The development of telecommunication infrastructure and systems that support and promote telecommuting shall be encouraged, to reduce the need to use the automobile for commuting and transacting business where appropriate and where-ever possible. The use of teleconferencing techniques and technologies at major business and government centres shall be encouraged to save time and money.

16) Use of Telecommunications to Enhance Public Service

Using telecommunications to increase operating efficiencies and improve communication with the public where financially feasible shall be encouraged.

17) Compensation for Use of Public/ Private Rights-of-Way

The use of public streets and rights-of-way via the installation of pipes, conduits and wires to engage in private, for-profit enterprise demands a fair payment for the use of the public's asset. As a matter of principle, the community shall be compensated for the right of way provided to the telecom operators, as well as a fair return and reimbursement to the community for the disturbance caused and the damage inflicted to public and private property in the development and installation of the telecom facilities.

18) Minimizing Aesthetic Impacts

The telecommunication facilities on public or private property shall have as little aesthetic impact as is reasonably possible. Execution of appropriate studies shall ensure the feasibility of appropriate actions where there is a significant danger of aesthetic or environmental impact.

19) Telecom Planning

The PTA shall conduct, on a periodic basis, planning in order to determine a comprehensive list of telecommunication uses to improve service delivery and support much higher levels of service. The Authority shall also coordinate a region-wide planning process in order to determine the telecommunication needs of all the regions in the country.

20) Promoting the Robust Telecom Marketplace

A vibrant marketplace where full competition among providers of telecommunication services exists is the ultimate goal. The most important aspect of this goal is to open up the local communications loop, which will be done according to the statutory provisions and within the best national interests. With respect to promoting local competition, the interconnection and access charge rules shall be established. These actions shall provide the right incentives and actually produce a competitive environment, which in turn will bring down prices for companies and consumers. The structure of access charges and interconnection arrangements shall send the right economic signals to the firms desirous of participating in the development of national telecom infrastructure.

2 The Availability of Qualified Manpower

The second element of the information technology business is the availability of manpower. Pakistan is a nation with 135 million people. Pakistan has a very good well-developed institutional system of schools, colleges and universities.

Educational Statistics

Primary schools	163,746
Middle schools	17,007
Secondary schools	10,519
Vocational institutions	498
Arts and science colleges	735
Professional colleges	265
Universities	26

All the universities/colleges/schools are either offering or has planed to establish some sort of IT training.

Main Agencies Involved in Promotion of Information Technology

Other main agencies involved in promoting the IT sector are as follows:

a) Ministry of Science and Technology (Information Technology and Telecommunication Division)

b) Pakistan Software Export Board (PSEB)

c) Pakistan Computer Bureau (PCB)

d) Pakistan Board of Investment (BOI)

e) Pakistan Telecommunication Corporation Limited (PTCL)

f) Pakistan Telecommunication Authority (PTA)

3 Regulatory Support

The future plans of the Government of Pakistan to promote the IT industry are on the following basis:

Regulatory framework is essential so that the policy goals and overall direction are not violated, social and consumer concerns are not overlooked in the deployment of new products and services and precious national resources are safeguarded. However, it must be ensured that these regulations do not stifle industry investment and growth. The government focus should be on fair and competitive environment, based on free market, open access and intellectual property rights.

Optimum use must be made of the existing investment in networks. Restrictions like not allowing voice, video telephony through Internet, Intranet or other data communication links shall be removed.

Network operators should have freedom to build backbone and local access. Combined and collaborative efforts shall be encouraged.

To facilitate rapid deployment transfer of data and to improve and strengthen the weakest link in telecommmunications

The Government shall encourage the use of electronic signatures. Electronic signatures streamline many internal processes and will strengthen the position of Pakistan for methods of authentication/ verification of electronic communications on national and international levels.

Use of encryption shall be fully allowed (up to specified level of encryption).

The Government shall review government management and procurement policies to encourage competition among telecommunication service providers on technical service standards, prices, and development of broadband services.

The working group shall establish a charter and composition of an accreditation body for certifying training programmes in IT and telecommunications.

The Pakistan Telecommunication Authority shall ensure that the authorized service provider meets network standards.

The telecommunication sector shall be deregulated, to ensure availability of the latest technology at the most economical cost.

Pending de-regulation, the private sector shall be allowed an up-link facility. PTCL shall lower tariffs to match competitive international rates and remove all restrictions on voice and video communications.

Access to the ISP shall be de-regulated to allow connection through any authorized media (such as coaxial cable) other than voice telephony network.

Investment Environment

Information technology is a fast-emerging industry in the world. Appreciating that this industry has substantial prospects in Pakistan and could become a major source for income generation, employment and exports, a number of measures have been taken for promoting and introducing information technology.

The measures undertaken by the Government in connection with the promotion of information technology in Pakistan include:

- Establishment of a steering committee for IT.
- Removal of duties and taxes on the import of hardware/software.
- Tax holiday for IT training/educational institutions.
- Fiscal incentives to software developers and exporters.
- Reduction in data communication charges.
- Internet/e-mail services at a number of stations/towns.

The Government has taken a number of steps to put Pakistan on the information investment environment super highway. In response to the long-standing demand of the software developers, the Government amended the copyright law under which software has been given protection along with other intellectual property.

Government Initiative for the Development of the IT Industry

The Government has adopted a two-tiered approach for IT industry development:

a) Domestic initiative

b) Export initiative

Domestic Initiative

A developed local software industry will not only meet Pakistan's own needs, but will also serve as a training ground for capturing export markets. Key policy recommendations for developing the local industry are:

1) Outsource Government software projects including mass data entry, digitization and GIS projects for the private sector.
2) Provide preference to the private sector software development for Government and non-classified defense projects.
3) Phase the government out of software development so the private sector can take over.
4) For software work requiring expertise that is not locally available, engage foreign companies only if a local partner is involved to ensure the transfer of technology.
5) Accord a high priority to development of local-language software to improve IT usage. Such software can also be exported to other countries where these languages are used.

Export Initiative

Rising costs in developed countries have significantly increased software development outsourcing. This has enabled other countries, especially those in Asia (such as India and China), to tap-offshore software development business. So far, Pakistan has not been able to secure any significant share of the global software market.

The following actions are envisioned to promote software exports, private sector investments, and attract foreign direct investment (FDI):

a) A Software Development Fund should be established to support promotion, expansion, and improvement of the software industry.
b) In all countries with a software export potential, appoint IT specialists at:

   Pakistani embassies, commercial consulates, and Export Promotion Bureau (EPB) offices. The IT specialists should be responsible for promoting Pakistani IT products. Where IT specialists are not available, this responsibility should be assigned to trained commercial counsellors. These individuals should report to and coordinate with the Pakistan Software Export Board (PSEB), Pakistan Software Houses Association (PASHA), CSP. For some large markets, e.g. the USA and EU markets, consultants should be hired to manage the effort, with the IT specialist doing the coordination work. These IT specialists will help find niche markets, provide market intelligence, and develop laws and guidelines regarding target markets.
c) Provide software exporters a one-window governmental interface through PSEB.
d) Encourage software export projects in IT service areas that require minimum time and can be started with currently available skills. These include operational activities for banks and airline offices, medical and legal encryption, data entry, data conversion, data warehousing, and call centres. Each of the above has potential to show immediate returns.
e) Encourage the hiring of women to help reduce unemployment and to utilize this largely untapped human resource. Women can be hired in large numbers in both the low-end data entry market and the high-end job market.
f) Simplify all governmental procedures related to software exports and recording of revenue for exports with the State Bank of Pakistan (SBP).
g) Review rules, regulations and SROs, and modify those that create obstacles for software exporters. Remove restrictions on foreign remittances and flow of funds.
h) Encourage the setting up of Technology Parks (TPs) and silicon cities with subsidized and world-class infrastructure facilities for establishing software and related services organizations. Provide infrastructure help outside the TPs.
i) Encourage expatriate IT professionals to return to Pakistan and establish software houses or extend assistance

to the local industry in the form of assignments from abroad.

j) Encourage equity participation of banks in software projects by setting up venture capital funds. Set up venture capital funds at the federal and provincial levels to encourage private local and foreign funds to establish privately managed venture capital funds.

k) Encourage banks, DFIs, and SMEADA to recognize software development as a priority industry. Major banks should have IT financing cells for smooth and transparent processing of loans and funding based on cash flows, future earnings, working capital financing, etc.

l) Assist and give incentives to private companies for acquiring ISO/SEI and other certification for quality standards for the software industry.

m) Encourage the setting up of a "content industry", comprising intellectual property such as encyclopaedias, compositions, photographs, and other information of international interest.

n) Fix yearly targets for software export and equip PSEB to perform its role effectively in export marketing. PSEB will be the focal point for all software-related export activities and it will work together with the Pakistan Software Houses Association (PASHA), software exporters, CSP, EPB, the Government and foreign missions to ensure that export marketing activities have a synergetic effect. Earmark adequate funds and provide infrastructure to carry out software exports activities.

o) In addition, put in place a mechanism to monitor PSEB's progress and restrict its activities to facilitation rather than active involvement in competitive activities with local software companies.

p) Encourage local business to invest in the software industry. Conduct awareness campaigns to highlight the immense potential and high returns from this industry.

q) Encourage major hardware and software vendors operating in Pakistan to set up software facilities and bring in international business through their established channels.

r) Establish an Export Market Development Fund to create a favourable market image of Pakistan's software industry. These funds should be used for participation in software-related fairs, single-country exhibitions, and investment seminars. This can be managed by EPB in consultation with PSEB, CSP and PASHA.

s) Prepare excellent marketing materials using multimedia to highlight Pakistani software expertise, government initiatives, incentives and necessary statistics. This will affect direct contact with target markets and will create a good image of Pakistan's software industry.

t) Assist entrepreneurs locally and abroad in obtaining visas and work permits. Major diplomatic efforts should be made where required.

Collaborative Opportunities

Joint Educational TV Specially Targeted to Information Technology

The literacy rate in Pakistan is 51% for male and 28% for female. The budgetary allocations for educational purposes are 2.25% of GNP. Although the Government intends to increase the spending to 4% of GNP, still this will not be sufficient.

Information Technology Human Resources

Training is a large part of the human resources issue in Pakistan and in the telecommunication and IT fields in general. Technologies change rapidly, and keeping government employees up on the latest developments takes a concerted and continuing effort. Pakistan has traditionally had a problem recruiting and retraining qualified people in the field of data processing. Currently, the country does not compete with private enterprise wages. As the Government aggressively pursues the electronic world, it needs to deal with this problem, and we view Japan as being expert in helping Pakistan to train its manpower in IT.

Technology Park

Technology Parks (TPs) have been set up to provide ones-window services to domestic and foreign companies that seek to engage in IT business in Pakistan. The TPs should cover and provide land, utilities, telecom, and other infrastructure facilities of international standard at low costs. Efficiently functioning TPs will attract local as well as foreign and multinational entrepreneurs.

Technology Transfer and R&D

In Pakistan, steps have been taken to employ R&D centres to develop the high-tech areas where there are restrictions or difficulties in technology transfer.

It has been proposed to encourage and fund R&D in universities and engineering colleges, and to make it attractive for industries to set up R&D centres at university level, through faculty chairs.

Other actions foreseen:

- Encourage expatriate IT experts and educationists to spend their annual vacations in Pakistan to transfer their knowledge and share their experiences with local universities.
- Establish a reliable online repository of scientific information that can be accessed easily from all major cities of Pakistan.
- Inculcate the spirit of innovation in Pakistan's students and young professionals: organize countrywide competitions at all levels – from primary schools to premier R&D centres – to stimulate innovative thought.
- Establish a premier think-tank institute based on public and private sector partnership. It is suggested that this should work in close collaboration with a similar set-up outside Pakistan and be close to a nucleus of R&D activity in this field.

Urdu and Regional Language Software R&D

A focused effort to standardize the Urdu code plate will be carried out in future and a concerted plan to encourage the development of open source and licensable Urdu software is being launched. This will enable plugs-ins for a popular office and e-mail packages to be made available. This initiative is expected to drive the development of other Urdu and regional software packages for word processing and database applications.

Hardware Manufacturing-Computers

In the context of information technology, the hardware industry can be defined as "design, development and production of computers, communications and related products, modules, components and hardware related services". The importance of a developed and thriving hardware industry cannot be overlooked in today's high-tech environment. Development of this industry will enable Pakistan to achieve self-sufficiency, facilitate technology transfer, attract expatriate IT professionals, earn foreign exchange through exports of products and services and establish state-of-the-art development and design centres with the help of Japan's experiences in this field.

Other than the above-mentioned business collaboration, the following business opportunities could be adopted between two friendly nations that have extensive growth:

a) Telecommunications to remote rural areas,
b) Establishing supercomputing R&D facilities jointly,
c) Joint ventures among IT companies for export of software,
d) Establishing centres of excellence,
e) Establishing Tele-Medicine centres,
f) Establishing Call Centres.

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Philippines

Implementation: ICT Regulation in the 21st Century in the Philippines

1 Background: Philippine Telecommunication Industry

The structure of the Philippine telecommunication industry prior to 1987 was that of a monopoly. There was only one national and international voice carrier. However, from the period 1987-1995, regulated competition was introduced, allowing the entry of three international carriers, two cellular mobile telephone services and a limited number of operators in the other services except the LEC service. It was in 1995 that full competition was introduced; thereafter, all services became open for competition.

At present, there are 11 international service operators, 5 CMTS operators, 76 LEC operators, around 200 registered value-added service providers, and 10 trunk radio operators.

Due to liberalization in the industry, the telephone density in 1996 rose from 2.01 to 9.12 in the year 2000. There was not only growth in wireline telephone service, but there was also marked increase in cellular mobile telephone service subscription. From the 959,024 figure of 1996, there were 6,298,000 CMTS subscribers in year 2000. The latest figure would show that, at present, the country has around 12 million CMTS subscribers.

Despite the entry of competition, there are still a number of problems facing the country. The issues of digital divide, convergence, universal access, interconnectivity, consumer protection and content regulation are among the concerns with which we are confronted. To address these issues, several initiatives were undertaken with the aim of promoting public service, public confidence and business investment.

2 ICT as a Priority Sector

The Philippine Government recognizes the crucial role that ICT plays in the country's future, its economic growth and competitiveness in the global economy. The creation of an Information Technology and E-Commerce Council (ITECC) chaired by no less than President Gloria Macapagal Arroyo shows that ICT is indeed one of the priority sectors of the Philippine Government. ITECC's membership is composed of ten Cabinet Secretaries and eight Private Sector CEOs. Its objectives are:

- develop the Philippines as a world-class ICT service provider;
- implement e-government;
- create an enabling legal and regulatory environment;
- enhance information infrastructure;
- develop human capital.

Awaiting legislative enactment is the creation of a Department of Information and Communication Technologies. The current structure which places the supervision of transportation and communications facilities and services in one department will be revised, leading to a separate and distinct department that will give the information technology and communications sectors focused priority. This functional streamlining will result in the

formulation of more cohesive national plans in the country's ICT capabilities.

3 Addressing Convergence

Existing legal and regulatory regimes pose barriers to investment and convergence. Among these are:

- The regulation of telecommunications and mass media in the Philippines involves one set of laws governing telecommunications and another set of laws for broadcasting or mass media.
- Entities engaged in telecommunications are allowed up to forty per cent (40%) foreign ownership. Telecommunication companies, however, could not offer broadcasting services inasmuch as the Philippine Constitution mandates that only Philippine citizens or 100% Philippine-owned entities can own and manage mass media. For purposes of ownership, cable TV is considered mass media.
- No single franchise can be issued for both telecommunications and broadcasting.

The current draft legislation on convergence seeks to address the separate and differing treatment of the law with respect to telecommunications, broadcast and cable television services.

4 Interconnectivity

The existence of 76 LEC Operators (3 of which are major), and 5 CMTS operators (2 major) brought challenges to the regulatory agency with regard to interconnectivity. Very much aware of this scenario, the present rules on interconnection are likewise up for revision. One of the significant provisions involves compulsory arbitration should the interconnecting parties fail to reach an agreement within a certain period.

5 IT Hubs

On the subject of infrastructure development, the National Telecommunications Commission identified certain areas in the country as IT hubs wherein PTEs may provision high-speed networks and connectivity. As an incentive, rates in IT hubs are deregulated in order to stimulate the growth and development of ICT.

6 Universal Service

There is also an on-going serious effort to develop and implement an effective universal access service program to bring services to unserved and underserved areas of the country including the marginalized sectors of the society and physically-challenged people. A two-part effort to achieve universal access and service is being proposed. Part One is the Alternative Communications Program (ACP) which will establish a telecentre and a payphone program. The second part is the Universal Service program.

The ACP aims to establish telecentres in all 1,500 municipalities and to provide access to public payphones in all 34,100 unserved *barangays* (villages) in the Philippines. A telecentre, as distinguished from a public phone access point, provides a variety of services available via the telecommunication link – voice, fax, e-mail, web, etc. Telecentres are expected to operate as a business, charging fees for services rendered.

As a means of providing and encouraging universal service, the following incentives are proposed to encourage private sector to venture into remote areas: tax and duty-free importation of communications equipment for use in remote *barangays*; graduated payment of fees for spectrum/ supervision; lowering of rates for leased lines and cellular services; and the establishment of one-stop offices for all clearance permits and licences required.

7 Consumer Protection/ Internet Concerns

The Philippines, together with other countries, is facing challenges brought about by rapid technological developments. Issues like Internet security and

privacy are presently discussed at the ITECC by both the private sector and government agencies concerned. ITECC is preparing a draft Memorandum of Agreement to be signed by law enforcement agencies engaged in the investigation of computer-related fraudulent activities and ICT private sector organizations. This Agreement will enable law enforcement agencies to effectively carry out their investigation of computer-related fraudulent activities as the private sector organizations agree to cooperate with the enforcement agencies to the fullest extent allowed under existing laws and regulations. To complement this effort, ITECC is also pushing for the passage of an effective CyberCrime Law.

The National Telecommunications Commission has intensified its efforts to address consumer complaints through its One Stop Public Assistance Centre (OSPAC). Problems like illegal text messages and mobile phone theft are tackled through bombardment of warning messages against the erring party and through blocking of the International Mobile Equipment Identification (IMEI) number.

8 Maximizing the Potential of ICTs

ICT Regulation in the 21st century is a major challenge for the National Telecommunications Commission of the Philippines. As a regulatory agency created at a time when terms like digital divide, convergence and ICT were unheard of, the Commission needs to attune itself with the changing times and technologies. The opportunities and benefits of ICTs must be accessible and affordable to all. This the Philippines aims to achieve because it recognizes ICTs as one of the essential and critical tools for *pole-vaulting* the economy into the 21st century.

In moving forward, the Philippines must acknowledge the realities brought about by globalization. In 1995, we opened the telecommunication market to competition. This because we believe that competition is one of the best forms of regulation. And it is the goal of most, if not all, governments to establish a transparent and stable regulatory and administrative process that will encourage fair and robust competition. This task needs political will – a strong leadership.

The role therefore of regulators is crucial. Forums like these allow policy-regulators, policy-makers and those in the ICT business from all over the region and the world to learn from each other. It is through listening to the stories and experiences of others that we can find out what we should apply and not apply in our respective jurisdictions.

Samoa

Questions

1

Can we, as a South Pacific Consortium, finance an undersea fibre ring to service all the islands?

2

How can we set up a server farm to cache Internet information so we do not need to pay high communication rates?

3

What kind of wireless local loop solutions are being used today successfully?

4

Are broadband Internet solutions being used with wireless or mobile solutions in the South Pacific? If so, where?

Allan Williams

General Manager Customer Services
Samoatel

Telecommunication Development Country Report for Samoa

Samoa is a beautiful land of sun, sea, rock and greenery but does not come without its problems for a telecommunication company. Underground construction is difficult and very costly.

SamoaTel has engaged in a construction-oriented programme to provide phone access to the people of Samoa. One of the major problems we are encountering is having cost-effective solutions. Our customers and the public in Samoa cannot afford the huge installation costs and as our shareholders require a return on their investment we struggle to be able to provide communications for everyone.

We have a focussed business plan that has us providing 100% growth in the next three years. We are proud of the fact we have completed phase one of our fibre network infrastructure. The lava rock conditions hinder our ability to trench and install cables around the Samoan Islands, therefore we are implementing a wireless local loop project to accommodate roll-out service.

The people of Samoa are understanding and supportive of the fact that their telecommunication services are improving but the limited access to the Internet and our ability to cache information is limiting our ability to provide for their needs.

Our greatest problems are as follows:

- Toll circuits are provided by satellite services and these are very expensive and not as reliable as under-sea fibre cable, etc. We require a fibre submarine cable to provide more reliable and expandable solution. As a small country it will be hard to support the cost of this solution on our own so we need to join with other small South Pacific countries to build this type of infrastructure.
- Network components are very expensive and need to be imported, as we have no manufacturing companies that supply this type of equipment.
- Equipping our company with spare parts is costly and requires a lot of capital.
- Experienced resources are limited in Samoa and training is costly because training is normally only available outside the country.

I believe that with the follow-through with our strategic plan we will provide capacity and modern telecommunication solutions to the people in Samoa. Providing a server farm to cache commonly visited websites is a requirement and Samoa needs to build this solution to reduce the cost of access. Information is the lifeline for young people of Samoa and their education will not progress if this solution is not built quickly.

I have experienced the willingness to learn and the desire to be successful of the Samoan people and can see that, with coaching and support, they can be leaders in the telecommunication industry in the South Pacific.

Solomon Islands

ITU TELECOM ASIA 2002 Hong Kong 2-7 December

TELECOM ITU MEET THE FUTURE

Questions

1

How will competition work in a small telecommunications market?

2

Does ITU have any model ICT legislations, as well as ICT policy and strategy principles for adoption by member countries?

3

Does ITU have any training programmes on telecommunication regulation which can be accessed via the Internet?

Robert Bokelema

Director Spectrum Management
Ministry of Transport, Works and Communications

Solomon Islands

ICT Regulation in Solomon Islands

Regulators are often cautioned to recognize the technical capability and creativity of the telecommunication private sector to facilitate these capabilities. Solomon Islands intends to harness the benefits of ICT technologies, as is happening in the developed economies. To facilitate this, we need to define our national ICT goals, and restructure our ICT legal framework; to ensure consumers throughout the country can readily access ICT services, at affordable prices. Such an arrangement would contribute positively to socio-economic developments throughout the country.

Solomon Islands is an LDC island country in the Asia-Pacific region, with a population of around 400,000. The telecommunication market here is relatively small compared to other countries in the Asia-Pacific region. Despite the Government's aspirations to extend ICT services to the rural areas, Solomon Islands' economic resources and small telecommunication market could slow down service roll-out to the rural areas.

The national public telecommunications network is operated by Solomon Telekom, who has monopolized telecommunication service provision since 1989. The current licence will expire at the end of 2003.

Up to 1988, the Government used to operate a basic telephone service, providing services in Honiara, the capital, and the two bigger provincial centres of Auki and Gizo. The then network was a combination of analogue step-by-step Strowger switching equipment, and HF transmission circuits. International access was via HF circuits to Sydney (Australia) – this was later replaced by satellite circuits in the late 1970s.

To provide telephone services to the other provincial centres, and to upgrade telecommunication services in general, the Government privatized the telecommunications sector in 1989. Consequently, Solomon Telekom, a joint venture company between Cable and Wireless (UK) and the Government, was established in 1989, and granted a 15 year monopoly licence to operate "public telecommunication services" in the country.

This arrangement provided telephone services to 7 other provincial centres of the country, connecting them to Honiara, via a configuration comprising digital switching equipment, and a combination of analogue satellite and terrestrial circuits. Most of these transmission routes have since been upgraded to digital circuits.

There are separate legislations in the country for the information, telecommunication and broadcasting sectors. Telecommunication services are administered under the Telecommunications Act 1971. The telecommunication regulator is presently also administering certain regulatory functions affecting the information and broadcasting sectors. With the convergence of ICT technologies, we are considering the benefits of establishing a multi-sector regulator for the ICT sector.

When the telecommunication sector was privatized in 1989, Solomon Telekom provided "public telecommunications services" on a commercial basis, and the government took on the regulatory and policy roles.

Privatization of the telecommunication sector created the need for a regulator; thus, a unit called Spectrum Management Division (SMD) was created within government to regulate the sector. Its regulatory functions include spectrum management, policy, and regulation of the telecommunication, information and broadcasting sectors. It has a staff of three, two telecommunication engineers and one technician. By definition, our "regulator" is a single regulator as opposed to the collegial model.

Our experience with telecommunication regulation is probably similar to that of other small developing countries. You wake up one morning to find the sector has been privatized, and you just have to get on with the job of effecting regulation as best as you can. There is limited financial support from Government, yet you are faced with the challenge to effect good regulation with untrained manpower and inadequate resources. Such a situation, if left unchecked, would negatively affect the performance of the regulator. The issues involved in regulation are quite broad, spanning technology, policy, economics, politics and legal matters. Regulators, particularly from developing countries, need training in these areas to effect good regulation.

Our regulator is located within a government ministry; thus, it is not independent or separate as is the case with the model used by developed countries. Perhaps the biggest problem with regulation in Solomon Islands is the fact that the regulator is located within government, and financed by government budget appropriation. Although, the SMD (regulator) has the capacity to raise revenue, about SBD 4 million (Solomon Islands dollars) annually, the funds are used elsewhere, thus inaccessible to the regulator, who needs funding for its operations as well as staff development purposes. It is unbelievable but it is a fact that we as "regulators" cannot even afford to have Internet access facilities due to our circumstances.

The SMD sometimes requires the services of economists and lawyers, for certain matters. There is the option to contract out for such services, but availability of government funding for such services is almost non-existent. Restructuring of the legal framework to have the regulator separate, and outside of government, would solve some of these problems, and would thus foster effective regulation practices. Such an arrangement would allow for financing of the regulator from licence fees, thereby, securing the much needed finance.

Apart from the need to secure financing for operation purposes, funds are also needed for staff development purposes. Since the sector was privatized in 1989, SMD staff have not been trained in telecommunication regulatory work. Attending workshops on regulatory issues would assist with our staff development purposes. Securing government financing for this sort of activity is a problem.

Apart from the need to extend telecommunication services throughout the country as "best as possible", all along we have not had any national ICT goals for the country. However, Solomon Islands has since committed itself to a regional initiative aimed at assisting Pacific Island countries to develop national ICT goals. At the joint South Pacific Applied Geoscience Commission (SOPAC), Pacific Islands Forum Secretariat (PIFS) and Secretariat of the Pacific Community (SPC) workshop held in Noumea, New Caledonia, from 27-31 August 2001, Solomon Islands with other Pacific Island countries have adopted a set of guiding principles that will become a basis for their respective national ICT goals. These four guiding principles are listed at Annex 1. As Solomon Islands does not wish to miss out from the benefits of ICT services, we will define and pursue our national ICT goals, and ensure these are catered for when we eventually restructure our relevant legal framework.

To cater for the convergence of IC technologies, and to extend ICT services throughout Solomon Islands as far as possible, the country needs to restructure and improve on its ICT legal framework

and regulatory capabilities. This calls for adoption of good, relevant regulation principles. We will implement any relevant reforms that would assist the country in this direction.

Solomon Telekom's current monopoly licence will expire at the end of 2003. Solomon Telekom has indicated its interest in renewing its monopoly licence. The government is considering various policy options, and will have to decide on whether to continue with the present monopoly arrangement, or to introduce a certain degree of competition to the sector. There is on the one hand the belief that competition would better meet the demands of consumers. There is also the belief that the Solomon Islands telecommunication market is small, and consequently, opening up of the market would inhibit service providers from moving into the rural areas due to economic reasons. The Solomon Islands economy is still reeling from the effects of a social crisis that has virtually closed down the economic production base of the country, which has incapacitated the country from servicing its huge debt. Such a gloomy situation could deter foreign investors, and could affect government policy for the sector.

Our experience with regulating from within a government ministry, and being funded by government budgetary appropriation is an unpleasant one. Lack of funding has inhibited the regulator from implementing some of its functions effectively, and has impeded staff development objectives. We would like to see the regulator established as an independent entity outside of government, to promote neutrality, to prevent unnecessary government influence or intervention, but most importantly to secure adequate funding by way of licence fees, in order to provide effective regulation for the ICT sector in the country, and to develop our regulatory mechanisms and human resources.

We are fully aware of the importance of ICT services in this information age – its potential impact and contribution to the socio-economic development goals of any country. With the convergence of ICT technologies, and our aspirations to roll out ICT services throughout the country, we are committed to upgrading our legal framework and regulatory capabilities. We are currently looking at the best way to do so.

Annex 1

ICT Policy and Strategy Guiding Principles

Guiding Principle 1: ICTs will be used to inform and connect Pacific Island populations and ensure that they benefit from flexible and appropriate education and training.

Guiding Principle 2: ICT Infrastructure will support development and be appropriate to the context of the Pacific Islands.

Guiding Principle 3: Easy access to information through ICTs will enable co-operation between stakeholders to develop good governance, the private sector and better service delivery.

Guiding Principle 4: ICTs and related Policies and Regulations will be appropriate to the people and cultures of the Pacific Islands.

Solomon Islands

ITU TELECOM ASIA 2002 Hong Kong 2-7 December

TELECOM ITU MEET THE FUTURE

Questions

1

Some countries in the region, including ours, have agreements with offshore companies who have an exclusive licence to provide telecommunication services to the country. With small economies like ours, how best can we make decisions as to whether to open up competition and how best to do it? Even at the hardest of times, Telekom always makes profits at the expense of the people to whom they should provide services in the first place. We would like to know the experiences of those Members States (small economies) like us within the Asia-Pacific region that may have opened, or in the process of opening, competition.

2

In line with question 1. Which areas, also in the context of Asia-Pacific, should the sector open up for competition and which areas to withhold? In our case, it is a decision on whether to terminate arrangements with a current provider and open competition or to remove the exclusive licence and open up some areas for competition. Any comments?

3

In the Solomons, we use HF radio, modem and solar panels to send e-mail messages to remote areas of the country. It is working but the set-up costs are still high for ordinary persons in communities unless they have combined efforts or receive some support from within or outside the country. What is the experiences of those Member States who may have used similar systems and can they comment on cost and sustainability?

4

The Solomons Islands have implemented a rural e-mail project to connect remote areas of the country and have seen benefits to such systems. Further assistance to complete this rural e-mail network will be needed. Can ITU and other developed countries in Asia consider assistance to such small island states in this area of ICTs? Or are there avenues for such assistance at all?

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Ministry of Transport, Works and Communication

Solomon Islands

Pioneering a digital-divide ICT project: reaching out to and informing rural people of Solomon Islands

The People First Network, or PFnet, is a pioneering project focused on rural development and peace building. In regional terms, PFnet's use of appropriate Information and Communication Technologies (ICTs) to deliver communications and information-sharing to the rural areas and grassroots communities of Solomon Islands is ground breaking and has attracted interest from not only the rural communities themselves, but a wide range of developmental, aid, commercial, investors and other organizations. This interest is reflected in the project support, which has already been provided by three major aid donors in addition to UNDP support through Solomon Islands Development Assistance Planning Programme (SIDAPP).

Despite funding problems for the 2-year core project programme, sufficient support has been obtained to allow the foundations of the project to be laid. The project was launched in March 2001 with the opening of a thriving Internet Café, a popular website and the beginning of the rural e-mail network with the establishment of a base station in Honiara and the County's first fully operational rural email station.

The first fully operational rural e-mail station was opened in October 2001 at Sasamungga, Choiseul Island, and another ten will be opened by the end of year 2002. It is planned that a network of 25 rural e-mail station would be fully operational throughout Solomon Islands in the next one to two years.

The network used proven systems used in Africa and other parts of the world needing a simple computer, short-wave radio, modem, and solar power for rural areas.

The technical capability resources and counterparts are available and in place. Readiness and demand have been proved. A detailed formulation has been prepared for the growth of the rural network and other objectives, which include:

- Facilitating point-to-point communications to and from the remote provinces of Solomon Islands;
- Facilitating rural development and peace-related information flows among all social groups;
- Facilitating the exchange of information between communities and development programmes, Non Government Organizations (NGOs), government offices, educational institutions, the media, businesses and other stakeholders;
- Building the capacity of stakeholder groups at institutional and human level to use the network to communicate and manage information.

The organizational foundations are also already cemented in place. PFnet is now established as a project of not-for-profit Rural Development Volunteers Association (RDVA), which has been conceived and registered through the Ministry of Provincial Government and Rural Development. RDVA is a fully independent NGO,

with a board of trustees which include the Chairman of the Central Bank of Solomon Islands, the Chairman of the Solomon Islands Broadcasting Corporation, the Sales Manager of Solomon Telekom, the Permanent Secretary of the Ministry of Provincial Government and Rural Development (MPGRD) and the Ministry of National Planning and Development (MNPD). Its affiliation with the Solomon Islands Government, as a partner of MPGRD, has been endorsed by the Government.

PFnet has received funding and technical support from the Solomon Islands Development Administration and Participatory Planning Programme (SIDAPP), a project of the United National Development Programme (UNDP) and the United Nations Office for Project Services (UNOPS). It has also received modular funding from the Governments of Britain and Republic of China, and the rural e-mail network will benefit from a communications component of a community schools' solar power project under the Japanese Government's Grassroots Assistance Programme. A detailed business projection, based on actual profit and loss data, shows that the Internet cafés are already capable of sustainable operation and, when expanded following the proposed 2-year core project, PFnet will be fully self-sufficient.

These start-up operations have demonstrated the impact of rural e-mail network on people's lives. The first community to be connected, Sasamungga, has already used the system to contact peers, relatives, business contacts, project advisors, health and education providers and others. The community is now enjoying much better access to news and information, which is e-mailed out to them. PFnet regularly sends out mixed national and global news reports as well as information sheets and newsletters about civil society, legal and civil rights, women's affairs and on many other subjects.

Perhaps the most important impact may be in sharing informing between rural communities as the wider e-mail network is established. Educational institutions and health authorities are now looking at ways to fully utilize the e-mail stations to assist disseminating information. As it will counter misinformation and misunderstanding, PFnet can make a vital contribution to national unity.

Internet for development is very crucial for the many islands in the Solomons group because it will promote peace, knowledge and growth of the local economy. In a country with many islands, 87 dialects, three main races and diverse culture, communication is a vital link to foster integration and understanding amongst not only the rural populace but also the global community as a whole. Financial limitations are our set-back and, though this system was successful, other experiences and systems used by other countries may be affordable and manageable. ITU, developed countries of Asia-Pacific and regional bodies may have to assist countries that are still to realize the importance of IT in development.

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Mrs Pushpa Réne Amarasiri
Director of Legal Affairs
Telecommunications Regulatory Commission of Sri Lanka

Sri Lanka

Extending the Provision of Universal Service Obligations to People with Special Needs

Introduction

No words can describe the trauma a person undergoes when he or she becomes aware that everyday is a test of endurance. In Sri Lanka as in most countries a significant portion of the population have different types of impairments which are due to war, accidents or to having been born with disabilities. These impairments restrict their mobility and also reduce their ability to use even basic telecommunication facilities. We are aware that technologies have been rapidly changing and ever expanding but these advancements have failed to address the issues concerning communication facilities for people with special needs.

Commencement of the Project

Two complaints made to the Internal Committee for Resolution of Consumer Complaints raised a "flicker" of interest in us and we decided to work out a scheme to offer benefits to such people in order to ensure that telecommunication facilities are available to all, irrespective of whether they are urban or rural, elderly and able or differently able.

The telephone is of crucial importance to people who never go out or those who go out only with assistance. Some are totally handicapped and their mobility is severely restricted; they use wheelchairs, walking frames, etc.

Legislation

In Sri Lanka, legislation have been introduced to protect the rights of persons with disabilities, i.e. Protection of Rights of Persons with Disabilities Act No. 28 of 1996, which provides *inter alia* for the establishment of a national council. Section 13(P) of the Act provides for the introduction of programmes to make the physical environment accessible to persons with disabilities and to implement schemes to provide access to information and communication by persons with disabilities.

Licence Conditions of the Licences granted to Fixed Access Operators and Cellular Mobile Operators

This is specifically stated as a condition in the licence, making it obligatory for the service providers to ensure telecommunication facilities to people with disabilities (specially people with hearing impairments) and the elderly.

Barriers to Communication Facilities

The most basic telephones have some keys in addition to number keys. They are of the same size, shape and texture and the space between the function and number keys is so often no greater that that between each number key. In Sri Lanka at present the majority of telephone instruments have an embossed dot on the number pad on number 5.

The most important questions raised are:

- What are the basic telecommunication needs of these people?
- How far have the regulators/service providers been successful in meeting these needs?
- If the needs have not been met, why?
- How do we take their needs into consideration when converging technologies?

It is very essential that people with special needs should not be left out in this modern information age if we consider the wider implications of digital divide.

Lack of Information

People may not have information with regard to the advantages in having access to communications. Due to lack of information, people may regard the telephone as merely a communication aid for emergencies and they will not consider using it to communicate with others.

Strategy

- Contacts with the relevant organizations/institutions
  - Department of Social Services
  - Army Headquarters
  - Community Centres
- Gathering Information
- Speaking to people
- Arranging meetings with service providers

Our Goals

- To provide at least basic telecommunication facilities at reasonable costs and to consider concessions on rental.
- To provide facilities to groups of people with disabilities such as those persons living in Ranaviru Villages (soldiers with disabilities) and community centres.
- Introduce Braille bills for people with impaired vision.
- To make available new technologies to enable them to communicate with others.
- To encourage people with disabilities to participate in social activities.
- To provide concessions on installation fees, rentals, etc.
- To encourage the use of assistive technologies.
- To ensure security and assist them to live with confidence.

And, finally, to build a civil society by enabling people to communicate with each other through different networks utilizing different services and techniques.

Progress

The way forward is to consider groups of people who require communication facilities and to consider benefits for people who already have telecom facilities.

We commenced this project by visiting the Ranavirugama in Kosgama. There are 107 homes in the village and 90% of the occupants were soldiers with disabilities. We were informed that a person who is physically impaired using a wheelchair or crutches has to undergo various difficulties in order to obtain just a single telephone call.

Ranaviru Village – Kosgama

They have to load the wheelchair or walking frame into a taxi or a three-wheel vehicle, and pay the taxi charges quite apart from paying for a telephone call.

It was then decided to request the service provider who had already laid a cable across Ranaviru village to install a payphone in the village within easy reach of a

wheelchair user. The first payphone was installed at the Ranavirugama which is about 175 kilometres from Colombo, the commercial capital of Sri Lanka.

P.A.B.X. System for Vocational Training Centre at Wattegama, Kandy for children with disabilities

There was a long-felt need for this system in this institution. The children with disabilities are prone to many types of sicknesses. Various units are spread over a large area of land and accessibility is difficult as people have to climb over hills to reach these units. With the installation of the PABX system, the authorities found it convenient to carry out their responsibilities easily and it offered greater security for the children.

Payphone Facility in Home for the Elderly at Matugama

When implementing this project, our senior citizens were not left behind. We realized the importance of providing communication facilities to elderly people to prevent them from being isolated from society. It is a social obligation to provide them with a safe environment. We recognized that there should not be a digital divide separating the information haves and have-nots.

A digital divide could persist between the information rich and information poor and it is for us and the future generations involved with communication technologies to make every endeavour to bridge this great divide.

Payphone Facility for Ranaviru Village in Wadduwa

The payphone access is not limited to elderly citizens and Ranaviru villages but also to people in the vicinity. It is certainly a successful method of providing universal access.

Braille Bills

We are now considering the possibility of encouraging service providers to issue bills in Braille. No one who could read print fluently will forego a written bill in favour of having details read over the telephone, however skilfully. Why should Braille readers forego Braille bills either?

Payphone facilities were also provided at the Council for the Blind/Federation for the Blind. This facility is mainly for the white-walking-stick users.

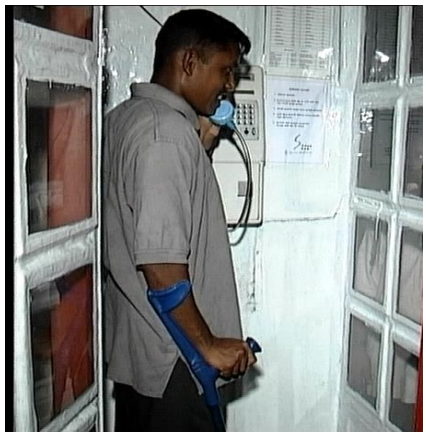
Special Equipment for Hearing Impaired People

We are also considering the benefits the service providers could make available to people with hearing impairments. Sri Lanka Telecom has already imported two sample telephones with volume control facilities. In some countries they convert voice into printed form. In Sri Lanka we are experimenting on telephones with features such as speech amplification. Communication is the number one problem of all hearing impaired persons and anything that aids or improves communications between them and the hearing world is of vital importance.

Our vision for the future should be to enable every citizen in this country to have access to communications. It should not be elusive or akin to chasing a moonbeam. It is necessary for us to bear in mind that Information and Communication Technologies will be the priority issue for all Sri Lankans.

This was the Telecommunications Regulatory Commission's contribution to the Hon. Prime Minister's 100 Days Revolution Programme. This will be a continuous process. We have opened a door and it is now up to us to encourage the younger generation to develop programmes to remove barriers to communications for people with different types of disabilities.

RANAVIRUGAMA – WADDUWA



Telecommunication policy objectives, therefore, are to build a civil society where information-based services will provide the basis for continuing enhancement to quality of work and life. It is also very important to ensure an equitable provision of affordable services over the national infrastructure.

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Uzbekistan

Telecommunication Development Country Report for Uzbekistan

Introduction

In the following report, an analysis of the existing situation and the development prospects of telecommunication means and data telecommunication networks in the Republic of Uzbekistan is presented.

The construction of the national data network is incorporated in view of an existing condition and prospects of means development of telecommunications and the construction of a multimedia and multi-protocol data telecommunication network for all branches of the economy and population of the Republic of Uzbekistan.

The purpose of Public Switched Telephone Network and Data Network

The Public Switched Telephone Network (PSTN) is the basis for creating and developing the provision of systems of information services, including the Internet. The successful use and development of an information services network is impossible without furthering the development of PSTN.

The data telecommunication network is intended for the transportation of information streams and the creation of an information space together with other network operators. It should provide the decision of the following tasks:

- Provision of transport services in transfer of all kinds of traffic, including voice, video and data, within the country;
- Provision of transport services in transfer of all kinds of traffic out of country;
- Creation of information systems and provision of access for corporate and individual users;
- Provision of access to global information systems, including the Internet;
- Introduction of new kinds of services and conditions for the development of electronic document circulation for governmental bodies and management, commercial organizations, switching multimedia, videoconferencing, etc.

Existing condition of tele-communication networks of Uzbekistan

In the Republic of Uzbekistan, the operator responsible for the organization of access via the international channels to information networks of the Internet is the joint-stock company Uzbektelecom. Access to channels of the Internet is organized with the use of satellite and ground channels.

Existing means of Uzbektelecom have high throughput on the organization of the international channels in the European and Asian direction or transit through them. If necessary, there are opportunities for the organization of

channels through a satellite telecommunication facility.

In connection with the sharp growth of requirements for Internet services in Uzbekistan, work will be carried out to increase stage-by-stage throughput of channel UzPaK as a network for the Internet up to 1152 Kbit/s.

Now, the constructed main channels of a telecommunication network of the Republic of Uzbekistan (*fibre optic telecommunication lines – FOCL, and radio relay lines – RL*) allow high-speed data links (from 64 Kbit/s up to 2048 Kbit/s) to be organized in all areas of the Republic.

The national highway of the fibre optic telecommunication lines consists of 3 segments of various projects. Practically everywhere the equipment of access to FOCL and RL has an opportunity to allocate 2 Mbit/s-streams, and in some units STM-1.

On PSTN in the Republic of Uzbekistan, access now prevails on the basis of analog user's lines. Systems of ISDN access, wireless radio access are applied, and also the introduction of access technology has begun on the basis of fibre optical lines.

National data telecommunication network

The national data telecommunication network consists of networks UzPAK and UzNet.

The State data telecommunication network UzPAK uses packet switching technology. The service of data telecommunication network is carried out under protocols ITI (X.3/X.28/X.29), X.25, X.75, FR, SNA.

The inter-corporate information computer network UzNet provides an information exchange and access to the Internet network by users in the Ministries and Departments of the Republic, in some of the international organizations and representations in the Republic of Uzbekistan.

UzNet carries out output in the international networks, in particular on the Internet, through the international gate of network UzPAK.

Other data telecommunication networks

The central bank of the Republic of Uzbekistan has created a bank telecommunication network throughout the Republic.

Now construction of a data telecommunication network for the State tax committee of the Republic of Uzbekistan is being carried out.

Internet providers operate in the Republic of Uzbekistan offering services. For example: *Naytov, SITA, Amaliy aloqalar, Albatross, Sarkor, Globalnet, Techno-ProSystem, etc*.

A data telecommunication network of operators and providers offer the following services:

- Online Internet
- E-mail
- S.W.I.F.T.
- VISA
- Reuters
- Bloom-berg and others.

Some State bodies, ministries and departments have their own websites on which certain information concerning the conditions for developing branches' prospects is submitted, and the data promoting activation of foreign trade activities and attraction of foreign investments are published.

Basic requirements and principles of construction of the national Data Telecom munication Network

Basic requirements

The basic requirements that should be satisfied by projected network are the following:

- Maintenance of a highly reliable mechanism of transfer of various kinds of information (*data/voice/video/fax*) between subscribers to a telecommunication network within the framework of a uniform telecommunication space;

- Interaction with other networks for general purpose telecommunications, for example the Internet;
- Maintenance of the functional survivability of a network;
- Achievement of high efficiency of a network resources;
- Convenience in operation and easy management;
- Opportunities of updating maintenance and technical re-equipment, and openness to the introduction of new information technologies;
- Maintenance of information safety for users, systems of granting information services and internal systems of a network.

Technical principles

The technical principles incorporated in a basis of requirements for a created data telecommunication network in the Republic of Uzbekistan are developed proceeding from theory, practice and the conditions necessary and sufficient for the effective work of such a network.

Necessary conditions are:

- Presence of a real market of potential users of technical and commercial services of a data telecommunication network that is directly connected to an increase of the distributed databases in the country.
- Presence of a certain minimum of working local computer networks.
- Availability of an exchange of electronic information for the greatest possible number of users, specific to the remote territories and settlements (*this is especially important for the effective work of State bodies, public health services, education, finance, trade, industry, etc.*).
- Creation of professional users of IT resources concerning technologies accessible to a large majority and economy of data telecommunication networks.
- Necessity, for the requirements for the user environment, of characteristics and parameters of a network created on the basis of the international standards applicable to this task.

Sufficient conditions are:

- Conformity offered, agrees the given technical project of technical decisions to a level and rate of development of a national telecommunication transport network in a complex – in the centre, areas and to peripheries.
- Compatibility offered, it agrees the given technical project of technical decisions with existing technologies and the equipment for data telecommunication in working networks of Uzbekistan.
- Ability offered, it agrees tasks of technical decisions on maintenance of non-failure operation of the traffic service in settlement volumes for predicted amount of users at maximum achievable self-support of a network.
- Support of universal remedies of access (*reports, interfaces, etc.*) hardware and program base offered, it agrees the technical project of technical decisions for connection of the maximal number of users (*first of all, corporate, and also Internet service providers*), including using distinguished technologies.
- Guaranteed, offered technical decisions expansion of commercial opportunities of a network, for example, direct connection of individual users the Internet.
- Flexibility guaranteed by offered technical decisions concerning introduction of new technologies (*creation of wireless channels of connection to a network the Internet*) and expansions of a spectrum of services (*transfer of the videoimage on channels of a network, etc.*) both by escalating hardware and software, and by activization of new characteristics of the equipment offered for introduction on a projected network.

Development prospects of a data telecommunication network

With a view to expanding access to the international information networks, including the Internet, the program of modernization and development of the national Data Telecommunication Network of the Republic of Uzbekistan, on the basis of which organizational and technical measures as well as actions for modernization and development of a network for the whole Republic are determined, has been approved by the Government of the Republic of Uzbekistan.

Modernization and development of the National Data Telecommunication Network of the Republic of Uzbekistan is made on the following basic requirements:

- Introduction of modern technologies in data telecommunication providing an increase of throughput and reliability of a network, improvement of quality of service with the purpose of meeting most needs of the State bodies, enterprises, organizations and establishments, as well as the population of the Republic, in data telecommunication services;
- Introduction of new kinds of services, and conditions for developing them, and development of electronic document circulation to governmental and management bodies, telemedicine, multimedia, videoconferencing, Internet-café, etc.;
- Ordering and expansion of access to global networks of data telecommunication, including to the Internet network;
- Unification of interaction reports on a transport network and management reports on information resources;
- Ordering the application of satellite technologies with the purpose of rational use of a radio-frequency spectrum, maximal use of departmental lines of industrial technological telecommunication for the organization of data links on the National Data Telecommunication Network.

Pham Van Dzung
Chief of Bureau
Department General of Posts and Telecommunications – Viet Nam

Viet Nam

Telecommunication Development Country Report for Viet Nam

First of all, I would like to express my gratitude to ITU for giving me the opportunity to attend the roundtable session of the Telecommunication Development Symposium (TDS) at the event of ITU TELECOM ASIA 2002.

This important event is a good chance for us, regulators and policy-makers in Asia, to exchange information and views on the development strategies of the info-communications sector in the 21st century. In this regard, I would like to share with you, Excellencies and distinguished delegates, a brief review of the main regulatory changes and other key developments in the telecommunication industry in Viet-Nam, and an assessment of the industry's achievements during the past decade, as well as some of the major challenges facing it in the near future.

Telecommunication reform

A wave of telecommunication reform is sweeping the world and Viet-Nam is not an exceptional case. According to ITU's experts, there are three components of telecommunication reform – organizational reform of the incumbent (including corporatization and participation of foreign investment), the introduction of competition and the establishment of regulation. In the following, I will examine each of these components as implemented in Viet-Nam.

Organizational reform of the incumbent

Previously, there was no effective separation of regulatory and operational responsibilities. This situation ended in 1990 when Vietnam Posts and Telecommunications Corporation (VNPT), the incumbent operator, was established as a state-owned business.

Although the need for organizational reform of the incumbent is recognized, not much progress has been made. VNPT has a rather complicated and inefficient organizational structure. Besides the functional divisions at the head office and a number of auxiliary units (such as training centres) which may be located elsewhere, VNPT's sub-units also include the local posts and telecommunications (P&T) offices in the country's 61 provinces, and a range of subsidiaries or "member companies". Some of the latter are financially not distinct from VNPT as a whole, while others are largely independent from VNPT in terms of financial management. Since 1 July 2002, the post and telecommunication business at the district level has been separated nationwide.

Foreign investors were welcome for at least two reasons. First, the amount of capital required to carry out the much-needed investments for capacity expansion far exceeded the available funding (mainly from the State budget). Second, foreign technology was attractive in that it offered the promise of being able to quickly upgrade local systems

through an "up-to-date technology" process which bypasses outdated technology and directly accesses latest innovations.

The most outstanding achievements of the telecommunication sector of Vietnam over the pasts years is rapid modernization and expansion of the network. The foreign cooperation and investment has played an important role in this achievement. In 1988, the first foreign direct investment (FDI) project in this industry was established by VNPT and Telstra (Australia). By 2002, a total of 25 FDI projects had been approved with the total value of capital committed in these projects of more than USD 1.2 billion.

It is expected that foreign investment policy in telecommunication will be changed dramatically in the next few years due to the impact of the Vietnam-US Trade Agreement that was signed in July, 2000. In this Agreement, the telecommunication services market will be fully opened to the American partners in December 2007 (joint venture enterprises provided that the capital contribution of the foreign side may not exceed 49% and 50% of the legal capital of the joint venture to provide basic services and value-added services respectively).

Introduction of competition

Before 1995, VNPT was the only company which provided post and telecommunication services. In 1995, the Government took the first step towards demonopolising this market by allowing two other domestic companies to provide telecommunication services: the Military Electronics and Telecom Company (Vietel), and Saigon Posts and Telecommunications Corporation (Saigon Postel, or SPT), both of which were established in 1995.

Initially, Vietel and SPT were allowed to compete with VNPT only in the provision of fixed-access using WLL technology, mobile, paging, radio trunking and Internet services. By March 2000, Vietel was licensed to provide Hanoi-HoChiMinh domestic long-distance services using IP technology on a trial basis. SPT signed a BCC with SLD Telecom (Korea) in order to deploy a mobile network. At the beginning of 2001, the latest operator was allowed to provide telecommunication services: Vietnam Electric Telecommunication Company. VNPT, Vietel, SPT and ETC have licensed to provide international and long-distance services using IP technology by July 2001.

The Internet was officially introduced in 1997 with Government Decree 21/CP. Since then, five local companies have been licensed to provide Internet services. These Internet service providers (ISPs) include VNPT, Vietel, SPT, and two other players: FPT and Netnam. Moreover, VNPT remains the only licensed Internet access provider (IAP) to provide international connection to the Internet backbone. In 2001, new Internet regulation was enacted with a view to boosting up the Internet development in Vietnam. The monopoly status of IAP was ended and a lot of ISPs have been licensed since new Internet regulation was issued.

However, even after the considerable changes which have occurred in recent years, VNPT remains dominant both overall and in most segments of the telecommunication market. The only exception to this is the ship-to-shore, shore-to-ship maritime communication services, Inmarsat access services and Inmarsat services submarket, in which Vietnam Shipping Communications and Electronics Company (VISHIPEL), owned by the Ministry of Transport,) shares the market with VNPT.

Establishment of regulation

Previously the functionality of both Department General of Posts and Telecommunications (DGPT) and VNPT were vested in the same State agency and there was no effective separation of regulatory and operational responsibilities. This situation ended in 1990 when VNPT was established as a State-owned business and the regulatory function was carried out initially by the Post and Telecommunications Department within the Ministry of Transportation (from 1990 to 1992), and then DGPT (from May, 1992 to August 2002) and now Ministry of Post and Telecommunications.

Historically, posts and telecommunications services in Viet Nam have always been administered together. At present, both types of services are regulated by

DGPT, whose responsibilities also encompass the management of radio frequency. The Government (at Cabinet level) determines broad policies governing the industry, and DGPT provides detailed policies, regulation and guidelines as to how the governmental policies are to be interpreted and implemented in practice, and supervises compliance.

At present, Government Decree 109/1997/ND-CP (12 November 1997) on Posts and Telecommunications is, highest level legal framework in the field of posts and telecommunications. Although the telecommunication market has been opened up to additional service providers since 1995, the Decree 109/ND-CP has continued to limit eligibility for such a role to entities which are either fully State-owned or joint-stock companies in which the state holds a "dominant or special share". However, the participation of the private sector will be promoted now that the Posts and Telecommunications Ordinance (Act) has come into effect since 1 October 2002.

Achievements

There can be no doubt that growth in coverage and total usage has been spectacular, albeit from a low base. While population and real GDP growth have been around 2 and 6-8% per year, respectively, the number of fixed lines was doubling every two or so years, and the number of mobile phones almost doubled every year. Similarly, the number of long-distance domestic calls doubled in three years. Statistics concerning the total traffic of distance (both domestic and international) calls also show very rapid growth. It is particularly interesting to note the marked widening in the geographical and socio-economic coverage provided by the existing networks: by the end of 2001, about 89% of the country's communes had access to telephone services compared to only 8% in 1991.

Future development plan

The Government's telecommunication policy is formally set out in a Decision of the Prime Minister (Decision No. 158/2001/QD-TTg of 18 October 2001 Ratifying Vietnam Post and Telecommunications Development strategy Till 2010 and Orientation Till 2020). The Decision provides a comprehensive range of sector development objectives and targets together with the key underlying strategies for their achievement.

The telecommunication policy specified in the Decision sets out a number of key goals and targets. Among these are:

- by 2010, the number of telephone sets and Internet users per 100 people shall reach the regional average;
- by 2005, all provinces and cities throughout the country shall be linked together by broadband optic fibre cables; and
- by 2010, the average telephone density shall reach 15-18 telephones per 100 people and 60% of households will have telephones.

Given the current state of telecommunication development in Viet Nam, these represent significant development targets. For example, Viet Nam currently has around 5 million telephone lines (fixed and mobile) giving a teledensity of around 6.3% people. The target penetration level requires the current teledensity to increase 3 fold in the space of 8 years. That is, an additional 9.4 million lines. The estimated capital cost for achieving this target would be in the order of USD 9,400 million in total or USD 1,175 million *per annum*.[1]

Challenges

Despite a number of other important regulatory changes, the telecommunication sector of Vietnam is still faced with great challenges. Due to the inefficiency of the operators, telecommunication services are not available at affordable prices for the socio-economic development. By regional standards, Vietnam's telecommunications prices, especially international calls, remain some 25-50% higher than elsewhere in the region.

[1] This assumes that the cost of installing each main telephone line is USD 1,000. This figure is a standard benchmark used to illustrate the cost of telecommunication infrastructure development around the globe.

Viet Nam joined ASEAN and APEC in 1995 and 1998, respectively. As a member of ASEAN and APEC and in the process of proceeding to the accession to WTO, the Viet Nam economy in general (and telecommunication in particular) has entered a time when it is directed by the global trends. A range of telecommunication policies has been recently issued and amended to adapt to the requirements of the new era. Under the terms of AFTA and APEC, Viet Nam has pledged to further open its telecommunication market. Therefore, Vietnamese carriers and service providers will need to be developed under the true, level-playing-field competitiveness domestically in order to have any hope of being competitive in the international competitive environment.

Conclusion

During the last decade, considerable changes have occurred in Viet Nam's telecommunication sector. Policy and regulatory changes have played a key role in that they have allowed foreign investors and domestic service providers to respond to both accumulated and growing demands for up-to-date services. As a result, the country has made significant strides towards catching up with regional and international standards.

As a member of the ITU family, we are delighted that the cooperation programmes are under way, boosting and consolidating the tradition of solidarity and friendship in the telecommunication world. ITU's initiatives and programmes are significantly facilitating member countries to keep pace with the evolution of information technology and bridging the digital divide as we enter the knowledge-based economy.

Once again, on behalf of the Department General of Posts and Telecommunications of Viet Nam, I would like to express my sincere thanks to ITU and may I wish ITU TELECOM ASIA 2002 a great success.